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Feature	Definition	Scenario 1 (BASE)	Scenario 2	Scenario 3	Scenario 4 (ADVANCED)	Self-assessment of the city (for Pan-City Solution) with regard to each feature	Basis for assessment and/or quantitative indicator (Optional - only if data exists)	Projection of 'where the city wants to be' with regard to the feature/indicator	Input/Initiative that would move the city from its current status to Advanced status (Scenario 4: Column G)
Citizen participation	A smart city constantly shapes and changes course of its strategies incorporating views of its citizen to bring maximum benefit for all. (Guideline 3.1.6)	The City identifies priorities and projects to pursue without consulting citizens.	City undertakes citizen participation with some select stakeholders. The suggestions are compiled and incorporated in some projects or programs. Very few major decisions are communicated to citizens until final projects are unveiled.	City conducts citizen engagement at city level and local area level with most stakeholders and in most areas. The findings are compiled and incorporated in projects or programs.	City constantly conducts citizen engagement with people at ward level to incorporate their views, and these shape priorities and development projects in the city. Multiple means of communication and getting feedback, both face-to-face and online are utilised. The effectiveness of city governance and service delivery is constantly enhanced on the basis of feedback from citizens.	Scenario 3	<ul style="list-style-type: none"> City Level Plans incorporate multi-round stakeholder consultations Active involvement of civic groups, NGOs and citizens' forums Initiated citizen engagement for Ongoing projects like AMRUT, HRIDAY, Smart Cities Challenge etc. The city has three modes of online grievances i) Lok Sewa Adhinyam Guarantee: 31754 complaints have been registered till 31st March 2016, out of which 31712 complaints have been addressed and the remaining have been rejected ii) Samarak: This portal is under local self government and till date 627 complaints have been registered, out of which 581 have been resolved and the remaining are pending. Complaints through this portal also directed to Ajmer Municipal Corporation and till date 611 complaints have been registered, out of which 508 have been resolved and 60 complaints are pending from collectorate and the remaining 43 complaints are pending from AMC. iii) Electronic Helpline: Complaints under this mode are resolved by AMC. <p>In the year 2013- 2014, 11876 complaints were registered out of which 14,997 were solved. In the year 2014- 2015, 19423 complaints were registered and 15462 complaints were resolved and in the year 2015-2016, 20927 complaints were registered and 15780 complaints have been solved.</p> <p>Mobile Apps Ajmer 311 and Smart Ajmer 311 have been launched for citizens and employees of AMC</p>	AMC believes that it can move its Citizen Engagement to Scenario 4 in the next 5 years by enabling citizen engagement through multiple communication channels and modes both online and in person consultations and enable citizen centric development for Ajmer.	<ul style="list-style-type: none"> Promote the existing modes of citizen engagement platforms Strengthening consultative forums at the ward-level Developing comprehensive Citizen Engagement Platforms Launch awareness programmes & knowledge dissemination initiatives Development of a dynamic websites of all government agencies giving access to public information.
Identity and culture	A Smart City has a unique identity, which distinguishes it from all other cities, based on some key aspect: its location or climate; its leading industry, its cultural heritage, its local culture or cuisine, or other factors. This identity allows an easy answer to the question "why in this city and not somewhere else?" A Smart City celebrates and promotes its unique identity and culture. (Guideline 3.1.7)	There are few architectural monuments, symbols, and festivals that emphasise the unique character of the city. Built, natural and cultural heritage is not preserved and utilised or enhanced through physical, management and policy structures.	Historic and cultural resources are preserved and utilised to some extent but limited resources exist to manage and maintain the immediate surroundings of the heritage monuments. New buildings and areas are developed without much thought on how they should reflect the identity and culture of the city.	Historic and cultural heritage resources are preserved and utilised and their surroundings are well-maintained. Public spaces, public buildings and amenities reflect the cultural identity of the city.	Built, natural and intangible heritage are preserved and utilised as anchors of the city. Historical and cultural resources are enhanced through various mediums of expression. Public spaces, open spaces, amenities and public buildings reflect local identity and are widely used by the public during festivals, events and activities.	Scenario 3	<ul style="list-style-type: none"> 1. No. of Heritage assets (Dargah, Adhai Din ka Jhopda, Nassiya Jain Temple, Akbar fort, Taragarh fort, Shah Jahan's Mosque etc.) 2. No. of parks / water bodies example - Anasagar Lake, Foyasagar Lake, Dualat bagh 3. No. of historical educational institutions- Mayo College 4. Ongoing Schemes- HRIDAY & PRASAD for conservation & preservation of heritage sites 5. Tourist Inflow in Ajmer <p>Year 2013- 4241880 domestic, 27016 International Year 2014- 4245710 domestic, 33069 International Year 2015- 56300 domestic, 36423 International</p>	Ajmer aspires to move to Scenario 4 within 10 years, by upgrading and retrofitting existing heritage areas through conservation projects, lake restoration, preserving historical educational institutions	<ul style="list-style-type: none"> Key interventions identified include the following: 1. Developing Tourist infrastructure, tourist circuits with focus on differently abled. 2. Installing Public Art installation, Sculptures and Street Paintings, Ajmer Heritage Film Museum 3. Tourist information Centre at public places 4 in no, kiosks, 10 Public conveniences, Pedestrian friendly walkways to connecting Dargah area to railway station through sky walks and Frontage improvement of shop's frontage and footpath and developing a location finder: A city guide app, with information about museums, parks, landmarks, public art, restaurants, Property number and real-time traffic data.
Economy and employment	A smart city has a robust and resilient economic base and growth strategy that creates large-scale employment and increases opportunities for the majority of its citizens. (Guidelines 2.6 & 3.1.7 & 6.2)	There are a few job opportunities in the city which do not reach all sections of the population. Majority of opportunities in the informal sector without sufficient facilities.	There is an entire range of job opportunities in the city, for all sections of the population having different skills and abilities. The city attempts to integrate informal economic activities with the formal sector.	There are adequate job opportunities for all sections of society. But skill availability among residents can sometimes be a challenge.	There are adequate job opportunities for all income groups and skill levels. Job-oriented skill training supported by the city and by industry. Economic activities are suited to and built on locational and other advantages of the city.	Scenario 1	There are very less opportunities for the youth in Ajmer, therefore they have to migrate outside Ajmer in lieu of better job opportunities	Ajmer aspires to aggressively work to shift the scenario toward 3 in next 10 years by developing initiatives such as skill development centres, ease of doing business, IT Centres etc.	<ul style="list-style-type: none"> Key interventions identified include the following: 1) Promotion of Tourism with a focus on eco-tourism- Development of tourist circuits and infrastructure upgradation 2) Ease the environment for doing or starting business 3) Developing Multi-Skill Institute for skill upgradation, a green high tech Incubation & Innovation center, Business Improvement District - Integrating commercial areas 4) Development of Multi-storeyed (10 Nos.) commercial property
Education	A Smart City offers schooling and educational opportunities for all children in the city (Guideline 2.5.10)	The city provides very limited educational facilities for its residents. Limited number of schools, compared to the demand. Many schools are in poor shape.	City provides adequate primary education facilities, within easily reachable distance of 15 minutes walking for most residential areas of the city. The city also provides some secondary education facilities.	City provides adequate primary and secondary education facilities within easily reachable distance for most residential areas of the city. Education facilities are regularly assessed through -databases of schools including number of students, attendance, teacher-student ratio, facilities available and other factors.	City provides adequate and high-quality education facilities within easily reachable distance of 10 minutes walking for all the residential areas of the city and provides multiple options of connecting with specialised teaching and multi-media enabled education. Education facilities are regularly assessed through database of schools including number of students, attendance, teacher-student ratio, facilities available and other factors.	Scenario 4	<ul style="list-style-type: none"> No. of primary schools- 118 no. government, 71 no. private Secondary Schools- 117 no. government, 147 no. private Higher Secondary School- 85 no. government, 160 no. private No. of renowned educational institutions (Mayo College, Sophia School, St. Mary's Convent School, DAV School) No. of new professional colleges/ courses have been introduced 	The city aspires to aggressively work to shift towards scenario 4 in next 10 years by developing centres of educational excellence in the city	<ul style="list-style-type: none"> Key interventions identified include the following: 1) Development of Educational Hub 2) Strengthening the existing professional/ university courses 3) Promoting smart classes in institutions 4) Upgrading infrastructure of public schools Digitization and upgradation of city & school libraries 5) Establishment of 1 Regional Science Centre
Health	A Smart City provides access to healthcare for all its citizens. (Guideline 2.5.10)	Difficult access for citizens - demand for healthcare often exceeds hospitals' ability to cater to the residents.	The city provides some access to healthcare for its residents but healthcare facilities are overburdened and far from many residents. Access to preventive health care easily available for some residents only.	City provides adequate health facilities within easily reachable distance for all the residential areas and job centers of the city. It has an emergency response system that connects with ambulance services.	City provides adequate health facilities at easily accessible distance and individual health monitoring systems for elderly and vulnerable citizens, which are directly connected to hospitals to prevent emergency health risks and to acquire specialised health advice with maximum convenience. The city is able to foresee likely potential diseases and develop response systems and preventive care.	Scenario 2	<ul style="list-style-type: none"> Jawaharlan Nehru Hospital- 918 (bedded) Govt. Mahila Hospital- 290 (bedded) Kamla Nehru Skin Disease Hospital - 50 (bedded) Govt. Satellite Hospital- 50 (bedded) Government Dispensary (12 in number) - 72 (bedded) Ayurvedic Government Hospital- 2 in no Ayurvedic Government Dispensary- 5 in no Gaps in Beds vis-à-vis norms Availability of emergency response ambulance Presence of multi-speciality hospitals. Availability of insurance schemes for poor 	The city aspires to shift towards scenario 3 in next five years by expanding and modernising its healthcare facilities to become an eminent health care hub for the region. It also aspires to strengthen its access for the needy to modern healthcare by expanding public healthcare capacity including upgrading the government hospital to a state of art multi speciality hospital	<ul style="list-style-type: none"> Key interventions identified include the following: 1) Development of Multipespeciality hospital 2) Mobile Tele-health services, which connect hospitals to remote facilities for consultation, diagnosis, and sometimes training
Mixed use	A Smart City has different kinds of land uses in the same places; such as offices, housing, and shops, clustered together. (Guidelines 3.1.2 and 3.1.2)	The city has mostly separated uses and areas are focused either on residential, commercial, or industrial, with little co-existence of uses. The average resident cannot walk to the closest market or shops, near his or her home. For almost everyone, going to work or going shopping for basic needs requires, a journey by automobile or bus of more than 15 minutes. Land use	In some parts of the city, there is a mix of land uses that would allow someone to live, work, and shop in close proximity. However, in most areas, there are only small retail stores with basic supplies near housing. Most residents must drive or use public transportation to access a shop for food and basic daily needs. Land use rules support segregating housing, retail, and office uses, but exceptions are made when requested.	Most parts of the city have housing, retail, and office buildings in close proximity. Some neighborhoods have light industrial uses within them (e.g., auto repair, craft production). Land use rules allow for mixed uses.	Every part of the city has a mix of uses. Everyone lives within a 15-minute trip of office buildings, markets and shops, and even some industrial uses. Land use rules encourage or encourage developers to incorporate a mixture of uses in their projects.	Scenario 4	Urban Development is guided by the draft Master Plan of Ajmer	The city aspires to be in scenario 4 in the coming 5 years. This can be done by getting the draft master plan approved and ensuring the implementation of the master plan	<ul style="list-style-type: none"> Key interventions identified in the ABD area include the following: 1) Development of designated vending zone in the market area
Compact	A Smart City encourages development to be compact and dense, where buildings are located close to one another and are ideally within a 10-minute walk of public transportation, forming concentrated neighborhoods. (Guidelines 2.9 and 5.2)	The city is expanding rapidly at its periphery into undeveloped land, rural or natural areas, or along industrial corridors - both formally and informally. Formal new development is occurring in a way that is "sprawling," meaning that the buildings spread across a	The city has one or two high density areas - such as the city center, or historic areas, where buildings are concentrated together and where people can walk easily from building to building and feel as though they are in center of activity. Most of the city consists of areas where buildings are spread out and	The city has multiple high density clusters that are easy to walk around where buildings are close together. However, the city actively encourages development to occur on under-utilized parcels of land into high-density, walkable areas. When new formal large-scale development	The city is highly compact and dense, making the most of land within the city. Buildings are clustered together, forming walkable and inviting activity centers and neighborhoods. Regulations encourage or incentivize re-development of under-utilized land parcels in the city	Scenario 3	It is measured by the share of two wheelers in trips and population density across city	The city aspires to reach scenario 4 in the next five years by transit oriented development as a key theme which would be followed by preparation of City Mobility Plans along with planned and systematic infrastructure development to facilitate planned development	<ul style="list-style-type: none"> Key interventions identified include the following: 1) Frontage improvement of shop's frontage and footpath in the ABD area
Public open spaces	A Smart City has sufficient and usable public open spaces, many of which are green, that promote exercise and outdoor recreation for all age groups. Public open spaces of a range of sizes are dispersed throughout the city so all citizens can have access. (Guidelines 3.1.4 & 6.2)	The city has very few usable public open spaces and very few low-usable green spaces. Available recreational spaces are located far away and are dispersed at long distances around the city. The few available public open spaces offer a limited variety of experiences for all sections of population and age groups such as places for sport, places for rest, and places for play.	A variety of public open spaces are available in some neighborhoods, but are not available in all the areas of the city or are located far away from residential areas. Many of the open spaces have access restrictions, or are not well-maintained. A variety of types of public open spaces may be lacking, such as natural areas, green areas, parks, plazas, or recreation areas.	Most areas of the city have some sort of public open space. There is some variety in the types of public spaces in the city. However, public spaces are sometimes not within easy reach or access of more vulnerable populations and are more restricted in poorer neighborhoods.	Public open spaces are well dispersed throughout the city. Every residential area and work space has access to open space within 10 minutes walking distance. Open spaces are of various types - natural, green, plazas, parks, or recreation areas - which serve various sections of people. Public spaces tend to truly reflect the natural and cultural identity of the city.	Scenario 3	<ul style="list-style-type: none"> Housing Area Park- 54 no (48611.87sqm) Neighbourhood Park - 29 no (94980.51) Community Park- 34 no (369691.87) 	Ajmer aspires to reach scenario 4 in the coming 5 years by conserving the existing lakes by their beautification and cleaning. Development of theme based green parks and open spaces. Development of Eco Mobility Corridor along the Anasagar Lake and Foyasagar Lake	<ul style="list-style-type: none"> Key interventions identified include the following: 1) Park Development including fencing, green development, water sprinklers, jogging / cycle tracks, children play equipment, and park furniture with focus on elderly and differently abled people etc in 10 hac of area 2) Development of Open gym in existing Parks 3) Select Parks are to be developed as theme based parks for children and elderly with focus on differently abled 4) Mega Amusement Park 1 in no 5) Open Air Amphitheatre, Promenades/ Plaza- 4.5 ha 6) Park pathways with cycling/walking tracks - 5.5 km 7) Select Parks are to be developed as theme based parks for children and elderly with focus on differently abled 8) Choreographed Musical Fountain with Laser show 9) Boating & Water Sports Facility 10) Development of Heritage Museum at Island- 1 in no
Housing and inclusiveness	A Smart City has sufficient housing for all income groups and promotes integration among social groups. (Guidelines 3.1.2)	Housing is very limited and highly segregated across income levels. Population growth far exceeds the creation of new housing. The poor live in informal settlements with limited or no access to basic services, and are concentrated in a few areas. The wealthy live in separate enclaves. Those in the middle have few options.	Housing is available for people of most income levels but is highly segregated across income levels. Population growth slightly exceeds the creation of new housing. The wealthy and the middle class have housing that meets their needs at costs appropriate to their income. The poor live in informal settlements.	Housing is available at all income levels, but is segregated across income levels. The growth in supply of housing almost meets the rate of population growth. Increasingly, lower and middle-income people can find housing in areas that are conveniently located.	A wide range of a housing is available at all cost levels. The supply of housing is growing at pace with population. Affordable, moderate, and luxury housing are found clustered together in many areas of the city	Scenario 4	<ul style="list-style-type: none"> The city had 81396 units against the 82249 households. Thus, there was a shortage of 853 houses and out of the existing stock, 1323 units were in a very dilapidated condition which was not livable, hence the total shortage was 2176 in 2011. As per Census, 2011, there are 103208 households in Ajmer and there is a housing shortage of 29811units. 	Ajmer aspires to be slum free in the next 5 years	<ul style="list-style-type: none"> Key interventions identified include the following: 1) Plan for creation of stock of affordable housing projects identified under Housing for All.
Transport	A Smart City does not require an automobile to get around; distances are short, buildings are accessible from the sidewalk, and transit options are plentiful and attractive to people of all income levels. (Guidelines 3.1.5 & 6.2)	Personal automobile centric city with very few modal options. Long trip lengths for daily commute to work and education. Accessing various areas by walking or cycling is difficult. Women and vulnerable sections find it very difficult to move independently in the city. There is limited public transport. Vehicles cause high air and noise pollution in the city. Vehicles occupy public spaces and affect their effective functioning.	The street network system is elaborate but public transport choices are restricted. Public transport is too expensive or unaffordable for the poor. Pedestrian infrastructure is only available in select areas. Majority of investments' focus on reducing traffic congestion through laying of more roads.	Network of streets is fairly complete. Public transport covers most areas of the city. However last mile connectivity remains incomplete and affects transport options. Foot paths are accessible in most areas, whereas concerns of safe crossings and security throughout the day remain. Parking zones are demarcated but absence of revenues from the parking lots.	Street network is complete and follows a clear structure. Public transportation network covers the entire city and intensity of connection relates with the demand. Plenty of options of public transport are available at affordable rates for all sections of the society. There is multi-modal integration at all mass transit stations and organized-priced on street and off street parking. Walking and cycling is prevalent.	Scenario 2	<ul style="list-style-type: none"> 1) Availability of public transport- 40% 2) Non-Motorised transport facilities a) % of network covered- 5% b) Encroachment on NMT roads by vehicle parking- 0% 3) Level of usage of Intelligent Transport System (ITS) facilities a) Availability of Traffic Surveillance- 5% b) Passenger Information System- 5% 4) Parking: Availability of on street paid public parking spaces (%) - 5% 	The city aspires to be in Scenario 4 in the next 10 years by developing a mass transit system on selected corridors along with investments in public transport, making investments in bus and freight terminals, multi level car parkings, developing facilities for non motorised transport and pedestrian movement, upgrading the existing road network including geometry, widening, grade separation, signalisation and new road formations	<ul style="list-style-type: none"> Key interventions identified include the following: 1) Multilevel modern centralised bus stand in the city 2) Upgradation of Passenger facilities 3) Multi-Level Car parking - 2 Locations 4) Open Car Parking at 3 Locations 5) Road surfacing- 51.71 km 6) Development of Underground utility corridors -20.68 km 7) Multi Level Flyover (from Martindale bridge – Station Road – Agra Gate – Old RPSC to bus stand)- 3.60 km 8) Covering and developing of Anasagar Escape Channel for circulation 9) BOS - Along with Passenger Information System- 66 in no 10) New Mini Buses for Ajmer-Pushkar City- 30 in no 11) GPS based Electronic Ticketing Machine (ETM)- 40 in no 12) Bus Driver Console with GPS- 40 in no 13) GPS based ETM- 35 in no 14) Bus driver console with GPS- 35 in no

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Walkable	A Smart City's roads are designed equally for pedestrians, cyclists and vehicles; and road safety and sidewalks are paramount to street design. Traffic signals are sufficient and traffic rules are enforced. Shops, restaurants, building entrances and trees line the sidewalk to encourage walking and there is ample lighting so the pedestrian feels safe day and night. (Guidelines 3.1.3 & 6.2)	The city is designed mainly for the automobiles. Daily life without a car requires long bus rides. Walking is difficult and often dangerous; there are few pavements, existing pavements need repair and lack trees to provide shade for pedestrians, and marked pedestrian crossings are rare. New buildings have their main entrances set-back from the street, sometimes with large driveways or parking lots separating them from the street, and sometimes are enclosed by gates. Traffic signals are often disobeyed.	Older areas of the city see a mix of pedestrians, cyclists, and vehicles but newer areas are focused mainly on the automobiles. In the new areas, there are few pavements and main entrances to new buildings are not accessible from the front of the street. Large driveways or parking lots often separates them from the street, and sometimes are enclosed by gates. In these areas, traffic signals are disobeyed.	The city has a good network of pavements and bike lanes. Buildings in most areas of the city are easily accessible from the pavement. However, traffic signals are sometimes disobeyed and it feels difficult to cross the street.	The city is highly walkable. Pavements exist on every street and are maintained. Trees line many sidewalks to provide shade for pedestrians. Buildings in most areas of the city are easily accessible from the sidewalk. Traffic signals control the flow of automobiles and are enforced. A network of bike lanes exists to promote cycling as a means of transport. Traffic rules are followed and enforced with great seriousness.	Scenario 2	The city currently has very few walkways in good condition. At most of the places, walkways & pathways have been encroached.	Ajmer aspires to move to Scenario 3 in next 3 years by promoting Non motorized transport, developing footpaths and pathways which would be user friendly including the elderly, differently abled and children.	Key interventions identified include the following: 1) Development of cycle track/ walkway around Anasagar Lake- 5.5 km 2) Total length of footpaths/ cycle tracks in ABD area- 51.71 km (50% of the roads in ABD area) 3) Fobs escalators- 5 4) Enhancement of walkability from neighbourhood of ABD to eco-mobility corridor with the focus on Differently abled and elderly
IT connectivity	A Smart City has a robust internet network allowing high-speed connections to all offices and dwellings as desired. (Guideline 6.2)	City has no major plans to introduce enhanced high speed internet connectivity to the public.	The city has plans to provide high speed internet connectivity through the existing framework.	The city makes high speed internet connectivity available in most parts of the city.	The city offers free wifi services to provide opportunity for all the citizens to connect with high speed internet across the city.	Scenario 2	Plans of the city related to internet connectivity Details of Internet Connections- BSNL 2011- 2012- 9676 connections 2012-2012- 10172 connections 2013-2014- 10338 connections 2014- 2015- 10320 connections 2015- 2016- 10973 connections Ajmer Municipal Corporation and Collectorate have provided 4 G Wi Fi connectivity to its employees to enable them fast and non interrupted internet connectivity.	The city aspires to reach scenario 4 by build an array of sophisticated ICT solutions and building on the intrinsic wifi/broadband network advantages covering (i) upgrading to a Web based e-governance and enterprise solution which is currently underway, (ii) enabling seamless service delivery on tap through web-enabled services and citizen service centres that are already in place and extending the same through mobile apps for wider reach, (iii) SCADA-based management of infrastructure services (water supply, sewerage), (iv) GPS-enabled intelligent transport solutions and vehicle tracking solutions and (v) City surveillance through a CCTV network and central monitoring and control room	Key interventions identified include the following: 1) Engage with private service providers to expand coverage and create wifi hotspots in important areas of the city like bus stand, railway station, public libraries, education institutes 2) Developing a smart app for Ajmer 3) Introduce Intelligent Transport Systems (ITS) for traffic management (tracking traffic rules violation and clearing traffic congestion). Introduce IT based application for commuters – smart cards, developing passenger information system, and tracking public transport vehicles
ICT-enabled government services	A Smart City enables easy interaction (including through online and telephone services) with its citizens, eliminating delays and frustrations in interactions with government. (Guidelines 2.4.7 & 3.1.6 & 5.1.4 & 6.2)	Essential Government services are not linked with online platforms. Paper intensive interactions with the local Government continues. Receiving services and response to citizen complaints take a long time. There is limited availability of data to monitor service delivery.	Some of the public services are provided online and infrastructure for total digitalization is not in place. Service delays occur regularly in some sectors. Responses to citizen inquiries or complaints are often delayed. No integration between services and billing.	Most of the services are provided online and offline. Data transparency helps monitoring. System and processes to better coordinate between various Government agencies are being developed.	All major services are provided through online and offline platforms. Citizens and officials can access information on accounting and monitor status of projects and programs through data available on online system. Robust data infrastructure system shares information and enhances internal government coordination.	Scenario 2	Presence of an active ULB website Facility for Online payments and service centres Grievance redressal At present 26 modules are working online	Ajmer aspires to move into scenario 3 in the next 3 years by (i) upgrading to a Web based e-governance and enterprise solution which is currently underway, (ii) enabling seamless service delivery on tap through web-enabled services and citizen service centres that are already in place and extending the same through mobile apps for wider reach, (iii) SCADA-based management of infrastructure services (water supply, sewerage), (iv) GPS-enabled intelligent transport solutions and vehicle tracking solutions and (v) City surveillance through a CCTV network and central monitoring and control room. Leverage social media and crowd sourcing platforms to strengthen citizen engagement and their role in decision making	Key interventions identified include the following: 1) Ajmer City domain specific mail service 2) Enabling Data transparency which will help in monitoring. Initiatives to create single platform for citizen for dealing with all government agencies like AMC, PHED, AVNVL, RTO, ADA etc 3) Develop integrated command and operation centres- To monitor process and relay information using smart applications for ensuring safety against crime, regulate traffic and enable expeditious emergency and disaster response. 4) City performance dashboards to monitor the performance of city subsystems through digital technologies and big data analytics to manage city governance 5) LED displays across the city with latest updates & information. 6) City Mobile Apps with information about museums, parks, landmarks, public art, restaurants, Property number and real time traffic data. 7) Digitization of revenue records and completion of GIS mapping
Energy supply	A Smart City has reliable, 24/7 electricity supply with no delays in requested hookups. (Guideline 2.4)	There is only intermittent electricity supply with regular power shedding. Many residents have to plan their days around when power is available.	Electricity supply and loads are managed as per demand and priority for various functions with clear scheduling, with electricity being available in many areas for most hours of the day.	Electricity is available in most parts of the city for most hours of the day but some areas are not so well-served. Smart metering exists in some parts of the city but not all.	Electricity is available 24 x 7 in all parts of the city with smart metering linked to online platforms for monitoring and transparency.	Scenario 2	99.6% of the city's population by grid based power. Nearly 5% of the total power supply in the city comes from renewable sources of energy. Scheduled tripping of existing 28 feeders (of 11 KV each) is 8 times for 4-5 hours in each feeder in a month. Unscheduled tripping of each feeder is 3 times for approximately 1 hour.	Ajmer aspires to be in Scenario by energy sourcing and network and plans investments in upgrading the network to improve reliability and consistency while reducing losses from current levels within the next five to seven years. It seeks to build on the state's vision to emerge as a power surplus state while encouraging and incentivizing citizens to continue adoption of green energy.	Key interventions identified include the following: 1) Solar panelled roofs, LED Lighting and Light posts- 280 no 2) In Progress/ Completed - Conversion of existing lamps to LED along with CCMS- 33000 in no 3) Intelligent street lights Installation of Solar Panels with battery, Autotimers, smart meters, GSM Module- 33000 in no 4) GIS Mapping of street lighting 5) Wi-Fi, air pollution monitoring, mosquito monitoring, transportation support, and locate parking spaces for stressed-out motorists, reroute cars and trucks as necessary 6) Installation of smart meters- 18420
Energy source	A Smart City has at least 10% of its electricity generated by renewables. (Guideline 6.2)	The city does not have any renewable sources of energy and there is no commitment to promote in the foreseeable future.	The city is preparing plans for ensuring that it gets more energy from renewable sources and is in the process of making commitments in this regard.	Small proportion of energy consumed is the city is produced through renewable sources. There are long term targets for higher renewable energy capacities and the city is making plans to achieve those.	At least 10% of the energy consumed in the city is generated through renewable sources. The city is undertaking long-term strategic projects to tap renewable sources of energy in its region/beyond to increase the percentage of renewable energy sources.	Scenario 2	Initiatives have been taken by installing 32000 LED street lights and solar panels. Ajmer Nagam Nigam has taken an initiative of installing solar panel of 30 KW solar grids on the roof top of Nagar Nigam building.	Ajmer aspires to reach scenario 3 in the next five years by harnessing solar energy on the roof tops of the buildings, street lights, open spaces, parks and gardens. Shifting towards electronic digital meters that enable two way reading. Creating awareness among the citizens to use solar energy	Key interventions identified include the following: 1) Implement solar roof-top projects in all large government, institutional and residential buildings- 55 no of buildings 2) Solar Power panels at public buildings, Open Parks, Anasagar Lake Establishment of Akshay Urja shop in the city.
Water supply	A Smart City has a reliable, 24/7 supply of water that meets national and global health standards. (Guidelines 2.4 & 6.2)	The city has a poor water supply system with limited water availability. There are no clear targets to achieve higher quality and optimal quantity standards. Unaccounted water loss is above 40%.	The city has intermittent water supply and availability. However it is setting targets and processes in place to try to improve its water supply. Unaccounted water loss is less than 30%.	The city has 24 x 7 water supply in most areas but the quality of water does not meet international health standards. Unaccounted water loss is less than 20%.	The city has 24 x 7 treated water supply which follows national and global standards and also available in sufficient quantity and affordable across all sections of the society. Unaccounted loss less than 15%.	Scenario 2	Coverage of water supply connections- 92% Per capita supply of water- 135 LPCD Extent of metering of water connections- 70% Extent of non-revenue water- 30% Quality of water supplied- 100% Cost recovery in water supply services- 33% Efficiency in collection of water supply related charges- 80% Average daily hours of water supply- 1 hr 15 min % of households connected by pipelines- 92%	Ajmer aspires to shift to Scenario 3 in the coming years by implementing ongoing water supply initiatives under JNNURM and AMRUT scheme for the city	Key interventions identified include the following: 1) OMSR & Related works 2) Installation of meters: 4107 3) Pipelines- 15.01 km 4) Smart Metering: 18, 481
Water management	A Smart City has advanced water management programs, including smart meters, rain water harvesting, and green infrastructure to manage stormwater runoff. (Guideline 6.2)	The city does not measure all its supply. It does not recycle waste water to meet its requirements and rain water harvesting is not prevalent. Flooding often occurs due to storm water run-off.	The city has meters for all its water supply but lacks mechanisms to monitor. Water wastage is very high. Not much rainwater harvesting projects exist.	The has meters for all its water supply with some smart mechanisms to monitor. Rainwater harvesting systems are installed and storm water is collected and stored in water bodies. However, recycling of waste water and reuse of storm water is limited.	The city has meters for all its water supply. It includes smart mechanism to monitor remotely. Rainwater harvesting systems are installed and utilised through the city and storm water is collected and stored in water bodies and treated for usage. Recycled waste water is supplied for secondary uses.	Scenario 2	Coverage of storm water drainage network- less than 50% Incidence of sewerage mixing in the drains- More than 99% Incidence of water logging- less than 15% Rain Water Harvesting Project in AMC Terrace Area of AMC: 500 sq m Annual Rainfall of Ajmer: 0.45 (450mm) Runoff Coefficient: 0.9 Water harvesting potential: 500 sq m X 0.45 m X 0.9=202.5 Cum (2,02,500 litres) With the assumption that 70% of rainfall will be effectively harvested, the total water : Volume of water harvested: 2,02,500 X 0.7= 1,41,750 litres Therefore, 388 litres of water is saved per day	The city aspires to reach scenario 3 by leveraging technology and ICT solutions (including universal metering and automatic reading, SCADA based monitoring of water system, Energy efficient pumping equipment and advanced network leak detection to plug technical losses and NRW) to enable wider and sustainable leeps in service delivery performance	Key interventions identified include the following: 1) Strengthen institutional mechanisms and adopt smart solutions to enforce metering and RWH implementation and enforcement of zero discharge of untreated water. Formulate & upgrade the existing methods for treatment of common bio medical waste 2) Install rain water harvesting system in all the public buildings and in open areas- 55 buildings 3) Recharge Pits and Bios wales in open spaces, parking areas, parks, and Road median.
Waste water management	A Smart City treats all of its sewage to prevent the polluting of water bodies and aquifers. (Guideline 2.4)	The city is unable to treat all its sewage. Many local water lines open into water bodies and open ground, thereby polluting the environment.	Most waste water is collected and treated before before disposal. However the treated water does not meet standards and is not recycled for secondary uses.	All the waste water is collected and treated before before disposal. It is also treated to a high standard and some proportion is recycled.	The city has zero waste water because all the waste water is collected, treated and recycled. It meets standards and reduces the need for fresh water.	Scenario 2	Coverage of sewerage network- 61.70% Efficiency of collection of sewerage- 15% Efficiency in Treatment: Adequacy of sewerage treatment capacity- 100% Households with sewerage network- 2246	Ajmer aspires to reach scenario 3 in the next 5 years by conducting studies and preparing DPRs related to waste water management and initiating processes for recycling domestic sewage	Key interventions identified include the following: 1) Reuse of treated waste water for watering & open spaces 3) Road side covered drains 4) Remodelling of Anasagar Escape channel under AMRUT
Air quality	A Smart City has air quality that always meets international safety standards. (Guideline 2.4.8)	City does not have plans, policies or programs to improve the air quality. Systems to monitor air quality are absent.	City has programs and projects to monitor air quality and spatialising the data to ascertain reasons for degrees of pollution in the air. A few strategies to decrease air pollution have been implemented.	City has programs and projects to monitor air quality and spatialising the data to ascertain reasons for degrees of pollution in the air. Pollution levels are acceptable.	The city has clean air as per the international standards. Live air quality monitoring cover the entire city and data of air quality are mapped.	Scenario 1	Existing Air quality parameters vis-a-vis the permissible value	Ajmer aspires to be in scenario 3 in the next 3 years by improving its air quality to the level of global standards, implementing online air quality surveillance systems and monitoring equipment at various locations across the city, improving the existing green cover and planning more green areas	Key interventions identified include the following: 1) Implement continuous air quality monitoring systems across different parts of the city 2) Reduce congestion, spread awareness on proper service of vehicles and promote green vehicles to reduce air pollution. 3) Installation of air quality monitoring - sensors equipment- 20 in no
Energy efficiency	A Smart City government uses state-of-the-art energy efficiency practices in buildings, street lights, and transit systems. (Guideline 6.2)	City has no programs or controls or incentive mechanisms to promote or support energy efficiency in buildings	The city promotes energy efficiency and some new buildings install energy efficiency systems that track and monitor energy use and savings.	Most new public buildings install energy efficiency systems and some older buildings are also retrofitted to be more energy efficient. Local government conducts counselling and outreach with developer, businesses and	All the existing old and new public buildings employ energy efficiency principles in development and operation and apply for energy rating by national and international forums. Many non-public buildings are also	Scenario 2	Energy saving plans being undertaken in Ajmer	Ajmer aspires to be in scenario 3 in the next 5 years by scaling up its energy conservation and efficiency improvement programs. Periodically undertake energy audits and work with other agencies to spread citywide awareness on demand side management and energy efficiency measures	Key interventions identified include the following: 1) Promote Green Buildings 2) Implement energy conservation building code 3) Increase awareness & knowledge dissemination programmes
Underground electric wiring	A Smart City has an underground electric wiring system to reduce blackouts due to storms and eliminate unsightliness. (Guideline 6.2)	City does not have plans for underground electric wiring system.	More than 40% of the city has underground electric wiring system.	More than 75% of the city has underground electric wiring system.	More than 90% of the city has underground electric cabling.	Scenario 2	No. and names of the roads having under ground wiring: 20 stretches of roads are undergoing underground cabling	The city aspires to be in scenario 3 in the next 5 years by undertaking underground cabling of electric wires. This would be done concurrently with development of GIS mapping of utilities below the ground to enable management and additions/changes to be done by all service providers.	Key interventions identified include the following: 1) Extend the current underground cabling project to the ABD area to improve the visual appearance of the city
Sanitation	A Smart City has no open defecation, and a full supply of toilets based on the population. (Guidelines 2.4.3 & 6.2)	Many parts of the city do not have access to sanitation infrastructure and facilities.	Sanitation facilities are available to 70% of the city's population.	Sanitation facilities are available to 90% of the city's population.	Sanitation facilities are available to 100% of the city's population.	Scenario 2	Coverage of Latrines (individual or community)- 80% Households with septic tank- 95054 Households without outlets for toilets- 8000 216.93 MT of garbage @400 gm per capita per day Municipal Corporation owns and operates approximately 30 vehicles comprising tractor trailers with 3 hydraulic loaders, 2 dumper placers, one JCB and one auto rickshaw container to transport the solid waste Community Toilets- 50	Ajmer aspires to reach scenario 3 in the next 5 years by initiating sanitation programs in the city, creating awareness among the citizens, implementing swachh bahar mission and making the city open defecation free.	Key interventions identified include the following: 1) Public Conveniences- 10 in no 2) Technology based efficient waste collection & disposal activities in the city including a) 100% Door to Door Collection with GPS enabled vehicle tracking system, Dustbins with sensors, and Waste to Energy
Waste management	A Smart City has a waste management system that removes household and commercial garbage, and disposes of it in an environmentally and economically sound manner. (Guidelines 2.4.3 & 6.2)	Waste collection systems do not pick up waste on a frequent basis and waste often enters into water bodies.	Waste generated is usually collected but not segregated. Recycling is attempted by difficult to implement.	Waste is segregated, collected, recycled and disposed in an environmentally sound manner.	The city reduces land fill caused by waste so that it is minimal. All the solid waste generated is segregated at source and forwarded for recycling. Organic waste is sent for composting, to be used for gardening in the city.	Scenario 1	% of Household covered by door to door collection- 2% % of treated waste- 0% % of households with septic tanks- 68% % of households with septic tanks- 60%	The city aspires to be in scenario 3 in the next 5-7 years by door-to-door collection, source segregation and decentralised composting and processing facilities under PPP mode	Key interventions identified include the following: 1) Initiatives for waste reduction at source 2) Implement technology based initiatives for efficient waste collection & disposal activities in the city
Safety and security	A Smart City has high levels of public safety, especially focused on women, children and the elderly; men and women of all ages feel safe on the streets at all hours. (Guideline 6.2)	The city has low levels of public safety - most groups of residents feel insecure during most parts of the day in many parts of the city.	The city has medium levels of public safety - some more vulnerable groups feel insecure during some points of the day and in some parts of the city.	The city has high levels of public safety - all citizens including women, children and the elderly feel secure in most parts of the city during most time in the day.	The city has very high levels of public safety - all residents feel safe in all parts of the city during all hours of the day.	Scenario 2	218 CCTV cameras across the district for ensuring safety and security of the citizens. Reliance Jio infocomm Limited has been engaged to provide 500 CCTV cameras for security purposes which would be utilized by the Police Department. Details of Crimes reported in Ajmer district 2011- 534 crimes 2012- 535 crimes 2013- 959 crimes 2014- 1034 crimes 2015- 743 crimes	Ajmer aspires to be in scenario 4 in the next 5 years by initiating surveillance to all the areas Preparing disaster management plan for Ajmer to tackle disasters such as flooding, earthquakes etc	Key interventions identified include the following: 1) Widen surveillance to hitherto uncovered areas installation of CCTV cameras Formulation of disaster management response team 2) 100 no CCTV Surveillance of Traffic & Air Quality Management to capture high resolution real-time images with facilities for wireless and wire connectivity including PTZ cameras, Fixed box cameras, Mobile Transport cameras etc. 3) Command Control Room for traffic management and vehicle tracking- 1no Development of mobile based application which will include Public Information System (PIS)



A MELTING
POT OF
CULTURE
&
CIVILISATION



TABLE OF CONTENT-ANNEXURE 3

- 3.1City Profile
- 3.2Citizen Participation - Engagement strategy and Out reach
- 3.3Citizen Participation through various mediums
- 3.4City Vision and Strategies
- 3.5ABD Area Profile
- 3.6Mapping of key Projects
- 3.7Theme 1 & 2: Heritage, Art & Culture and Tourism- Pilgrimage & Leisure
(Auditorium Promoting local crafts, folk dance, music Public installation Street Painting)
- 3.8Theme 3: Pristine environment and Eco-Friendly Living
(Anasagar Promenade)
- 3.9Theme 3: Pristine environment and Eco-Friendly Living
(Innovative use of Public Open spaces: Park Development & Mega Amusement Park)
- 3.10Theme 3 & 4: Pristine environment & Eco-Friendly Living and World class infrastructure and public Conveniences (Green Building, Escape channel & ML flyover)
- 3.11 Theme 4: World class infrastructure and public Conveniences
(Road Up gradation & NMT - Foot path and Cycle Tracks)
- 3.12Theme 4: World class infrastructure and public Conveniences
(Multi level modern bus stand, Modernization of Railway station and Smart Parking)
- 3.13Theme 4: World class infrastructure and public Conveniences
(Solar Power generation and, Designated vending zone in the market area Frontage improvement of shop's frontage and footpath)
- 3.14Theme 5: Hotspot of technology, innovations and startups
(Incubation Center for start ups and Multi skill institute)
- 3.15Pan City #1 - Integrated Traffic Management, Security & Surveillance system and Intelligent Streetlights
- 3.16Pan City #2 - City E- Governance
- 3.17Implementation Plan and SPVs Relations with other agencies
- 3.18Stakeholder Roles
- 3.19Project Cost & Source of Funds
- 3.20SPV – Financial Statements



IN SYNC WITH
NATURE



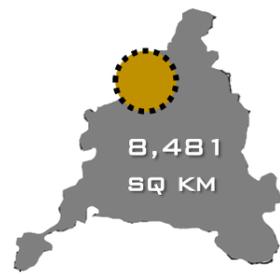
100% SOLAR
CITY



PRISTINE
MODERN
HISTORICAL



3.1 CITY PROFILE



POPULATION
2,583,052

DISTRICT



POPULATION
542,321

AMC AREA

YEAR: 2011

542,321



578,990
TOTAL POPULATION
(2016)

947
SEX RATIO



278,545
51.36%

263,776
48.64%



60,922
(0-6 YEARS)



1,40,000
TOTAL
HOUSEHOLD



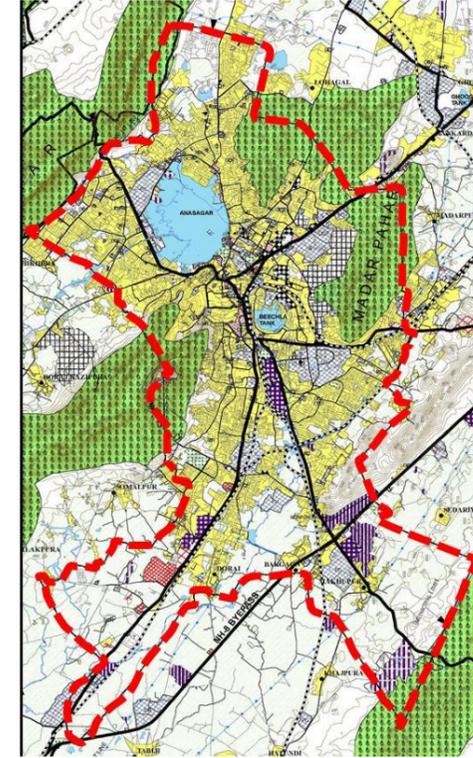
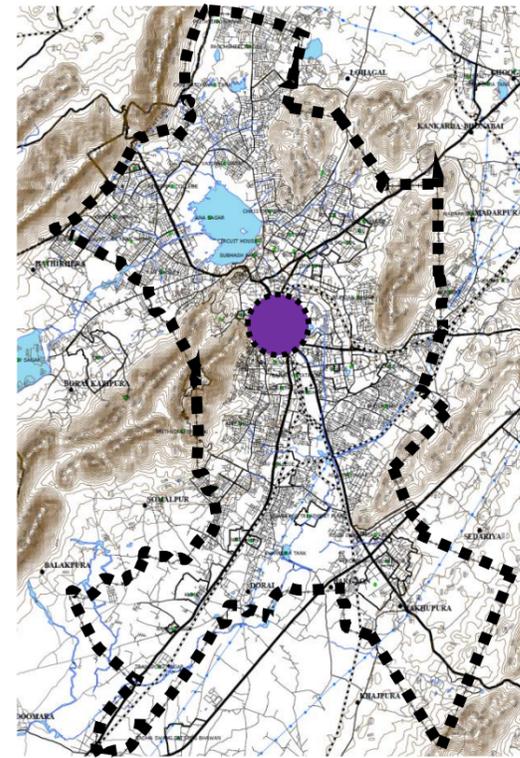
86.52 %
LITERACY RATE



79,887
14.60 %
POPULATION
LIVE IN SLUM

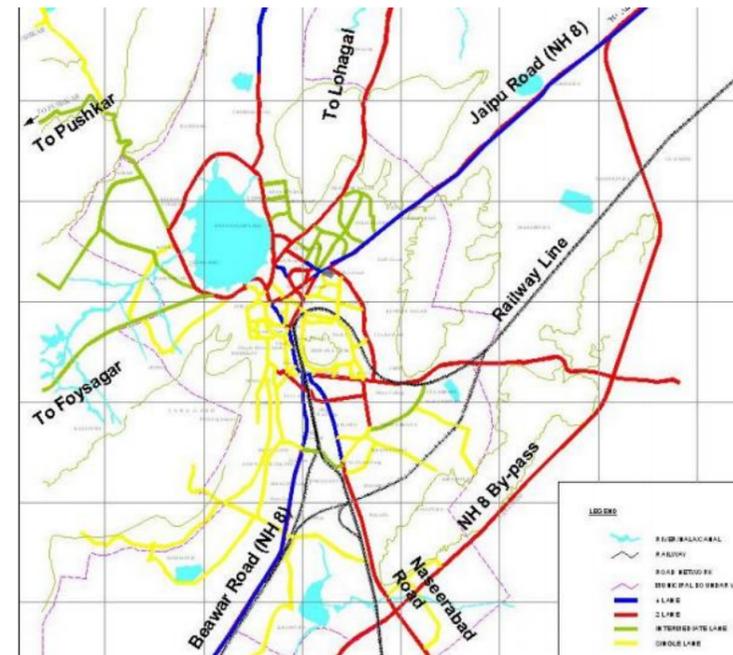
11.74 % (2011)

GROWTH RATE



AMC BOUNDARY ■■■■■
RAILWAY LINE ·····

RAILWAY STATION (Purple circle)
MAJOR ROADS (Thick line)



4 Lane

2 Lane

Intermediate

Single Lane

5,750 PERSONS/SQKM

POPULATION DENSITY



1981

3.75 LAKHS

1991

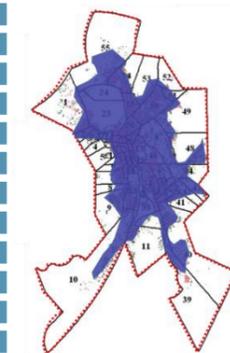
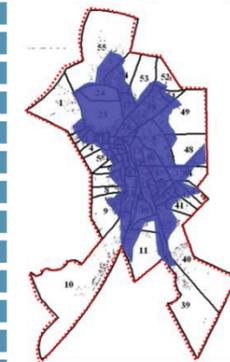
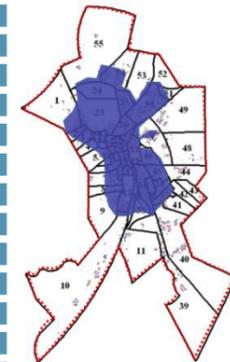
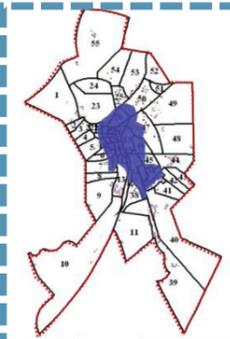
4.02 LAKHS

2001

4.85 LAKHS

2011

5.42 LAKHS



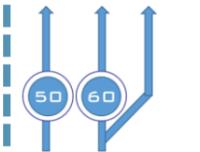
540 KM
TOTAL ROAD
LENGTH



40%
COMMUTERS RELY ON
PUBLIC
TRANSPORTATION



2%
% OF CITY
COVERED BY FOOTPATHS



50-60 KMPH
AVERAGE TRAFFIC
SPEED



30.94 HA
NO. OF PARKS-117



50
NO. OF PUBLIC TOILET



92% (2015)
OF HOUSEHOLDS
CONNECTED BY PIPELINES



98% (2016)
CONVERTED INTO LED
LIGHTS

3.2

CITIZEN PARTICIPATION – ENGAGEMENT STRATEGY AND OUT REACH

CITIZEN ENGAGEMENT STRATEGY



CITIZEN PARTICIPATION

500+ ARTICLES PUBLISHED
17000+ LIKES
2,26,754 REACH, 8000+ COMMENTS
50% OF CITY POPULATION COVERED

10000+ COMMENTS
15,500+ HARD COPIES
500+ ENTRIES FOR TAGLINE CONTEST

CITIZEN STAKEHOLDERS

Elected Representatives

FGDs
Members of Sub Group Committees
Architects, Builders, Doctors, Advocates
Religious Groups, Schools, & Colleges, various clubs

City Administration
AVVNL, PHED, RTO, ADA, CHMO, PWD, Town Planning department etc.
Engagement with **USTDA**

Citizen Consultation
Online
Email
Form Submission
Contest
City level competition for schools

COMPETITIONS IN SCHOOLS

5000 + PARTICIPANTS

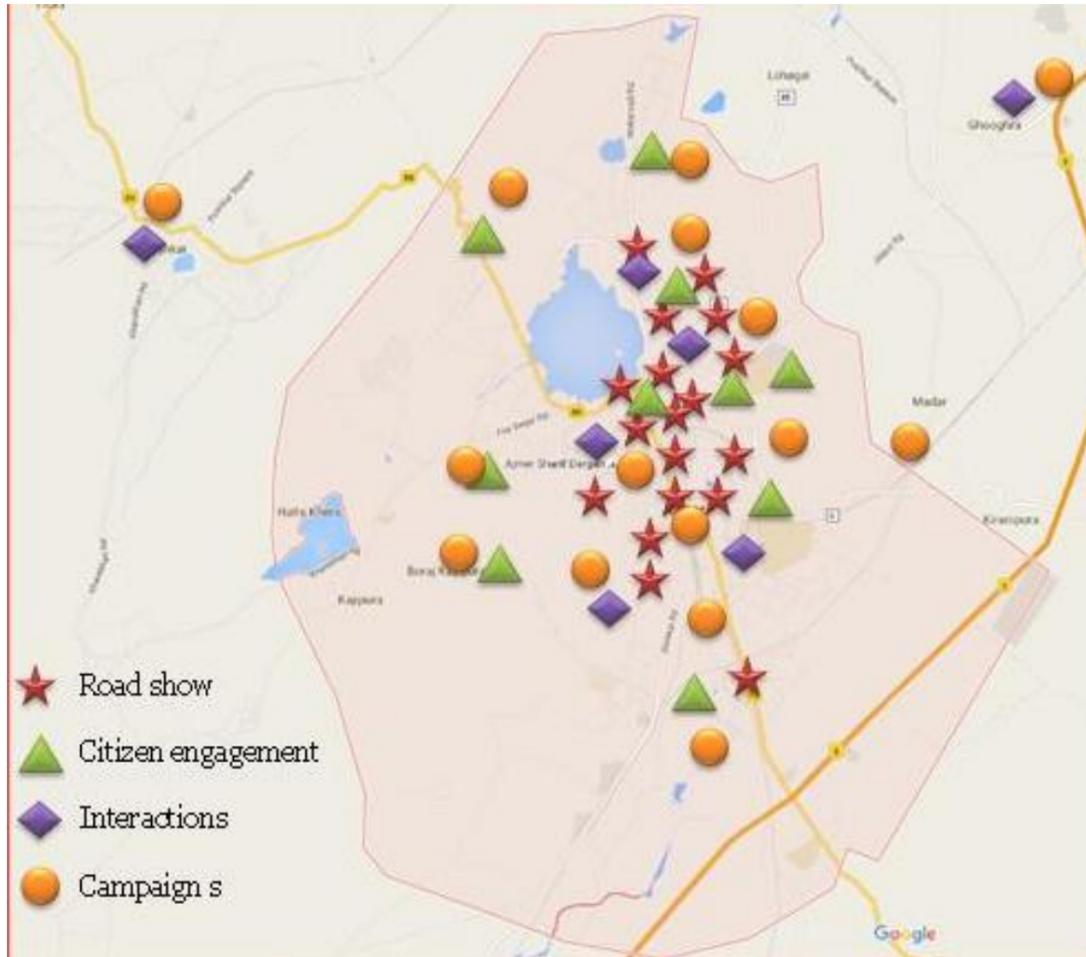
Painting **Quiz** **Debate** **Essay** **Logo** **Slogan** **Short Speech**



3.3

CITIZEN PARTICIPATION THROUGH VARIOUS MEDIUMS

GEOGRAPHICAL PRESENCE THROUGH CITIZEN ENGAGEMENT



ENGAGEMENT HUBS - INTERACTION, CAMPAIGNS AND ROAD SHOW

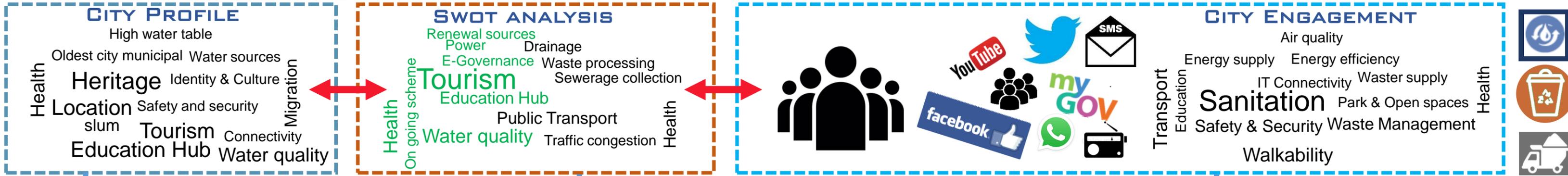


EMPOWER SMART CITIZEN WITH....

- FREE 4G DATA CONNECTIVITY
- AUDIO VISUAL ON AJMER CITY INITIATIVES
- PAPERLESS AND ENVIRONMENT FRIENDLY DIGITAL CAMPAIGN
- DISTRIBUTING SMART CITY CAPS



3.4 CITY VISION AND STRATEGIES



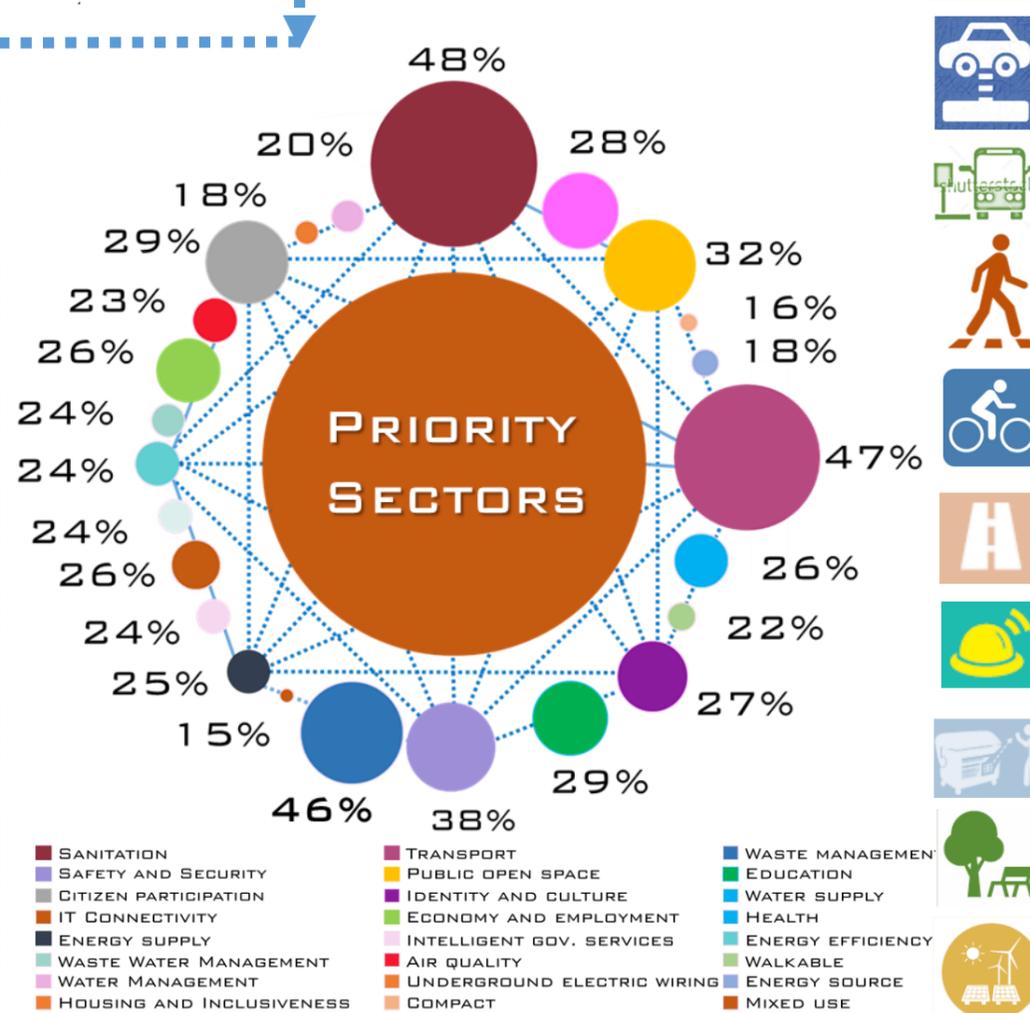
- ### STRATEGIES
- Nurturing Ajmer's Pristine Environment
 - Universal access to world class infrastructure
 - Skilling manpower for economic growth
 - Fiscal Sustainability
 - Smart, Transparent and Citizen-focused Governance

VISION

“To develop Ajmer as a global religious and heritage tourism destination with high quality living and sustainable smart citizen services”

- ### THEMES
- A Heritage, Art and Culture
 - A Vibrant Tourism, Pilgrimage & Leisure Destination
 - Pristine environment & eco-friendly living
 - World class infrastructure and civic Amenities
 - A hotspot of technology, innovations and start-ups

- ### GOALS
- Protect, nurture, and celebrate Ajmer's rich cultural, religious and heritage assets, while promoting local arts and crafts
 - Become a world class pilgrimage and heritage city by catering to the needs of pilgrims and tourists and enhancing and integrating heritage sites, entertainment, and hospitality
 - Develop a well-connected, clean, green and healthy city
 - Mobility: Create a robust state-of-the-art transportation and transit infrastructure that provides seamless mobility options to all
 - Sanitation and SWM: To make Ajmer city clean and open defecation free.
 - Water and waste water: 24x7 metered piped water supply and 100% access to safe collection and disposal of waste water
 - Energy: Enhance energy security for all the citizens of Ajmer with an increased focus on renewable sources
 - Health Care: Develop an inclusive, efficient, and easily accessible health care system
 - Education: Provide world-class education access and facilities in Government schools
 - Sports : Encourage a sports-centric healthy lifestyle
 - Enhance Ajmer's economic development with innovation
 - Smart Governance system and effective citizen participation

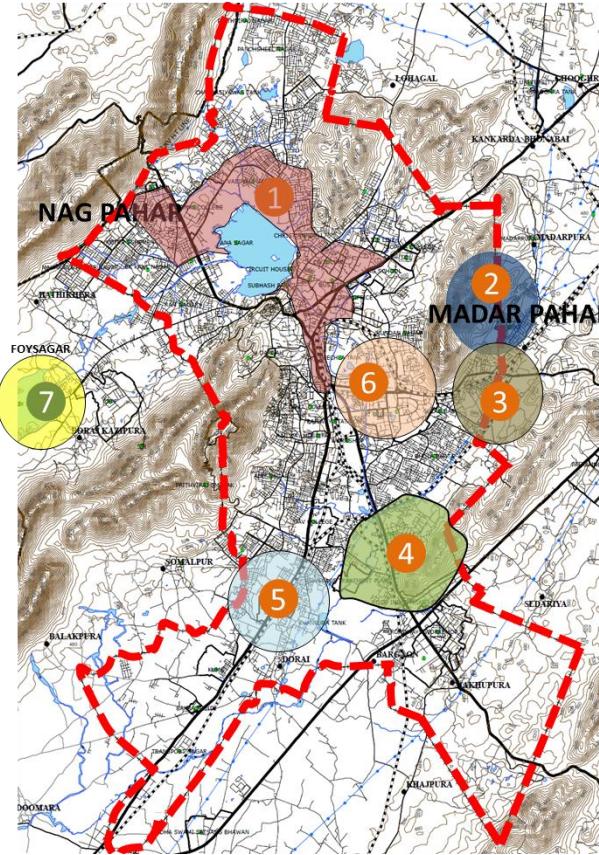


3.5 ABD-AREA PROFILE

AJMER SMART CITY PROPOSAL

OPTIONS IDENTIFIED FOR AREA BASED DEVELOPMENT

OPTIONS- I : DEVELOPMENT ALONG ANASAGAR LAKE



RETROFITTING OPTIONS

- 1 DAULAT BAGH, PATEL MAIDAN, GAURAV PATH, MITTAL HOSPITAL
- 2 NAKA MADAR
- 3 JP NAGAR
- 4 ADARSH NAGAR
- 5 GHANDRAVARDAI NAGAR
- 6 PAL BEECHLA

GREEN FIELD

- 7 VILLAGE HATHIKHERA



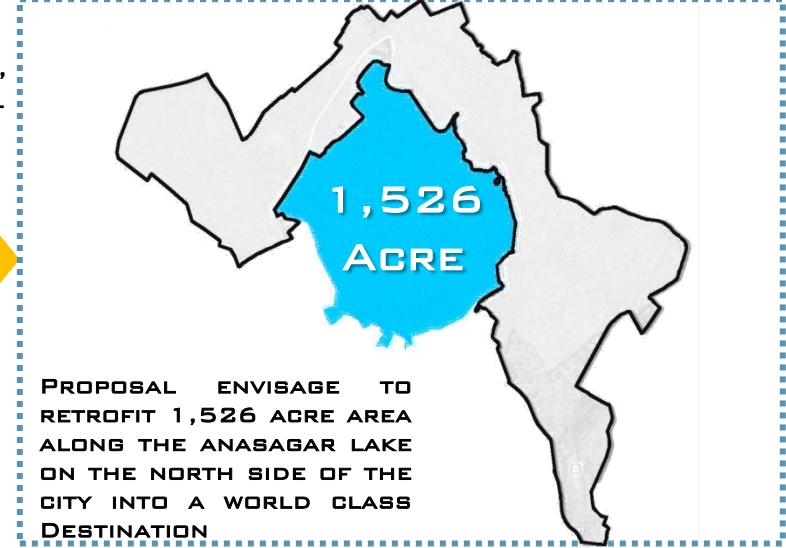
No. of Wards: 1, 2, 6, 12, 43, 44, 50, 51, 54, 55, 56, 57, 60



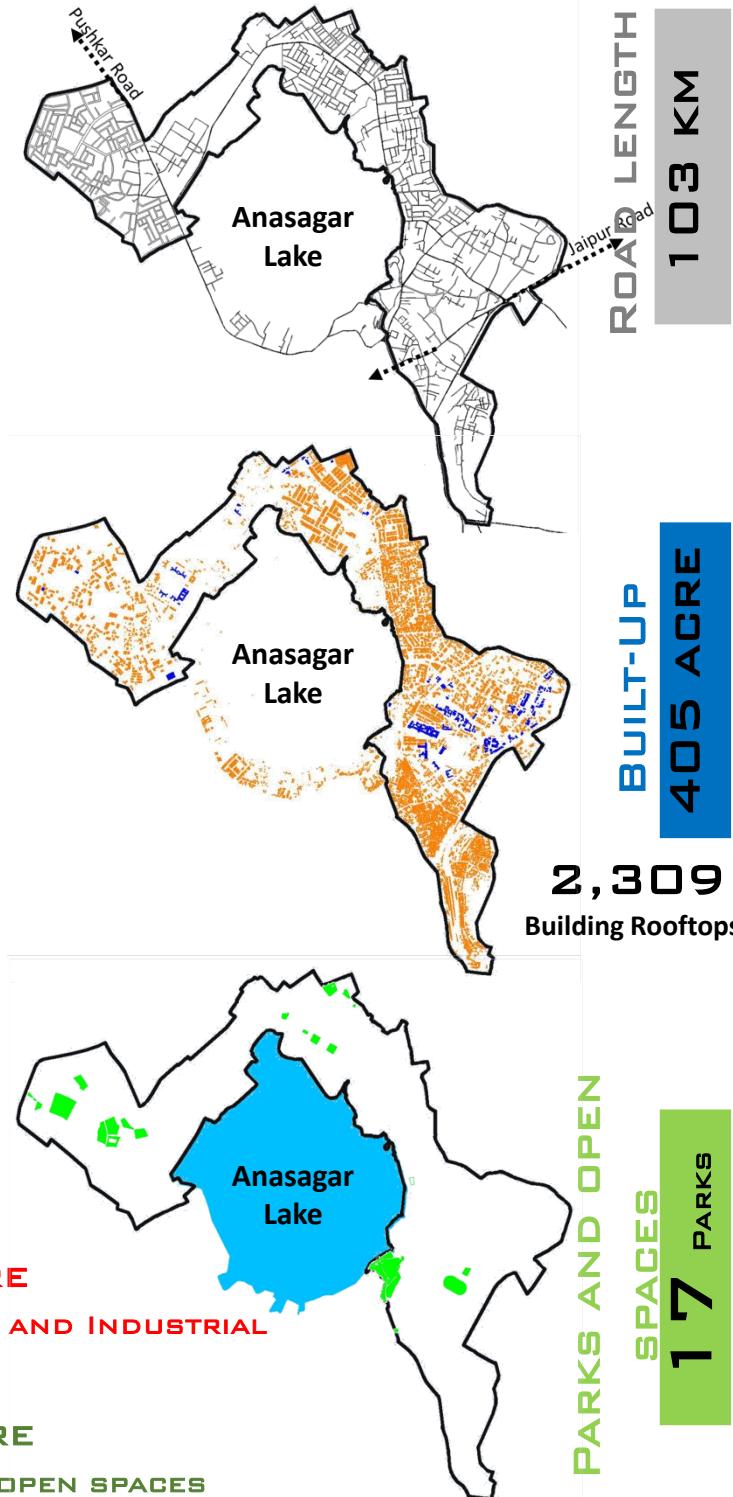
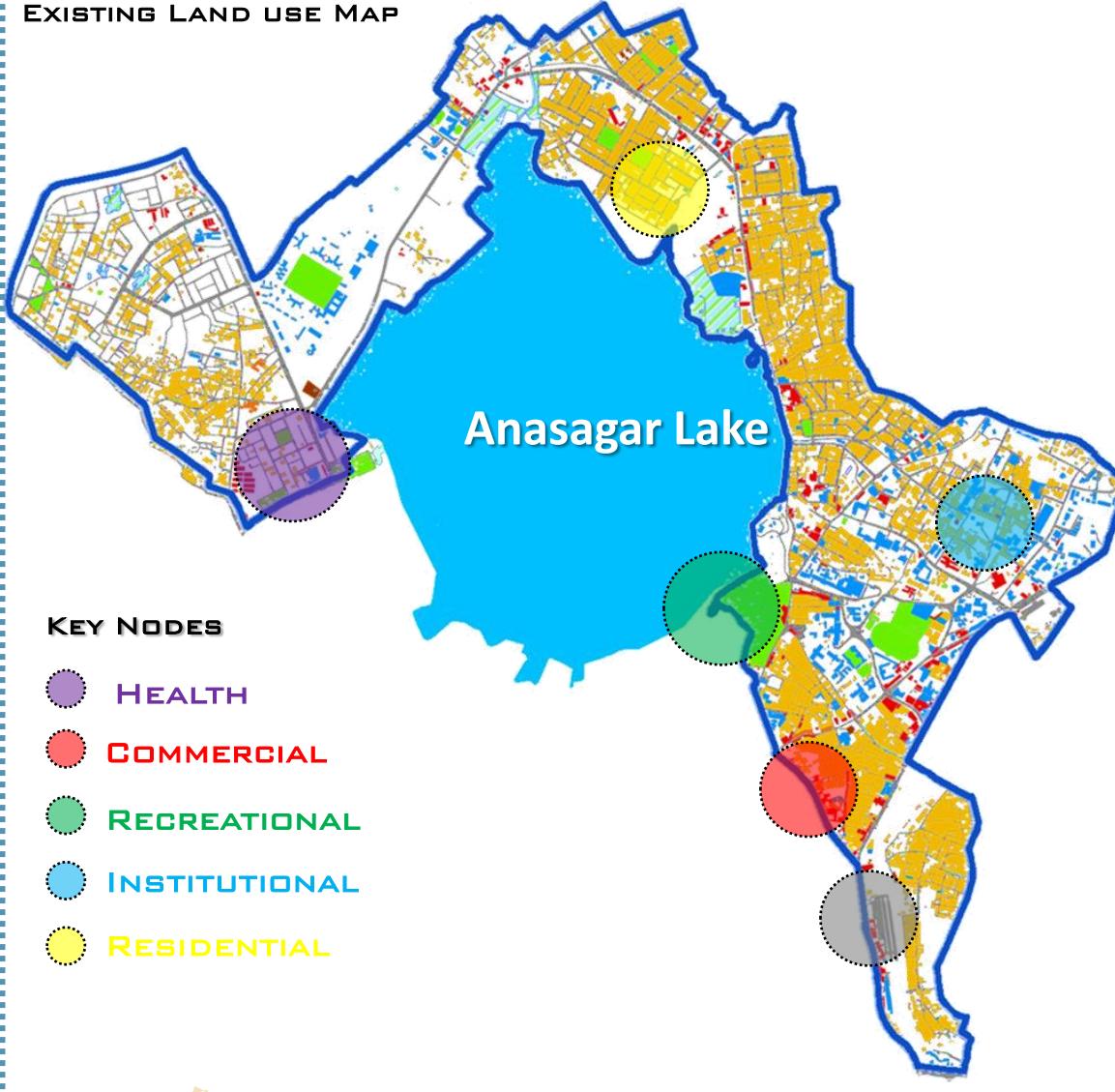
Population: 91, 454 (2016)



Household: 18,420 (2016)



EXISTING LAND USE MAP



336 ACRE
RESIDENTIAL

31 ACRE
COMMERCIAL AND INDUSTRIAL

68 ACRE
INSTITUTIONAL & CIVIC FACILITIES

51 ACRE
PARKS AND OPEN SPACES

3.6

MAPPING OF KEY PROJECTS

AJMER SMART CITY PROPOSAL

ENERGY GENERATION
Integrated Photovoltaic cells with canopies and building facades will generate energy during the day and be connected to a Smart Grid

TOURISM INFRASTRUCTURE
Infrastructure such as Hotels, Retail, Restaurants / Cafes and Public Toilets shall be developed along the lake

NALA REVITALIZATION
Cleaning of existing nala by diverting all sewage lines directly to the local STP

WASTE WATER MANAGEMENT
Reusing waste water for flushing, irrigation, and regeneration landscape shall reduce water demand using smart mechanical and natural filtration methods

LOCAL DECENTRALISED SEWAGE TREATMENT PLANT
Connecting all drains from residential and commercial buildings directly to the local STP and treated water can later be reused for irrigation of public parks

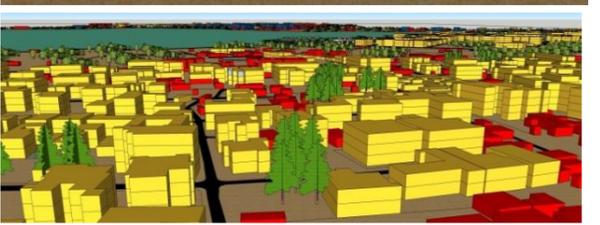
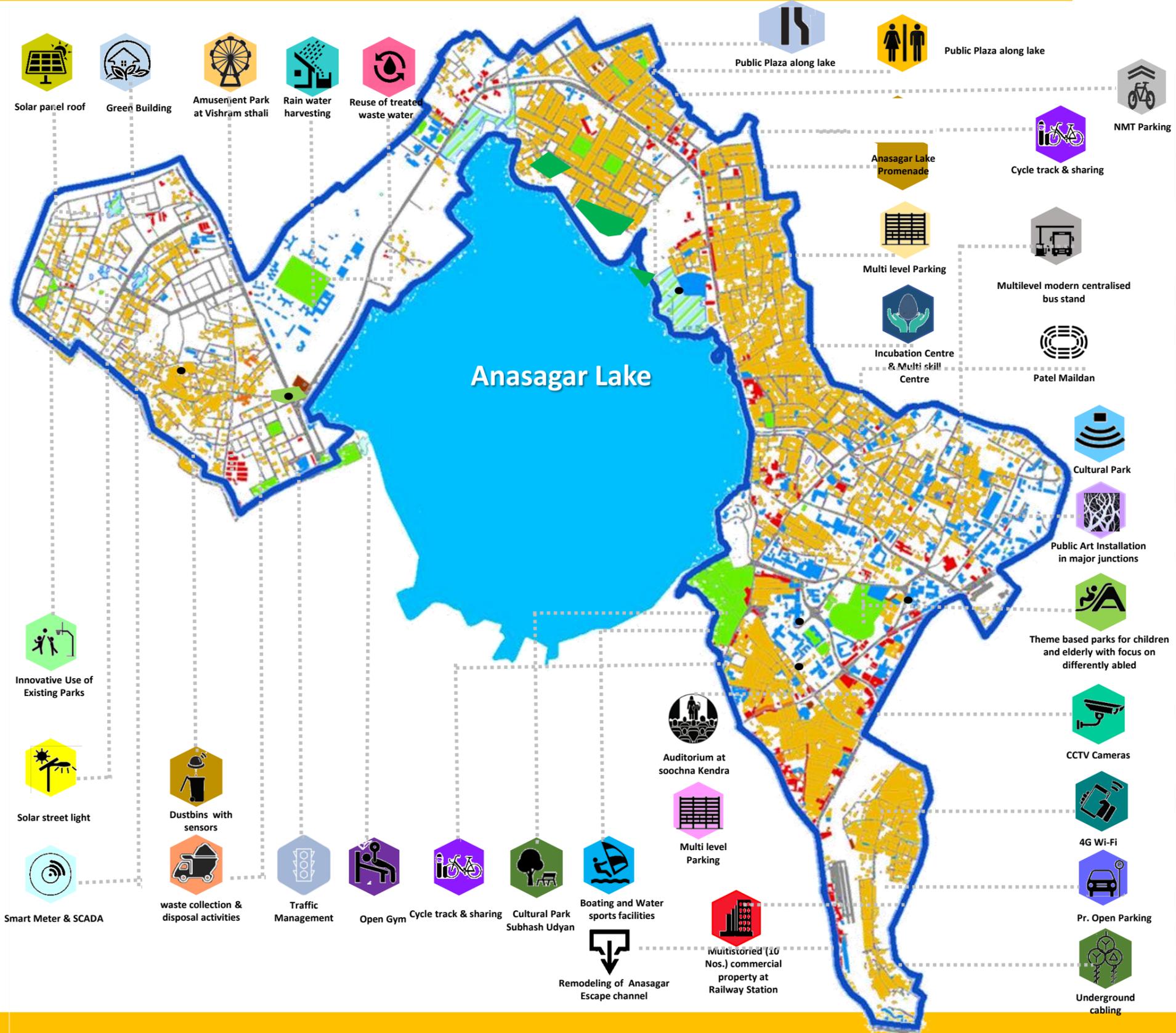
EQUITABLE STREETS
A People-First approach: Smart Mobility supporting multi-mode transportation, promote walking and NMT infrastructure. Equipped with storm water infiltration pits, Smart Street Lamps and Shade

SMART INTELLIGENT STREET LIGHTING
LED lighting, with energy savings, adding communications, enabling numerous smart applications including remote diagnostics and control. Provide a canopy network for all streetslights and connect all devices with a citywide, multi-service communications system

SMART BUS STOPS
Enable computer interactive interface for routes and bus tracking, easy access, informative displays and interactive apps.

ECO-MOBILITY CORRIDOR
Public Promenade for walking, cycling and NMT infrastructure, parks and trails within open spaces with public art, programmatic spaces with seats and seating areas.

Integrated Smart Solutions and Development along Anasagar Lake
Source: USTDA Technical Advisory – High Level Sector Report (Annexure 4)



SMART CITY

3.7 IDENTITY & CULTURE AND TOURISM-PILGRIMAGE & LEISURE

AJMER SMART CITY PROPOSAL

THEME-1: HERITAGE, ART & CULTURE

IDENTITY AND CULTURE

1. AUDITORIUM
2. PROMOTING LOCAL CRAFTS, FOLK DANCE, MUSIC
3. PUBLIC INSTALLATION
4. STREET PAINTING

10 CR. PROJECT COST

AUDITORIUM AT SUCHNA KENDRA



0.5 ACRE AREA OF SUCHNA KENDRA

STREET PAINTING AND INSTALLATION OF PUBLIC ARTS & SCULPTURE IN STREETS, MAJOR JUNCTIONS, PUBLIC PLACES

35 CR. PROJECT COST



THEME 2: TOURISM-PILGRIMAGE & LEISURE

TOURIST INFRASTRUCTURE

1. TOURIST INFORMATION CENTRE AT PUBLIC PLACES, KIOSKS, PUBLIC CONVENIENCES
2. PEDESTRIAN FRIENDLY WALKWAY CONNECTING DARGAH AREA TO RAILWAY STATION THROUGH SKY WALKS

10 CR. PROJECT COST

TOURIST INFORMATION CENTRES KIOSK



SKYWALK



PUBLIC TOILETS SIGNAGE



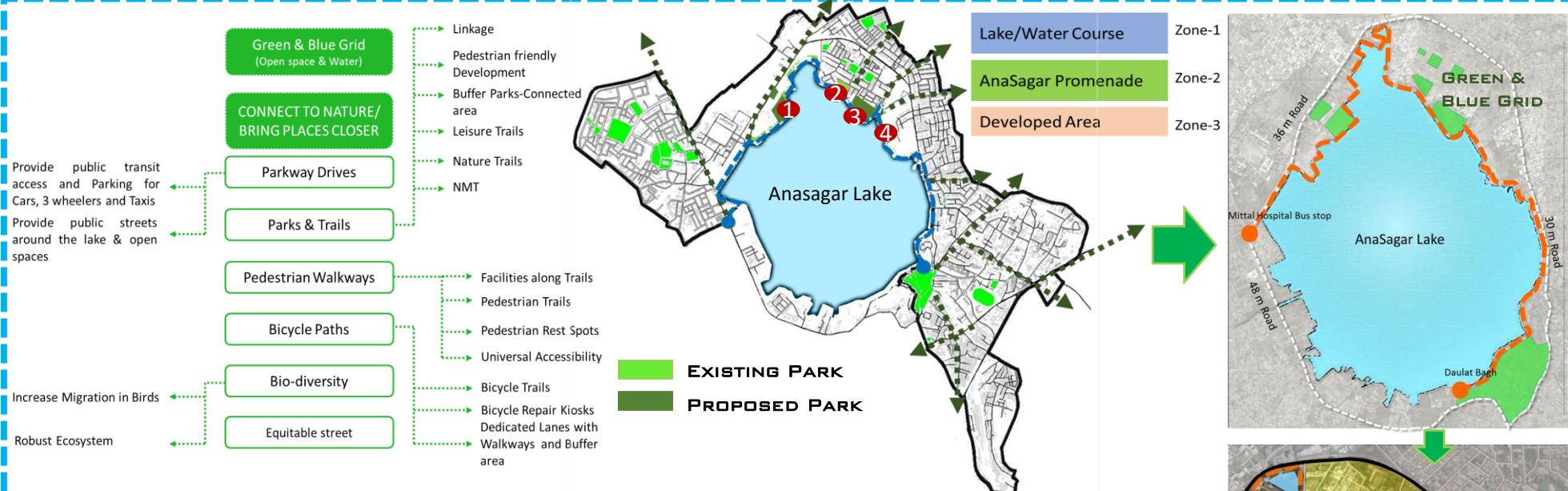
5 CR. PROJECT COST

SMART CITY

OBJECTIVE: TO PROMOTE TOURISM, IMPROVE THE EXISTING SITUATION AND ENCOURAGE WALKABILITY



LAKE FRONT DEVELOPMENT



LENGTH OF CORRIDOR = 5.5 KM
 WIDTH OF CYCLE TRACK = 2.5 M
 WIDTH OF FOOTPATH = 3.0 M

- ### COMPONENTS
- OPEN AIR AMPHITHEATRE, PROMENADES/ PLAZAS
 - BICYCLE TRACKS & BICYCLE STAND
 - WALKING TRACKS
 - BOATING AND WATER SPORTS FACILITIES
 - MUSICAL FOUNTAIN
 - PARK DEVELOPMENT (LANDSCAPING, STREET FURNITURE, INTELLIGENT STREET LIGHTING
 - PARKING SPACES

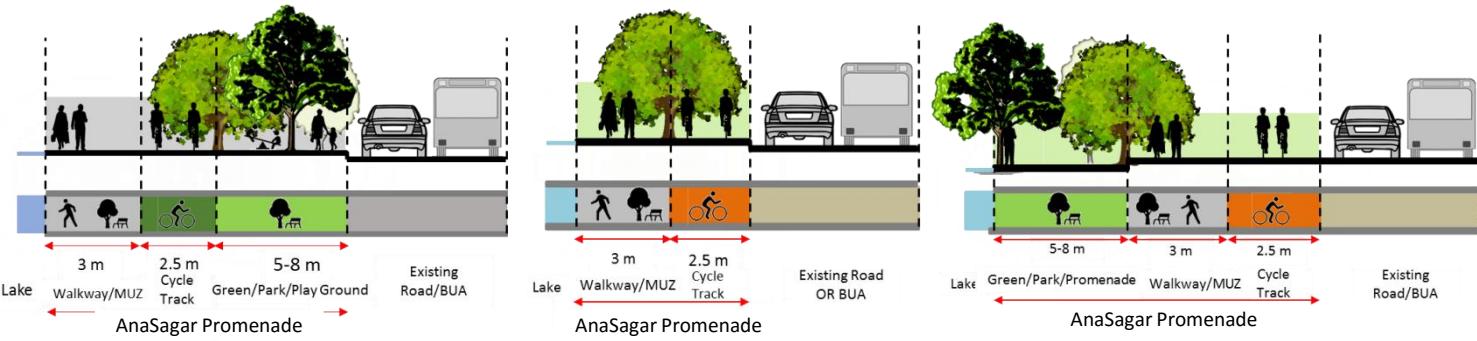
ENHANCEMENT OF WALKABILITY FROM NEIGHBORHOOD OF ABD TO ANASAGAR PROMENAD WITH THE FOCUS ON DIFFERENTLY ABLED AND ELDERLY

CONCEPTUAL VIEW OF PROPOSED ANASAGAR PROMENADES WITH OPEN SPACE

Public Plaza & Walkway



Cycle track & walkway



Major Road
 Eco-Mobility Corridor
 Park/Green space
 Proposed Promenade/Parks/Play Ground
 Lake

1 8.2 THEME BASED OPEN SPACE & WATER SPORTS FACILITIES
 ACRE

2 2.8 PROPOSED THEME BASED CHILDREN PARK
 ACRE

4

3 8.6 PROPOSED CULTURAL PARK AND OPEN AIR THEATER
 ACRE



- 1 Park
- 2 Picnic lawn
- 3 Cycle track
- 4 Promenade
- 5 Seating space
- 6 Water and trees
- 7 Overlook
- 8 Green buffer
- 9 Nature walk
- 10 Bridge
- 11 Grove
- 12 Lake promenade/Seatin
- 13 Lawn
- 14 Habitat Restoration
- 15 Play Ground
- 16 Basic Facilities
- 17 Semi-covered area
- 18 Multiuse play space
- 19 Fountain plaza
- 20 Entrance

4 400 M ANASAGAR LONG PROMENADES WITH STRETCH PUBLIC PLAZAS



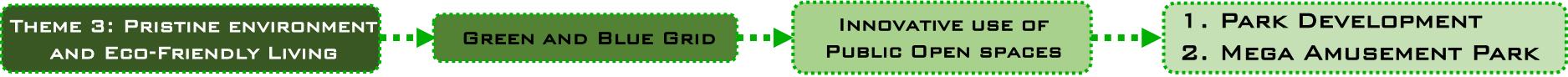
110 CR.
 PROJECT COST



3.9 DEVELOPMENT OF OPEN SPACES

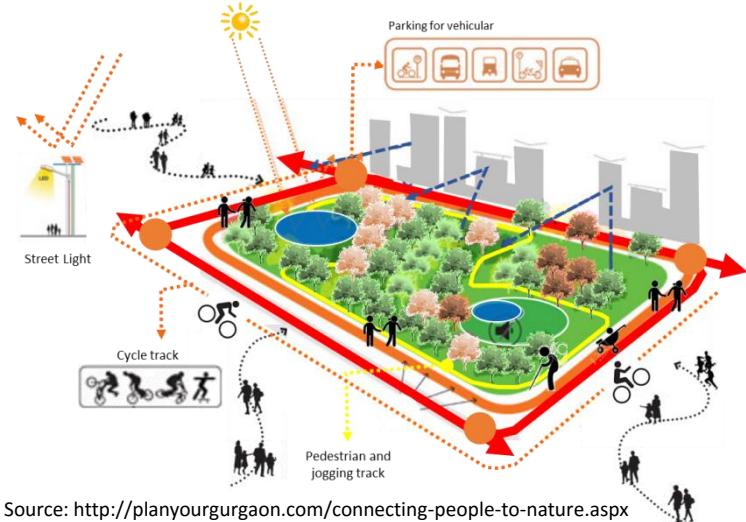
AJMER SMART CITY PROPOSAL

OBJECTIVE: UP GRADATION OF EXISTING PARKS/OPEN SPACE, PROPOSED THEME BASED PARKS/OPEN SPACE



INNOVATIVE USE OF PUBLIC OPEN SPACES

PROJECTS



Open space

Connect to Nature

The open space improve connectivity and bring the various programmed places and activities planned in the open spaces closer to the people of city



51 ACRE
EXISTING PARKS AND OPEN SPACES

- Solar Street Light
- Reduce glare
- Colorful landscape
- Walking and Bicycle Infrastructure
- Water bodies reduce local temperature
- Soothing soft scape
- Visual Relief

35 CR.
PROJECT COST

1. PARK DEVELOPMENT (EXCLUDING IN ECO-MOBILITY CORRIDOR ALONG ANA SAGAR LAKE) BUT INCLUDING GREEN PARK DEVELOPMENT OF SUBHASH UDHYAN & FOY SAGAR UDHYAN
2. DEVELOPMENT OF OPEN GYM IN EXISTING PARKS
3. THEME BASED PARKS FOR CHILDREN AND ELDERLY WITH FOCUS ON DIFFERENTLY ABLED

Source: <http://planyourgurgaon.com/connecting-people-to-nature.aspx>

1 SUBHASH UDYAN: YOGA BASED THEME PARK



DEVELOPED PUBLIC OPEN PLACES

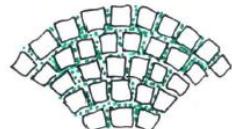


CHILDREN PARK



OPEN GYM

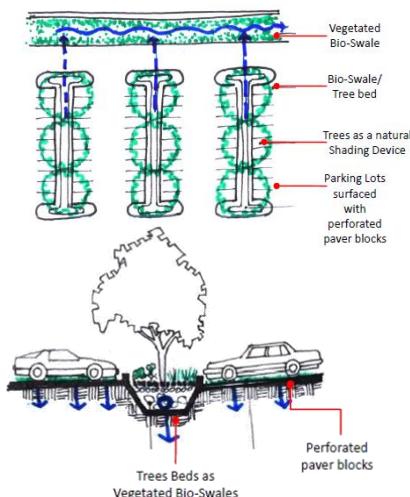
THEME PARK



Pervious Paving



Perforated paver blocks



MEGA AMUSEMENT PARK IN VISHRAM STHALI



16.8 ACRE
AREA FOR AMUSEMENT PARK



PROPOSED

25 CR. PROJECT COST



3.10 GREEN BUILDINGS & TRANSPORTATION

AJMER SMART CITY PROPOSAL

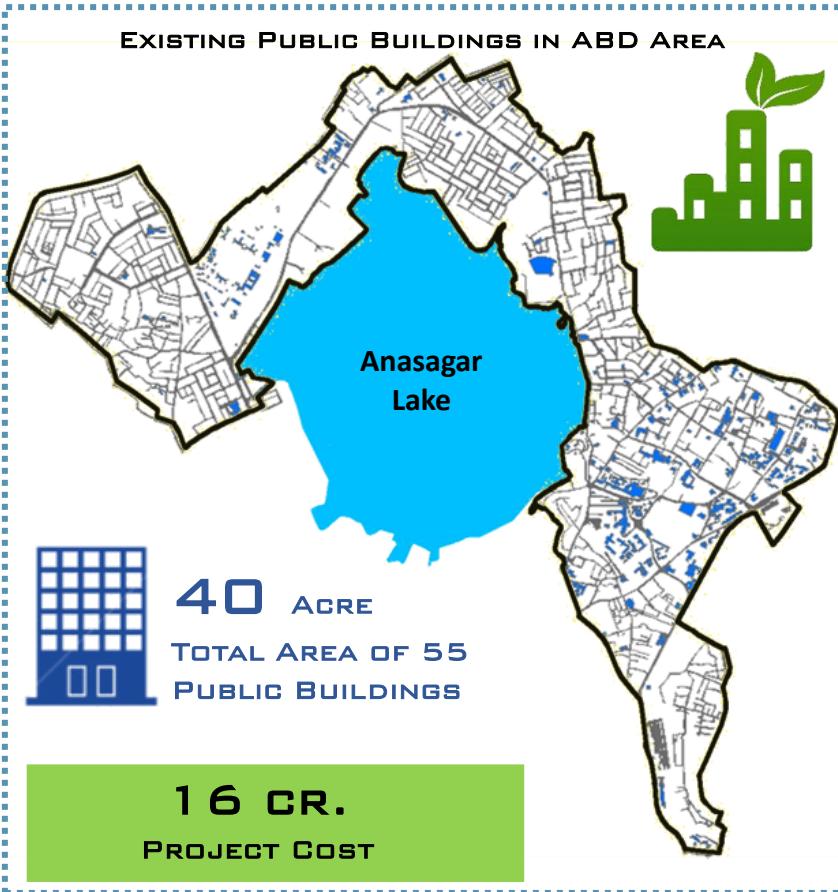
THEME 3: PRISTINE ENVIRONMENT AND ECO-FRIENDLY LIVING

GREEN AND BLUE GRID

GREEN BUILDING

1. CONVERSION OF PUBLIC BUILDING IN TO GREEN BUILDING (LEED/ GRIHA)

OBJECTIVE: TOWARDS A GOAL OF ZERO ENERGY , WATER AND WASTE THROUGH PUBLIC BUILDINGS IN AJMER
CONVERSION OF PUBLIC BUILDINGS IN TO GREEN BUILDINGS



GREEN BUILDINGS CAN REDUCE

24%-50% Energy Use

CO2 Emissions 33%-39%

Water Use 40%

Solid waste 70%

Benefits Of Energy efficient Buildings

- Emissions reduction
- Reduced energy bills
- Lesser Installed equipment & systems
- Incentives/Awards/Recognition

GREEN BUILDING



PATNI (I-GATE) KNOWLEDGE CENTER, NOIDA



GODREJ GREEN BUSINESS CENTRE, HYDERABAD



DISTRICT COOLING SYSTEM - RMZ ECO SPACE, KOLKATA



THEME 4: WORLD CLASS INFRASTRUCTURE AND PUBLIC CONVENIENCES

INTEGRATED MOBILITY

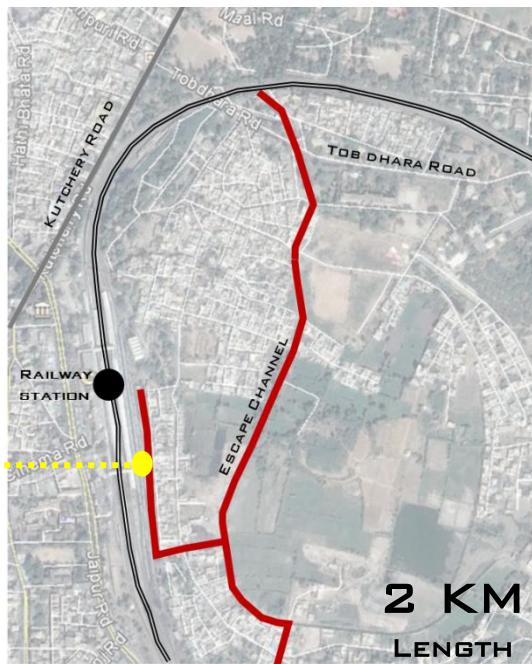
TRANSPORTATION & MOBILITY

1. REMODELING OF ANASAGAR ESCAPE CHANNEL
2. MULTI LEVEL FLYOVER

REMODELING OF ANASAGAR ESCAPE CHANNEL FROM VEER KUMAR MARG TO SRINAGAR & BEHIND RAILWAY STATION

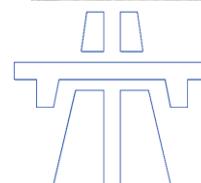
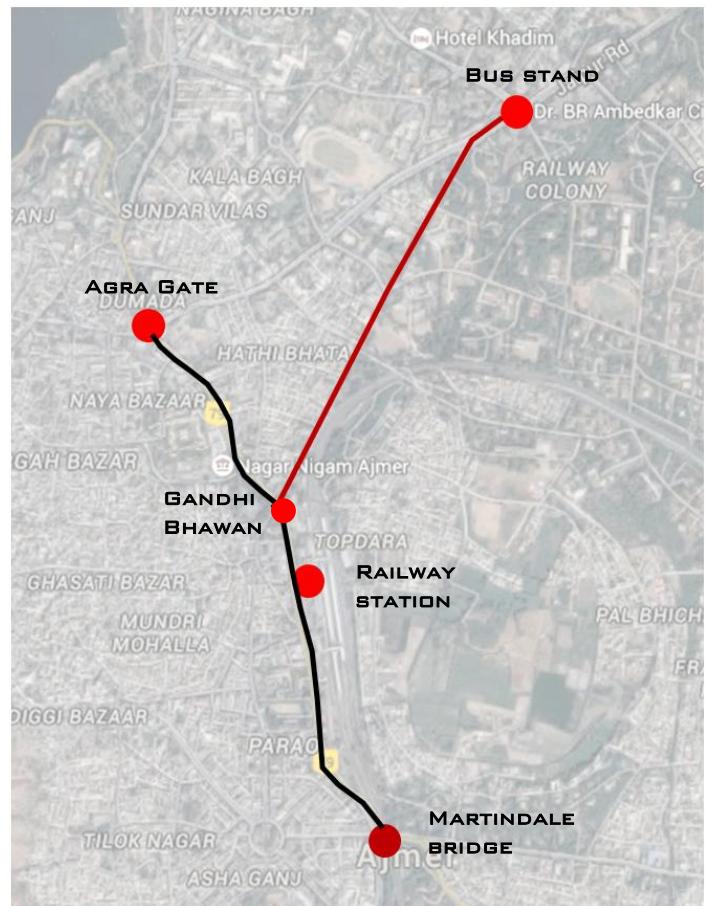


EXISTING CONDITION OF ESCAPE CHANNEL NEAR TOBDARA



250 CR.
PROJECT COST

FLYOVER FROM MARTINDALE BRIDGE - STATION ROAD - AGRA GATE - OLD RPSC TO BUS STAND



3.6 KM
LENGTH OF FLYOVER

162 CR.
PROJECT COST

SMART CITY

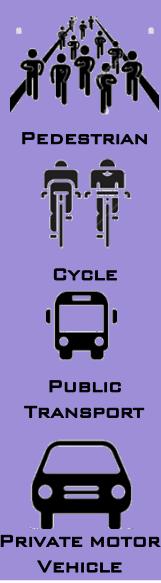
THEME 4: WORLD CLASS INFRASTRUCTURE AND PUBLIC CONVENIENCES

INTEGRATED MOBILITY

TRANSPORTATION & MOBILITY

1. ROAD UP GRADATION
2. NMT - FOOT PATH AND CYCLE TRACKS

PEOPLE FIRST APPROACH



- To balance provision of road space for pedestrians & vehicles
- Effective segregation of bus / IPT / emergency vehicle / private vehicle traffic
- Dedicated pedestrian zone
- Develop universally accessible streets**
- To designate space for street vending
- To allocate space for road side tree / green cover
- To develop space for storm water management features / catch pits along roads
- To set standards for street furniture / road side amenities / signage etc.

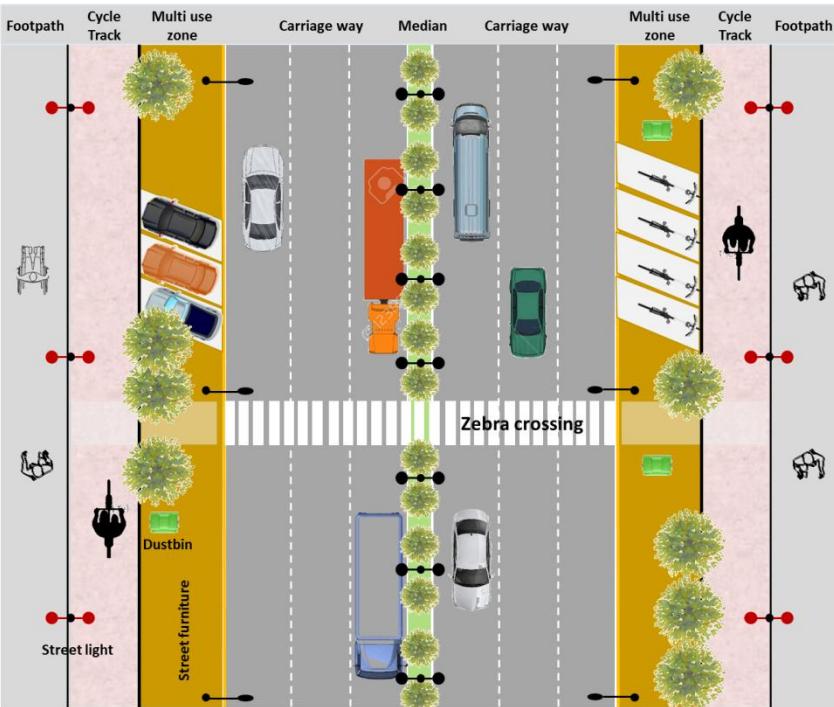


ROAD UP GRADATION & NON MOTORIZED TRANSPORT

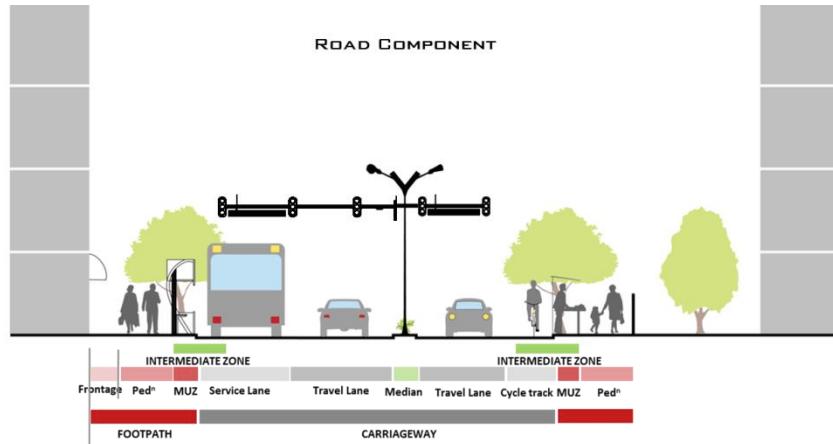
78.51 CR.
PROJECT COST

Mobility & Accessibility	Safety & Security	Environment
Footpath-side walk	Pedestrian crossing	Multi use zone
Cycle Track-NMT	Traffic calming measures	Plantation
Carriage way-MV Lane	Speed breakers	Utility and services
Shoulders	Traffic signals	Storm water Management
Parking	Central medians	Dustbins
	Railings	Public toilets
	Bollards for separation	
	Street lights	
	Street furniture	
	Signage's, marking & Advertisements	

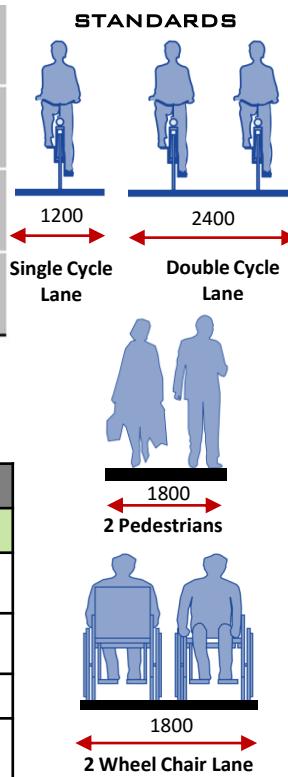
TYPICAL STREET COMPOSITION



SECTION SHOWING ROAD UP GRADATION & NMT



ROAD COMPONENT STANDARDS



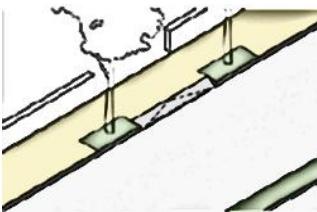
Footpath			Intermedia te Zone	Carriageway		
Frontage zone	Pedestrian zone	Multi-use Zone		Service Lane	Travel Lane	Median
Commercial / Retail frontage	Pedestrians	Bus stop / Bus shelter	On-street parking	Service lane / Shoulder	Car / IPT Lane	Median
Planting strips/ beds	Wheel-chair users	Street Vending	Bus bay	Bus lane	Emergency Vehicle Access	Planting strips / beds
		Planting strips / beds	Drop-off points	2 Wheeler / Cycle track		
		Public Toilets and street furniture		Service Vehicle Access		

EXISTING ROAD UP GRADATION & NON MOTORIZED TRANSPORT



STREET COMPONENTS

KERB-CUTS



MEDIAN



BOLLARD



CYCLE SHARING SYSTEM



PEDESTRIAN CROSSING & REFUGES



TACTILE STRIPS IN RAMPS WITH ADEQUATE SLOPES



DEDICATED CYCLE TRACK



STREET FURNITURE



ROAD MARKING



CYCLE PARKING



SIGNAGE



SMART CITY

3.12 TRANSPORTATION & MOBILITY

AJMER SMART CITY PROPOSAL

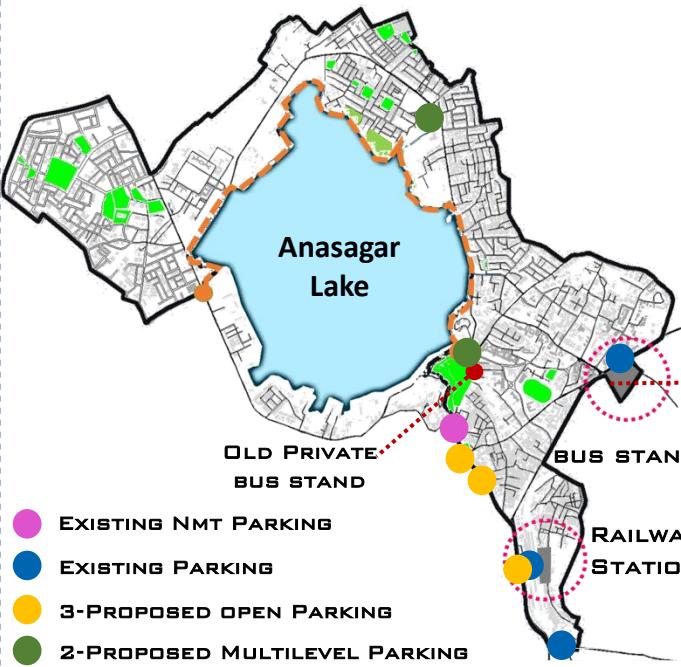
THEME 4: WORLD CLASS INFRASTRUCTURE AND PUBLIC CONVENIENCES

INTEGRATED MOBILITY

TRANSPORTATION & MOBILITY

1. MULTI LEVEL MODERN BUS STAND
2. MODERNISATION OF RAILWAY STATION
3. SMART PARKING

MULTILEVEL MODERN CENTRALIZED BUS STAND



5.4 ACRE
AREA OF BUS STAND

PROPOSED FOUR FLOOR MULTI LEVEL BUS STATION WITH BASEMENT PARKING

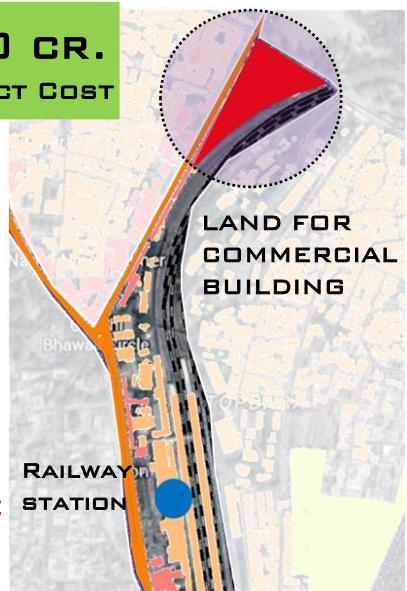


50 CR.
PROJECT COST

MODERNISATION OF RAILWAY STATION



300 CR.
PROJECT COST



1.21 ACRE
AREA OF RAILWAY STATION BUILDING

100 CR.
FOR 2 PROJECT COST

SMART PARKING MULTILEVEL CAR PARKING



VIBRANT PARKING INFO SYSTEM, SENSOR ENABLED PARKING WHICH WILL INDICATE AVAILABILITY OF PARKING



- SMART ENTRY & EXIT TERMINAL
- SMART CARD READER
- GPRS SYSTEM
- PARKING APP WHICH WILL LOCATE PARKING
- LCD OR DISPLAY BOARD FOR LOCATION AND FARE DISPLAY

LOTS AVAILABLE



SOLAR POWERED OPEN CAR PARKING



VIBRANT PARKING INFO SYSTEM, SENSOR ENABLED PARKING WHICH WILL INDICATE AVAILABILITY OF PARKING

15 CR.
FOR 3 PROJECT COST

SMART CITY

3.13 ENERGY SECURITY, COMPACTNESS & MIXED USE

AJMER SMART CITY PROPOSAL

THEME 4: WORLD CLASS INFRASTRUCTURE AND PUBLIC CONVENIENCES

ENERGY SECURITY

ENERGY SUPPLY & SOURCE

SOLAR POWER GENERATION

48.58 CR. PROJECT COST

SOLAR POWER GENERATION IN ABD AREA



SOLAR WATER HEATING SYSTEMS IN DOMESTIC, COMMERCIAL, INDUSTRIAL AS WELL AS PUBLIC BUILDINGS

DEVELOPMENT OF SOLAR PARK



SOLAR TRAFFIC LIGHTS POWERED BY SOLAR PANELS AT ROAD INTERSECTIONS, PEDESTRIAN CROSSINGS ETC.

SOLAR POWERED ADVERTISEMENTS ON HOARDINGS



PREPARATION OF SOLAR MASTER PLAN FOR AJMER & ESTABLISHMENT OF AKSHAY URJA SHOP IN THE CITY.

THEME 4: WORLD CLASS INFRASTRUCTURE AND PUBLIC CONVENIENCES

- 1. COMPACTNESS
- 2. MIXED USE

- 1. DESIGNATED VENDING ZONE IN THE MARKET AREA
- 2. FRONTAGE IMPROVEMENT OF SHOP'S FRONTAGE AND FOOTPATH

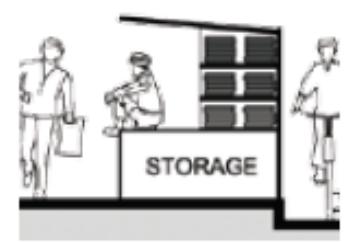
STREET VENDING ZONE



A SIMPLE ELEVATED CONCRETE PLATFORM



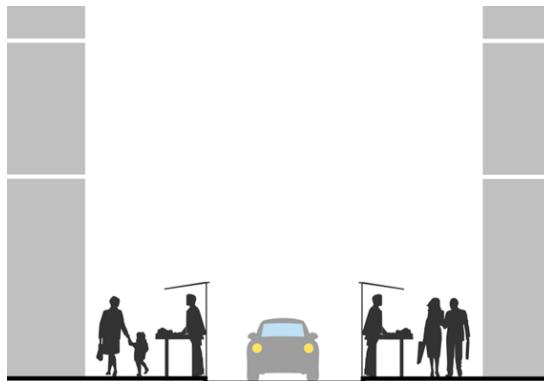
A FULLY ENCLOSED SHELTER



A PLATFORM DOUBLING AS LOCKABLE STORAGE



A CONCRETE PLATFORM PLUS ROOF, WHICH DOUBLES AS A DISPLAY PLATFORM



Ped ⁿ (1.8 m)	MUZ (1 m)	Travel Lane (3.5 m)	MUZ (1 m)	Ped ⁿ (1.8 m)
FOOTPATH (2.8 m)		CARRIAGEWAY	FOOTPATH (2.8 m)	

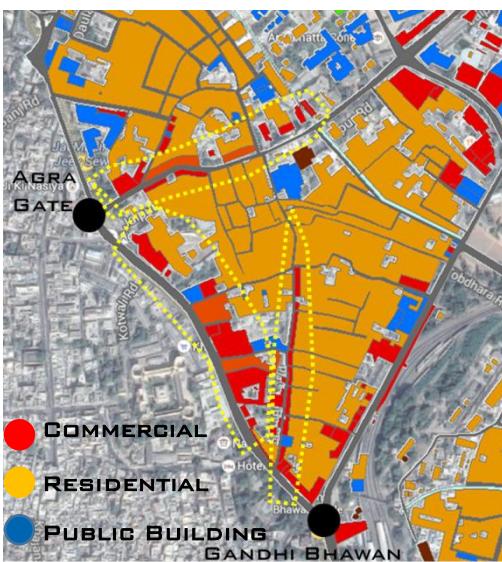
Footpath		Carriageway
Pedestrian zone	Multi-use Zone	Travel Lane
Pedestrians & Wheel-chair users	Street Vending	Car / IPT Lane Emergency Vehicle



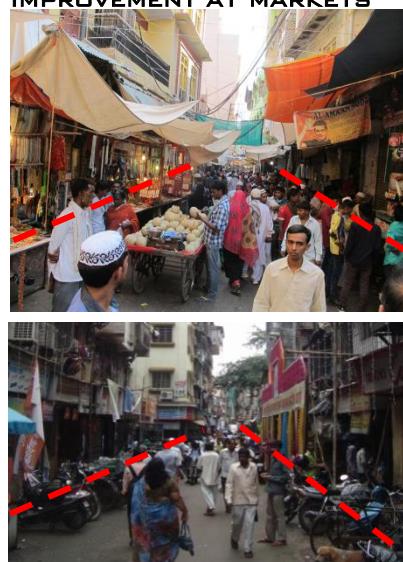
Ped ⁿ (3.5 m)	Street Vending (2.4 m)	Ped ⁿ (3.5 m)
--------------------------	------------------------	--------------------------

Footpath	Carriageway
Pedestrian zone	
Pedestrians & Wheel-chair users	Emergency Vehicle
Street Vending	-
Planting strips /tree beds	-

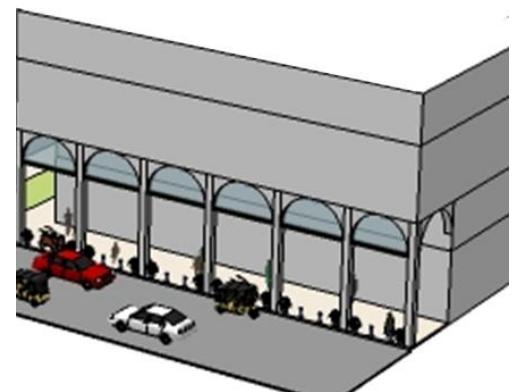
EDGE CONTROL



SHOP'S FRONT EDGE IMPROVEMENT AT MARKETS



- A COORDINATED THEME IN TERMS OF COLOR AND STYLE
- POOR / UNATTRACTIVE SHOP FRONTS FOR REFURBISHMENT
- IMPROVE OVERLOOKING FROM INSIDE OF SHOP FRONTS OVER THE STREET



SMART CITY

3.14 INCUBATION CENTRE & MULTI SKILL INST.

THEME 5: HOTSPOT OF TECHNOLOGY, INNOVATIONS AND STARTUPS

MIND SPACE

ECONOMY & EMPLOYMENT

1. INCUBATION CENTER FOR START UPS
2. MULTI SKILL INSTITUTE

20 CR.
PROJECT COST

INCUBATION CENTER FOR START UPS

THE INCUBATION CENTRE IS ENVISAGED TO FUNCTION AS A CENTER OF LEARNING AND INNOVATION FOR CONTRIBUTING TOWARDS PROMOTION AND ENRICHMENT OF TRADITIONAL WORKS IN THE CITY/ REGION

START-UP CREATION

EARLY STAGE

EXPANSION

The incubation activities will be classified as under:



EFFORT IDEAS
SUCCESS DECISION
STRATEGY SOLUTION
PLAN ACTION MOTIVATION
GROWTH EMPLOYEE



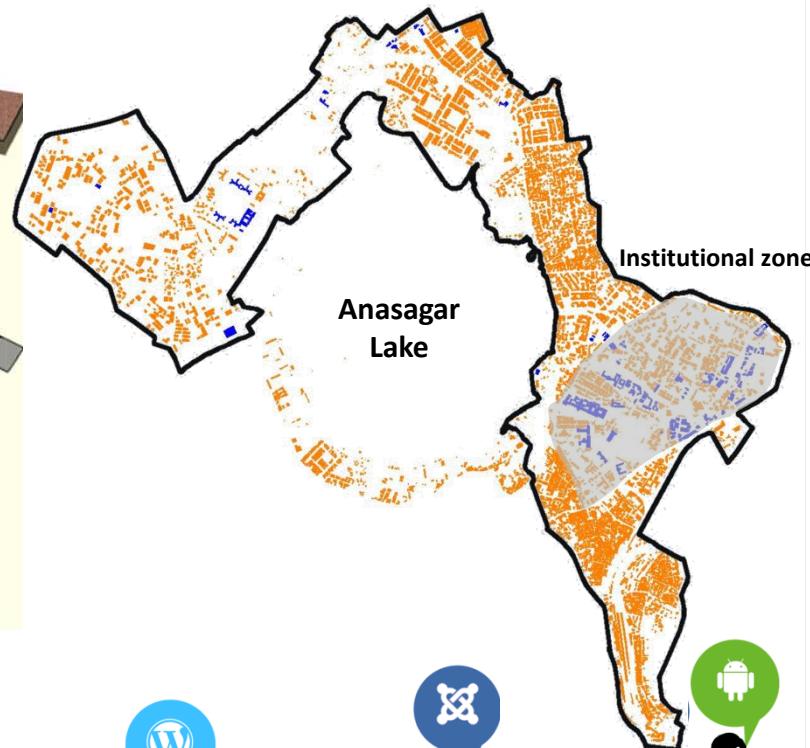
PREMISES

Pre-Incubation services	Incubation Services	Post Incubation centre	Training Services	Coaching and monitoring services
<ul style="list-style-type: none"> Room for pre-incubation Workshops Connectivity Office facilities 	<ul style="list-style-type: none"> Incubation space Secretarial space/reception Meeting rooms Coffee corner Conference rooms Library Laboratories Office facilities 	<ul style="list-style-type: none"> Conference rooms Research centers Laboratories 	<ul style="list-style-type: none"> Fully-equipped training rooms 	<ul style="list-style-type: none"> Office space Meeting rooms Connectivity

MULTI SKILL INSTITUTE

- Changing aspirations of city's youth
- Creating high paying jobs
- Setting new standards for work environment

5 CR.
PROJECT COST



Project Manager



Php Developer



Data Administrator



Web developer



Ethical Hacker

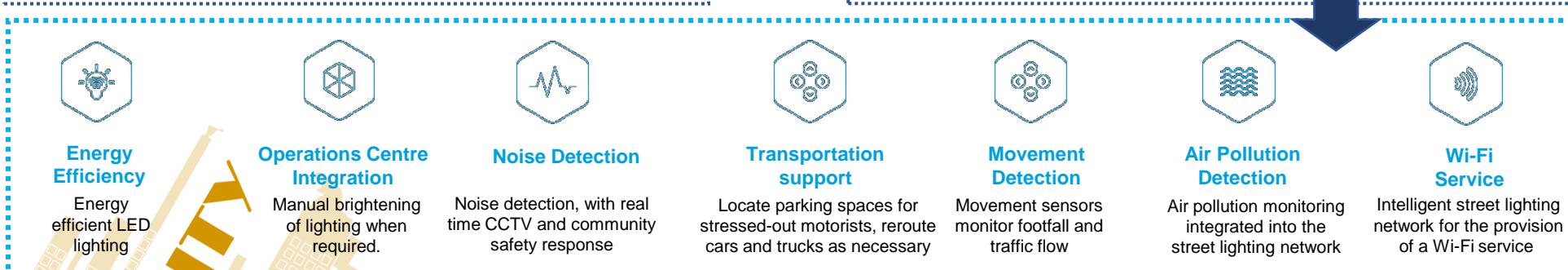
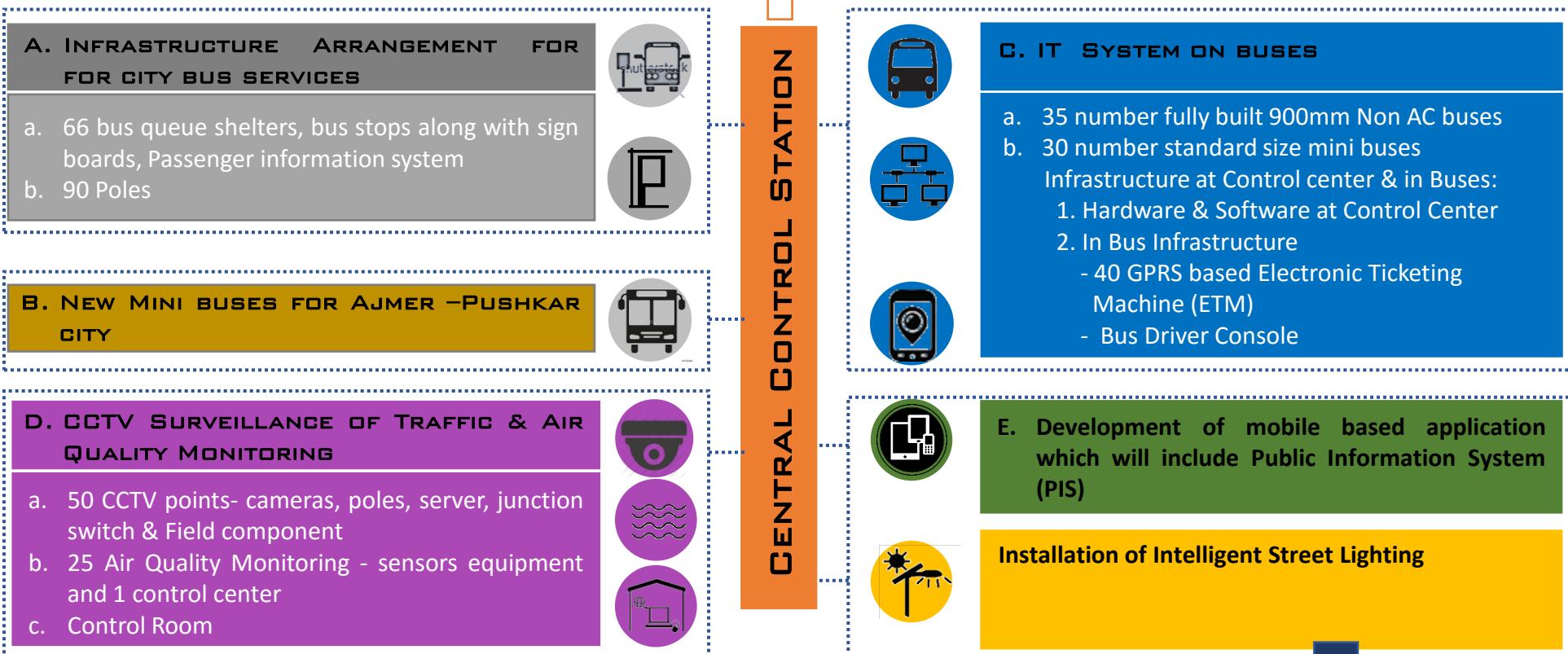


Software developer

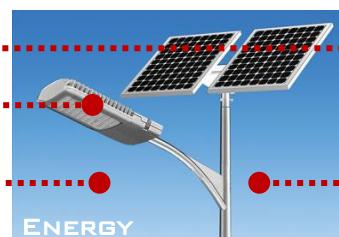
OPTIONS IDENTIFIED FOR PAN CITY SOLUTIONS



PAN CITY SOLUTION # 1: INTEGRATED TRAFFIC MANAGEMENT, SECURITY & SURVEILLANCE SYSTEM



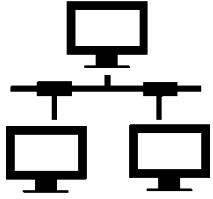
THE ULTIMATE INTERPLAY



SMART CITY

PAN CITY SOLUTION #2: SMART GOVERNANCE

AJMER CITY DOMAIN SPECIFIC MAIL SERVICE



DEVELOP INTEGRATED COMMAND AND OPERATION CENTERS

ICT BASED CROWD/DISASTER MANAGEMENT SYSTEM FOR DARGAH AREA THAT ADDRESSES CRITICAL SAFETY AND SECURITY THREATS



DIGITALIZATION OF REVENUE RECORDS AND COMPLETION OF GIS BASED MAPPING

CITY MOBILE APP: INTRODUCE MULTI CHANNEL CITIZEN INTERFACES FOR BILL PAYMENT, TAX PAYMENT, GRIEVANCE REGISTRATION ETC.



CENTRAL OPERATION CENTER

Taxes

1. Urban Development Tax
2. House Tax

Certificate/ Licenses

1. Birth
2. Death
3. Marriage
4. Trade License
5. Lease, Billing & Collection

Grievances & Redressal system

1. Electronic Helpline
2. Lok Sewa Adhinyam Guarantee
3. Sampark

Others

1. Ajmer 311 App
2. E-Tendering
3. E Auctioning
4. Solid Waste Data Management System



3.17

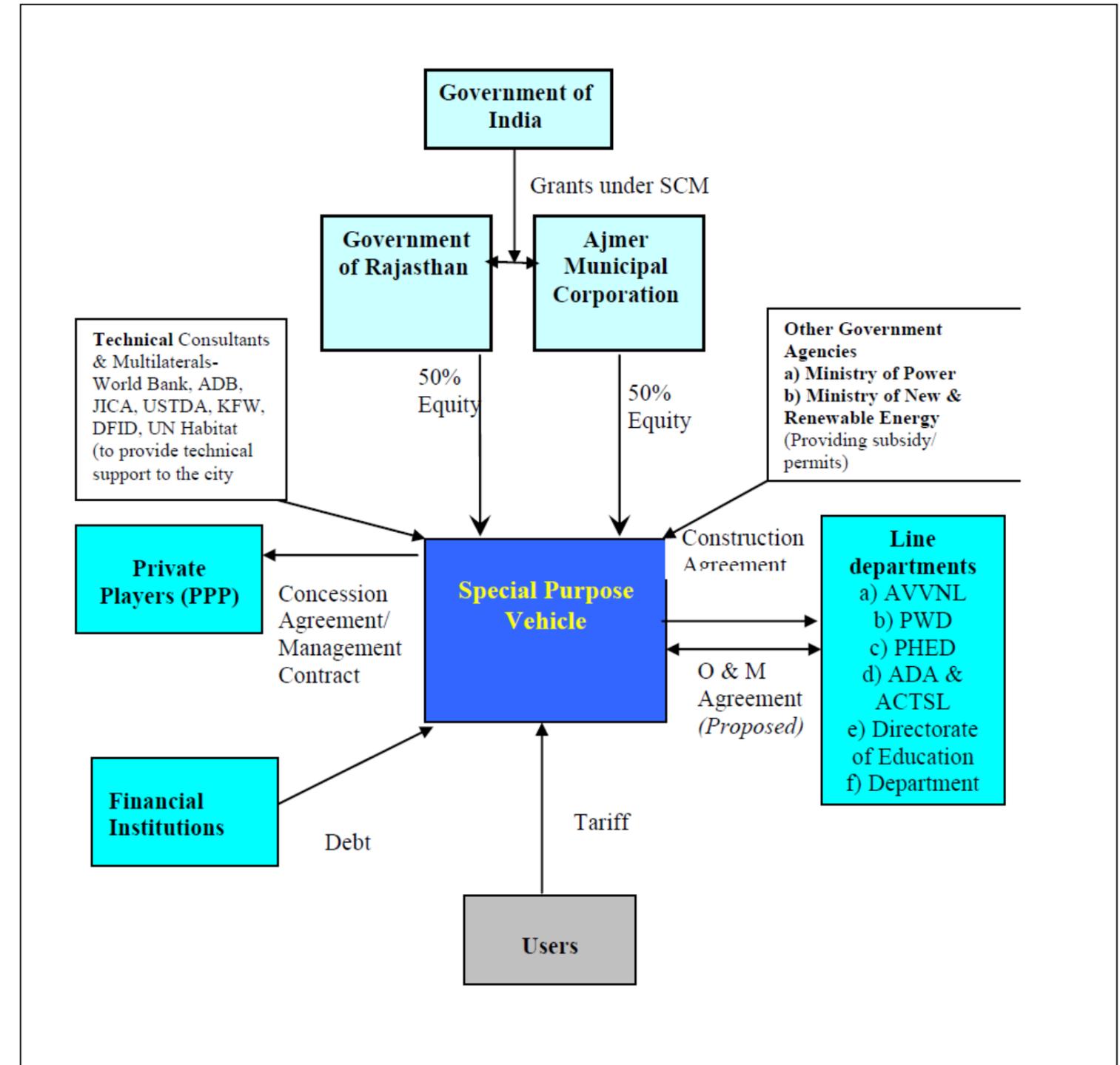
IMPLEMENTATION PLAN AND SPVs RELATIONS WITH OTHER AGENCIES

IMPLEMENTATION PLAN (REFER Q 32)

Package no.	Implementation Packages/ Time lines	Year 1		Year 2		Year 3		Year 4		Year 5	
		2017		2018		2019		2020		2021	
		H1	H2								
IP#1	Promote Ajmer	■	■	■	■	■	■	■	■	■	■
IP#2	Anasagar Promenade	■	■	■	■	■	■	■	■	■	■
IP#3	Green Ajmer	■	■	■	■	■	■	■	■	■	■
IP#4	Integrated Infrastructure Improvement	■	■	■	■	■	■	■	■	■	■
IP#5	Railway station and Bus stand area development			■	■	■	■	■	■	■	■
IP#6	Integrated Transport Management System	■	■	■	■	■	■	■	■	■	■
IP#7	Economically vibrant Ajmer	■	■	■	■	■	■	■	■	■	■
IP#8	Smart Ajmer with WiFi connectivity & E-Governance	■	■	■	■	■	■	■	■	■	■
IP#9	Smart Transportation	■	■	■	■	■	■	■	■	■	■
IP#10	Safe and Healthy Ajmer			■	■	■	■	■	■	■	■

Legends:	
■	Project Preparedness - Approvals
■	Structuring – DPR/ Feasibility, Implementation mode
■	Procurements for selection of vendors and PPP partners
■	Project Execution
■	Commissioning achieved and project functional

SPV NETWORK AND RELATIONSHIP WITH OTHER AGENCIES (REFER Q 33)





3.19

PROJECT COSTS AND FINANCING SOURCES

AJMER SMART CITY PROPOSAL

S.N	Component	Capital Cost	Share	Financing Plan				CAPEX Phasing (In Rs. Crores)					O&M Phasing (In Rs. Crores)					Cumulative O&M in 5 yr	Life Cycle cost
				Smart Cities	Convergence of Schemes	PPP / CSR	AMC/ Loans	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5		
I	AREA BASED DEVELOPMENT	(Rs. Crore)	(%)	(Rs. Crore)				2017	2018	2019	2020	2021	2017	2018	2019	2020	2021	In Rs. Crores	
A	Heritage and Tourism	77.50	4.9	45.00	27.50	5.00	-	12.50	28.50	30.50	5.00	1.00	0.50	1.49	2.52	2.69	2.86	10.05	87.55
1	Heritage and Cultural Promotion	62.50	4.0	40.00	17.50	5.00	-	11.50	24.50	24.50	1.00	1.00	0.46	1.36	2.31	2.47	2.63	9.23	71.73
2	Tourism	15.00	1.0	5.00	10.00	-	-	1.00	4.00	6.00	4.00	-	0.04	0.12	0.21	0.22	0.23	0.82	15.82
B	Green and Blue grid	161.69	10.3	110.59	5.10	46.00	-	25.74	50.27	58.47	22.00	5.20	0.86	2.38	3.97	4.46	4.89	16.57	178.25
1	Anasagar Promenade	110.69	7.0	74.69	-	36.00	-	15.54	36.07	44.27	14.80	-	0.45	1.38	2.36	2.48	2.60	9.27	119.96
2	Innovative use of Public Open spaces	35.00	2.2	19.90	5.10	10.00	-	7.00	11.00	11.00	4.00	2.00	0.28	0.73	1.21	1.43	1.58	5.24	40.24
3	Green Buildings	16.00	1.0	16.00	-	-	-	3.20	3.20	3.20	3.20	3.20	0.13	0.26	0.40	0.55	0.71	2.05	18.05
C	Transportation & Mobility	965.51	61.3	451.87	11.50	475.00	27.15	70.10	177.35	329.35	266.10	122.60	1.52	5.17	9.75	14.01	16.64	47.09	1,012.60
1	Smart Centralised Bus stand	50.00	3.2	-	-	-	-	-	10.00	20.00	20.00	-	-	-	-	-	-	-	50.00
2	Modernisation of Railway Station	310.00	19.7	-	10.00	350.00	-	-	2.00	123.00	123.00	62.00	-	-	-	-	-	-	310.00
3	NMT - Foot path and Cycle Tracks	25.51	1.6	14.01	1.50	10.00	-	4.10	10.15	6.15	5.10	-	0.12	0.32	0.52	0.67	0.70	2.33	27.84
4	Smart Parking	115.00	7.3	-	-	115.00	-	23.00	46.00	46.00	-	-	-	-	-	-	-	-	115.00
5	Road upgradation and Multi-level flyover	215.00	13.7	187.85	-	-	27.15	43.00	59.20	59.20	43.00	10.60	1.40	3.35	5.41	7.07	7.85	25.09	240.09
6	Remodelling Anasagar escape channel to Road	250.00	15.9	250.00	-	-	-	-	50.00	75.00	75.00	50.00	-	1.50	3.83	6.27	8.08	19.67	269.67
D	Basic Amenities	165.07	10.5	73.62	20.31	71.15	-	33.69	58.25	56.46	14.34	2.34	2.05	5.31	8.62	9.14	9.69	34.81	199.88
1	Water, Waste Water and Rain Water Harvesting	37.23	2.4	26.92	10.31	-	-	9.12	15.45	12.66	-	-	0.57	1.62	2.61	2.74	2.88	10.41	47.64
2	Storm Water Drain	21.70	1.4	11.70	10.00	-	-	4.34	6.34	6.34	2.34	2.34	0.17	0.44	0.71	0.84	0.98	3.14	24.84
3	Sanitation and Waste Management	11.15	0.7	-	-	11.15	-	2.23	4.46	4.46	-	-	0.07	0.22	0.38	0.40	0.42	1.50	12.64
4	Mobile Health care centre & Super specialty Hospital	40.00	2.5	-	-	40.00	-	5.00	11.00	12.00	12.00	-	-	-	-	-	-	-	40.00
5	Smart Education	35.00	2.2	35.00	-	-	-	9.00	13.00	13.00	-	-	1.24	3.03	4.91	5.16	5.42	19.76	54.76
6	Sports facilities	20.00	1.3	-	-	20.00	-	4.00	8.00	8.00	-	-	-	-	-	-	-	-	20.00
E	Energy Security	105.00	6.7	61.35	43.65	-	-	17.72	38.72	42.00	6.57	-	0.99	3.35	6.16	7.12	7.48	25.11	130.11
1	Solar Power generation	48.58	3.1	34.00	14.57	-	-	9.72	19.43	19.43	-	-	0.97	2.96	5.05	5.31	5.57	19.87	68.45
2	Power distribution strengthening	56.42	3.6	27.34	29.08	-	-	8.00	19.29	22.57	6.57	-	0.02	0.39	1.11	1.82	1.91	5.24	61.66
F	Integrated urban development	20.00	1.3	-	-	-	20.00	4.00	8.00	8.00	-	-	0.16	0.49	0.83	0.87	0.92	3.27	23.27
	Visual Improvements along roads in commercial areas	10.00	0.6	-	-	-	10.00	2.00	4.00	4.00	-	-	0.08	0.24	0.42	0.44	0.46	1.64	11.64
	Vending zones	10.00	0.6	-	-	-	10.00	2.00	4.00	4.00	-	-	0.08	0.24	0.42	0.44	0.46	1.64	11.64
G	Start-up Innovations and Economy	29.00	1.8	5.00	-	22.40	1.60	7.00	12.00	10.00	-	-	0.04	0.12	0.21	0.22	0.23	0.82	29.82
	Incubation Centre for start ups & Skill Centre	25.00	1.6	5.00	-	20.00	-	5.00	10.00	10.00	-	-	0.04	0.12	0.21	0.22	0.23	0.82	25.82
	Business Improvement District - Integrating commercial areas	4.00	0.3	-	-	2.40	1.60	2.00	2.00	-	-	-	-	-	-	-	-	-	4.00
H	SMART Connectivity	50.70	3.2	8.00	-	42.70	-	10.04	20.18	20.48	-	-	0.15	0.47	0.93	0.98	1.03	3.55	54.25
	Wi-Fi Services	41.70	2.6	-	-	41.70	-	8.34	16.68	16.68	-	-	-	-	-	-	-	-	41.70
	Disaster Management response	8.00	0.5	8.00	-	-	-	1.50	2.70	3.80	-	-	0.15	0.47	0.93	0.98	1.03	3.55	11.55
	Town Centre App	1.00	0.1	-	-	1.00	-	0.20	0.80	-	-	-	-	-	-	-	-	-	1.00
	Subtotal (Area Based Development)	1,574.47	100.0	755.42	108.06	662.25	48.75	180.78	393.27	555.27	314.01	131.14	6.28	18.77	32.99	39.49	43.73	141.26	1,715.73
II	PAN-CITY																		
1	Integrated Traffic Management, Security & Surveillance system	173.07	88.3	127.52	37.50	8.06	-	40.71	68.06	49.31	15.00	-	3.03	10.05	17.42	20.54	21.57	72.61	245.68
2	City Governance	23.00	11.7	18.00	-	-	5.00	4.60	9.20	9.20	-	-	0.69	2.10	3.59	3.77	3.96	14.11	37.11
	Subtotal (Pan City)	196.07	100.0	145.52	37.50	8.06	5.00	45.31	77.26	58.51	15.00	-	3.72	12.15	21.01	24.31	25.52	86.72	282.79
III	Technical & Admin Support																		
1	Technical Assistance & Management Support	88.53	50.0	36.04	-	33.52	18.97	26.56	22.13	17.71	13.28	8.85	-	-	-	-	-	-	88.53
2	Contingency	88.53	50.0	36.04	-	33.52	18.97	11.30	23.53	30.69	16.45	6.56	0.50	1.55	2.70	3.19	3.46	11.40	99.93
	Subtotal (Technical & Admin Support)	177.05	100.0	72.07	-	67.03	37.95	37.86	45.66	48.39	29.73	15.41	0.50	1.55	2.70	3.19	3.46	11.40	188.45
	Total Project Cost	1,947.60		973.01	145.56	737.33	91.70	263.96	516.18	662.17	358.74	146.55	10.50	32.47	56.70	66.99	72.72	239.38	2,186.97

	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27	Rs. Lakh
REVENUE ACCOUNT												
Opening Balance		1,260	563	-93	3,764	3,127	7,080	8,073	6,905	5,968	5,578	
Apportioned Revenue Income												
Urban Development Tax	82	105	132	147	163	182	203	226	252	281	313	
AMC - Income from other sources - Apportioned	2,364	2,601	2,861	3,147	3,462	3,808	4,189	4,608	5,068	5,575	6,133	
New Revenue Streams owing to development	1,273	1,324	6,074	9,131	9,495	9,746	6,855	4,748	5,012	5,570	5,886	
Sub-Total	3,720	4,030	9,067	12,424	13,120	13,736	11,247	9,582	10,332	11,426	12,331	
Revenue Expenditure												
Base O&M Costs in Service Area	1,409	1,480	1,554	1,632	1,713	1,799	1,889	1,983	2,082	2,186	2,296	
Additional O&M due to new investments	1,050	3,247	5,670	6,699	7,272	7,636	8,017	8,418	8,839	9,281	9,745	
Loan Repayment	-	-	237	237	237	349	349	349	349	349	349	
Sub-Total	2,459	4,727	7,461	8,568	9,222	9,783	10,255	10,750	11,270	11,816	12,389	
REVENUE SURPLUS	1,260	563	-93	3,764	3,127	7,080	8,073	6,905	5,968	5,578	5,520	
CAPITAL ACCOUNT												
Opening Balance - Capital Account		21,858	9,511	-	3,211	-						
Capital Receipts												
Grants - Smart Cities Mission	38,600	19,567	19,567	19,567	-	-	-	-	-	-	-	
Grants - Convergence	3,803	5,838	3,985	730	200	-	-	-	-	-	-	
PPPs and CSR	5,850	13,867	28,519	18,788	6,710	-	-	-	-	-	-	
SPV	-	-	2,261	-	4,534							
Loans	-	-	2,375	-	-	-	-	-	-	-	-	
Sub-Total	48,253	39,272	56,706	39,085	11,444	-	-	-	-	-	-	
Capital Expenditure												
Project Spending	26,396	51,618	66,217	35,874	14,655	-	-	-	-	-	-	
Sub-Total	26,396	51,618	66,217	35,874	14,655	-	-	-	-	-	-	
CAPITAL ACCOUNT - Surplus/ Deficit	21,858	9,511	-	3,211	-	-	-	-	-	-	-	
OVER ALL CLOSING BALANCE	23,118	10,073	-93	6,975	3,127	7,080	8,073	6,905	5,968	5,578	5,520	
FCFF (Free Cash Flow Funds)	-20,597	-8,948	-93	552	3,127	7,080	8,073	6,905	5,968	5,578	5,520	
Cumulative Cash Flow	-20,597	-29,546	-29,639	-29,086	-25,959	-18,879	-10,806	-3,901	2,066	7,644	13,164	
Availability of Own Resources against Resource Gap	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23					
SPV/ AMC												
<i>Resource Gap after accounting for SMART/ CONVERGENCE/ PPPs</i>	-	-	4,636	-	4,534	-	-					
Available Own resources	-	-	2,406	-	4,534	-	-					
Contribution from available own sources		100%	94%	100%	100%	100%	100%					
Contribution from Own sources	-	-	2,261	-	4,534	-	-					
<i>Resource Gap after accounting for Own Resources/ Debt Funding</i>												
SPV Loan		-	2,375	-	-	-	-					

Ajmer

Pristine ■ Modern ■ Historical



Smart City proposal
Smart city Code - RJ-04-AJM
30TH June, 2016



Volume 2
Annexure 4 – Supporting documents



SMART CITY



AJMER NAGAR NIGAM



ANNEXURE 4

(Supporting documents, such as government orders, council resolutions, response to Question 33 may be annexed here)

S. No	Particulars	✓
1	4.1. Resolution of the Ajmer Municipal Corporation for approving Smart City Plan including Financial Plan & setting up Special Purpose Vehicle	<input checked="" type="checkbox"/>
2	4.2. Agreement/s with Para Statal Bodies, Boards existing in the City for implementing the full scope of the SCP and sustaining the pan-city and area-based developments	<input checked="" type="checkbox"/>
3	- Ajmer Development Authority	<input checked="" type="checkbox"/>
4	- Department of Information Technology	<input checked="" type="checkbox"/>
5	- Department of Tourism, Rajasthan	<input checked="" type="checkbox"/>
6	- Public Health and Engineering Department, Ajmer Region	<input checked="" type="checkbox"/>
7	- Ajmer Vidyut Vitran Nigam (AVVL), Ajmer	<input checked="" type="checkbox"/>
8	- Rajasthan State Road Transport Corporation (RSRTC), Ajmer	<input checked="" type="checkbox"/>
9	- Regional Transport Office, Ajmer	<input checked="" type="checkbox"/>
10	- Office of the Superintendent of Police, Ajmer	<input checked="" type="checkbox"/>
11	- Public Works Department, Ajmer	<input checked="" type="checkbox"/>
12	- Reliance Geo Infocomm Ltd., Ajmer	<input checked="" type="checkbox"/>
13	4.3. Preliminary human resource plan for the SPV	<input checked="" type="checkbox"/>
14	4.4. Institutional Arrangement for operationalization of SPV	<input checked="" type="checkbox"/>
15	4.5. Minutes of Meeting High Power Steering Committee, Dated 14.06.2015	<input checked="" type="checkbox"/>
16	4.6. Supporting documents related to schemes/ work under implementation considered for convergence by AMC and other para statal bodies	<input checked="" type="checkbox"/>
17	- Letter from Ministry of Urban Development (MoUD) on inclusion of Ajmer under HRIDAY	<input checked="" type="checkbox"/>
18	- Agreement Between Municipal Corporation Ajmer & Energy Efficient Services Limited (EESL)	<input checked="" type="checkbox"/>
19	- Integrated Power Development Scheme (IPDS) Scheme in Ajmer	<input checked="" type="checkbox"/>
20	- MoU between Ministry of Power (MoP), GoR and AVVNL	<input checked="" type="checkbox"/>

21	- Letter of Intent (LOI) for Bicycle mobility services in Ajmer	<input checked="" type="checkbox"/>
22	4.7 MOU between Ajmer Nagar Nigam and Confederation Of Indian Industry (CII)	<input checked="" type="checkbox"/>
23	4.8 MOU between GoR and USTDA	<input checked="" type="checkbox"/>
24	4.9. High Level Sector Report by USTDA	<input checked="" type="checkbox"/>
25	4.10. State Policies supporting implementation of Smart Solutions proposed under SCP	<input checked="" type="checkbox"/>
26	- Rajasthan IT & ITES Policy - 2015	<input checked="" type="checkbox"/>
27	- Rajasthan Solar policy	<input checked="" type="checkbox"/>
28	- State Policy on Rain_Water_Harvesting_-_2011	<input checked="" type="checkbox"/>
29	- Draft Rajasthan Urban Water Policy - 2015	<input checked="" type="checkbox"/>
30	- State Sewerage & Waste Water Policy - 2016	<input checked="" type="checkbox"/>
31	4.11. List of Sub group Committees formed for Smart City Proposal preparedness under chairmanship of Divisional Commissioner, Ajmer in March 2015	<input checked="" type="checkbox"/>
32	4.12. Detailed Project list of SCP	<input checked="" type="checkbox"/>
33	4.13. SPV Revenue from Internal Sources and O&M Costs	<input checked="" type="checkbox"/>
34		<input type="checkbox"/>
35		<input type="checkbox"/>
36		<input type="checkbox"/>
37		<input type="checkbox"/>
38		<input type="checkbox"/>
39		<input type="checkbox"/>
40		<input type="checkbox"/>

**4.1. Resolution of the Ajmer Municipal Corporation
for
approving Smart City Plan including Financial Plan
&
setting up Special Purpose Vehicle**



कार्यालय नगर निगम, अजमेर

पृथ्वीराज मार्ग, अजमेर

दूरभाष-0145-2429953, फ़ैक्स-0145-2433813, Email-ajmermc@gmail.com, web.-www.ajmermc.org

क्रमांक प्रस्ताव - 315

दिनांक 23-6-2016

प्रस्ताव (RESOLUTION)

दिनांक 22.06.2016 को दोपहर 3:00 बजे नगर निगम अजमेर की साधारण सभा की बैठक श्रीमान् महापौर महोदय, अजमेर की अध्यक्षता में सम्पन्न हुई। बैठक की कार्य सूची (Agenda) में प्रथम प्रस्ताव अजमेर शहर को स्मार्ट सिटी बनाने हेतु प्रस्तावित 'स्मार्ट सिटी प्लान' सदन के सम्मुख विचारार्थ रखा गया। प्रस्तावित स्मार्ट सिटी प्लान, स्मार्ट सिटी वित्तीय प्रस्ताव एवं Special Purpose Vehicle के गठन के प्रस्ताव को सर्वसम्मति से स्वीकृति का प्रस्ताव पारित कर अनुमोदन किया गया।

23-06-2016

(प्रियव्रत पंडेय)
आयुक्त

नगर निगम अजमेर

(धर्मन्द्र गहलोत)
महापौर

नगर निगम अजमेर



4.2. Agreement/s with Para Statal Bodies, Boards existing in the City for implementing the full scope of the SCP and sustaining the pan-city and area-based developments

Ajmer Development Authority, Ajmer

S.NO./ 7031

Date: 21-06-2016

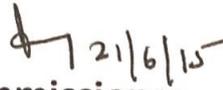
To
Commissioner
Ajmer Municipal Corporation
Ajmer

Subject:- Consent for Extending support to Ajmer Municipal Corporation in implementation of Ajmer Smart City Proposal.

Ref : - Your Letter No. SBM - 18 dt. 20-06-2016

Sir,

In light of the finalization of Smart City Proposal for Ajmer under the Smart City Mission, launched by Ministry of Urban Development, Government of India, **Ajmer Development Authority** agrees to cooperate and offer support to Ajmer Municipal Corporation for the implementation of Ajmer Smart City Proposal regarding implementation of projects.


21/6/16
Commissioner,
Ajmer Development Authority,
Ajmer



Office of the Additional Chief Engineer

PHED, Region Ajmer
Jal Bhawan, Todarmal Marg, Civil Lines, Ajmer
Tel. 0145-2628475, Fax. 0145-2970247 Email-aceregionajmer@gmail.com

No. F ()/ACE/ AEN Ajmer/15-16/ 6679

Date : 21/6/16

To

Ajmer Municipal Corporation

Ajmer

Subject: Consent for Extending support to Ajmer Municipal Corporation in implementation of Ajmer Smart City Proposal

In light of the finalization of Smart City Proposal for Ajmer under the Smart City Mission, launched by Ministry of Urban Development, Government of India, **Public Health and Engineering Department** agrees to cooperate and offer support to Ajmer Municipal Corporation for the implementation of Ajmer Smart City Proposal regarding projects related to water supply rain water harvesting and installation of smart meters.

(VK Sharma)

Additional Chief Engineer
PHED, Region Ajmer.

D.No. 1509

Date 21/6/16

To

Ajmer Municipal Corporation

Ajmer

Subject: Consent for Extending support to Ajmer Municipal Corporation in implementation of Ajmer Smart City Proposal

In light of the finalization of Smart City Proposal for Ajmer under the Smart City Mission, launched by Ministry of Urban Development, Government of India, **Department of Information Technology, Ajmer** agrees to cooperate and offer support to Ajmer Municipal Corporation for the implementation of Ajmer Smart City Proposal regarding implementation of centralized command and control centre, performance dashboards, other IT based activities such as city apps, providing Wi Fi connectivity in the selected area, making the city wireless

With Regards



Department of Information Technology, Ajmer



Government of Rajasthan
Tourist Reception centre, Ajmer

Date 21-6-2014

No. 2145

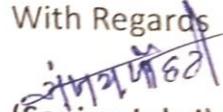
To
Commissioner
Ajmer Municipal Corporation
Ajmer

Subject: Consent for Extending support to Ajmer Municipal Corporation in implementation of Ajmer Smart City Proposal

Sir,

In light of the finalization of Smart City Proposal for Ajmer under the Smart City Mission, launched by Ministry of Urban Development, Government of India, **Department of Tourism, Government of Rajasthan, Ajmer** agrees to cooperate and offer support under direction of Director Department of Tourism, Jaipur to Ajmer Municipal Corporation for the implementation of Ajmer Smart city Proposal regarding development of tourist information centre at public places, kiosks, public conveniences etc.

With Regards


(Sanjay Johri)

Deputy Director
Tourism, Ajmer

155) Date 21-6-2016

To

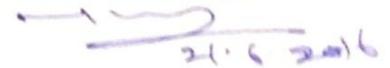
Ajmer Municipal Corporation

Ajmer

Subject: Consent for Extending support to Ajmer Municipal Corporation in implementation of Ajmer Smart City Proposal

In light of the finalization of Smart City Proposal for Ajmer under the Smart City Mission, launched by Ministry of Urban Development, Government of India, **Ajmer Vidyut Vitran Nigam Limited**, agrees to cooperate and offer support to Ajmer Municipal Corporation for the implementation of Ajmer Smart City Proposal regarding development of a solar city, generation of solar power, strengthening of power distribution and harnessing solar energy for different uses

With Regards



Ajmer Vidyut Vitran Nigam Limited

Superintending Engineer (ACC)

A.V.N.L., AJMER

To

Ajmer Municipal Corporation

Ajmer

Subject: Consent for Extending support to Ajmer Municipal Corporation in implementation of Ajmer Smart City Proposal

In light of the finalization of Smart City Proposal for Ajmer under the Smart City Mission, launched by Ministry of Urban Development, Government of India, **Rajasthan State Road Transport Corporation, Ajmer** agrees to cooperate and offer support to Ajmer Municipal Corporation for the implementation of Ajmer Smart City Proposal regarding development of multilevel modern centralised bus stand.

With Regards

Rajasthan State Road Transport

M 16/6/16
मुख्य प्रबन्धक
सं.रा.प.प.निगम
अजमेर आण्डर

शु.शु. 2552.

Date 22/6/16

To

Ajmer Municipal Corporation

Ajmer

Subject: Consent for Extending support to Ajmer Municipal Corporation in implementation of Ajmer Smart City Proposal

In light of the finalization of Smart City Proposal for Ajmer under the Smart City Mission, launched by Ministry of Urban Development, Government of India, **Regional Transport Office, Ajmer** agrees to cooperate and offer support to Ajmer Municipal Corporation for the implementation of Urban Transport Project under Smart Cities. The project would include development of traffic data management with GPS enabled Vehicle Tracking System and developing an integrated plan to achieve the implementation of interventions identified under Smart City

With Regards

 22/6/16
Regional Transport Office, Ajmer

To

Ajmer Municipal Corporation

Ajmer

Subject: Consent for Extending support to Ajmer Municipal Corporation in implementation of Ajmer Smart City Proposal

In light of the finalization of Smart City Proposal for Ajmer under the Smart City Mission, launched by Ministry of Urban Development, Government of India, **Reliance Ltd, Ajmer** agrees to cooperate and offer support to Ajmer Municipal Corporation for the implementation of Ajmer Smart City Proposal.

With Regards
Reliance JIO Infocomm Ltd
AJMER
Reliance Ltd, Ajmer
22/06/2016

**OFFICE OF THE SUPERINTENDING ENGINEER
PUBLIC WORKS DEPARTMENT
CIRCLE, AJMER**

No: 9105

Date: 10.12.2015

To,
Mr. H. Guite
CEO
Ajmer Municipal Corporation
Ajmer

Subject : Consent for extending full support to Ajmer Municipal Corporation for implementation of Ajmer Smart City Proposal

In light of the finalization of Smart City Proposal for Ajmer under the Smart City Mission, launched by Ministry of Urban Development, **PUBLIC WORKS DEPARTMEN, AJMER** agrees to Co-operate and offer full support to Ajmer Municipal Corporation for the implementation of Ajmer Smart City Proposal.

Warm Regards


(B.L. BAIRWA)
Superintending Engineer
PWD, Circle,
Ajmer

OFFICE OF THE SUPERINTENDENT OF POLICE, DISTRICT AJMER.

No: PA/2015/ 2060

Date: 10.12.2015

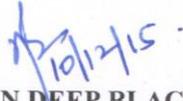
**Chief Executive Officer,
Nagar Nigam,
Ajmer.**

Subject: Consent for extending full support to Ajmer Nagar Nigam for implementation of Ajmer Smart City Proposal

Sir,

In light of the finalization of Smart City Proposal for Ajmer under the Smart City Mission, launched by Ministry of Urban Development, **District Police, Ajmer** agrees to cooperate and offer full support to Ajmer Nagar Nigam for the implementation of Ajmer Smart City Proposal.

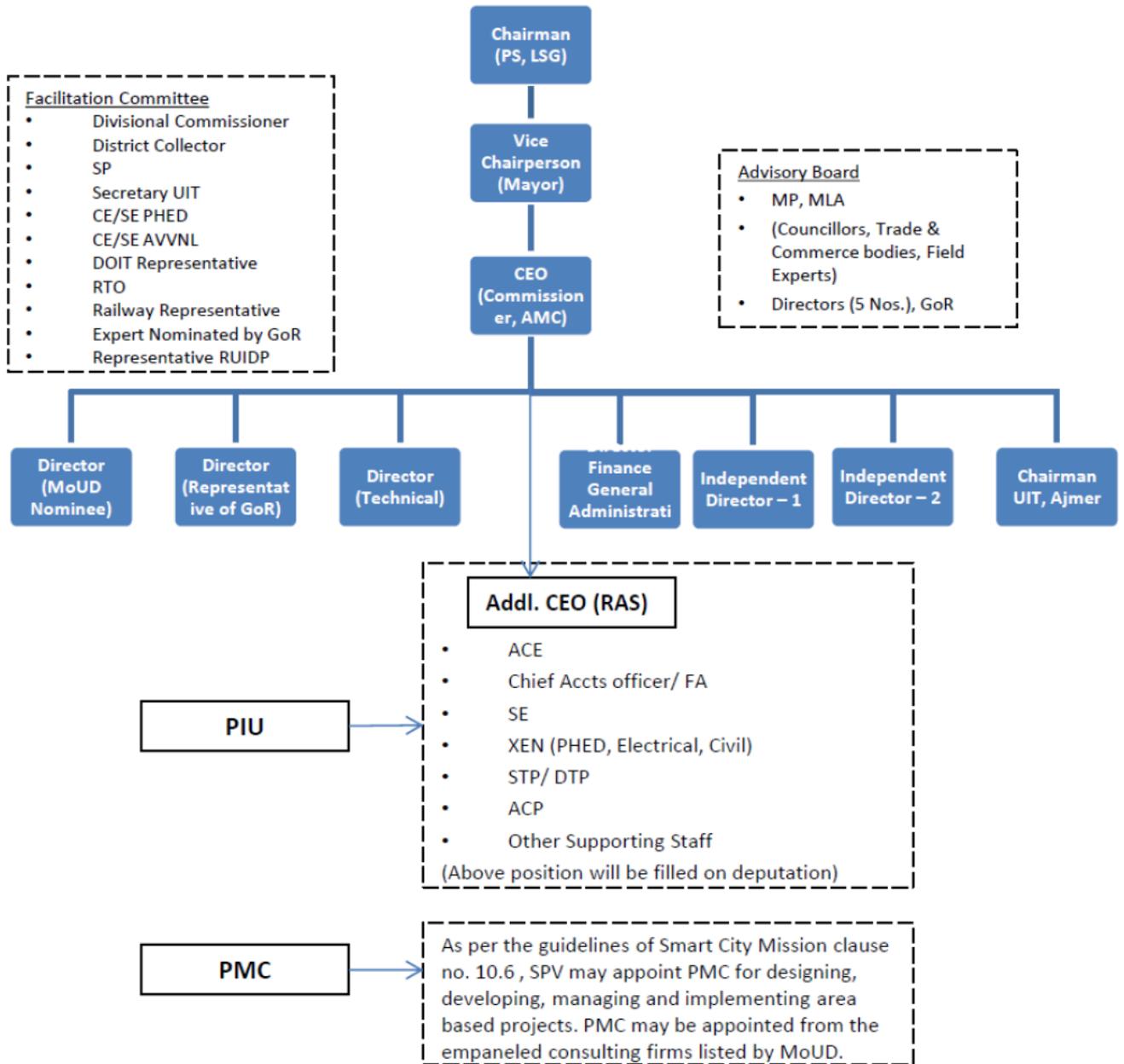
Yours faithfully,


(DR. NITIN DEEP BLAGGAN)
Superintendent of Police,
Distt. Ajmer.
(Dr. Nitin Deep Blaggan)
Superintendent of Police
Distt.-Ajmer



4.3. Preliminary human resource plan for the SPV

Organogram for SPV





4. Institutional Arrangement for operationalization of SPV

Draft Special purpose vehicle (SPV) Proposal

Objective:

The objective of the SPV is to ensure better coordinated and harmonious delivery of multiple municipal services, so as to achieve the implementation of the Smart City projects on a mission mode.

Introduction :

The SPV will be an umbrella institution responsible for planning, appraisal, deployment of funds, implementation, management of urban assets and service delivery, coordination with other institutions and departments, award of contracts / PPP concessions, monitoring and evaluation of the Smart City development projects.

The Smart city SPV shall be responsible not only for functions that are being carried out by the Municipal Corporation today, but also for functions like water supply, power distribution, sewerage that today are being discharged by parastatal agencies like the PHED, AVVNL, UIT respectively in Walled City Area. Accordingly all powers & functions will be delegated appropriately under the Rajasthan Municipal Act and other relevant statutes in this regard as per Clause 4 of Annexure V : Structure and Functions of SPV of the Smart City Mission guidelines.

Funding Pattern and Paid Up Capital Of SPV:

In terms of constitution, the SPV will be a limited company incorporated under the Companies Act, 2013, in which the State Government of Rajasthan and the Municipal Corporation (MC) will be the promoters with equal shareholding. At all times the share of the Government shall be more than 51%. The balance equity capital may be contributed / subscribed by private sector or financial institutions.

The initial paid up equity capital of the SPV shall be Rs 200 Crores contributed equally by the GoR and the Municipal Corporation. Out of Rs 500 Crores GoI support, Rs 100 Crore will be treated as the Municipal Corporation's initial contribution to the paid up equity while GoR will put in an equivalent amount as its share from its contribution.

Board of Directors:

The Chairman of the SPV will be the Minister, Government of Rajasthan PS LSG. It will have the Mayor as Vice Chairman and the Municipal Commissioner will be the CEO till a full time CEO is appointed. The Board of the SPV will have nominees of the Central Government, 5 directors of State Government and ULB, and two Independent Directors. The SPV will be supported by an advisory Board comprising of MP, MLA, Councillors and eminent experts and a Facilitation Committee comprising the heads of various line departments. The Chairman of the SPV will be given autonomy and full financial powers as given to the Municipal Board in accordance with Clause 4 of Annexure V of the Smart city Mission guidelines

Structure of SPV

The SPV will have one Project Management Unit (PMU) and number of Project Implementation Unit (PIU) as required and decided by CEO .The Project Implementation Unit comprising Addl CEO.(Rajasthan Administrative Officer),SE/ Executive Engineers (Civil, Electrical) and few Asstt Engineers and Junior engineers, DTP/STP, ACP and other supporting staff.

The SPV / PIU will be assisted by a PMC as per Clause 10.6 of the Smart Cities Mission guidelines for designing developing, managing and implementing area-based projects

Functioning:

The SPV shall function like a holding or investment company. All funding assistance, grants, contributions from the Government of India, State Government, Municipal Corporation under various missions and schemes that could relate to the Smart City initiative would be channelised through this SPV on a convergence mode.

The Draft Organogram is indicative is enclosed for reference .



4.5. Minutes of Meeting for HPSC held on 14.06.2016

F.(SC-03)RUDSICO/Smart City/2016-17/5810

Date: 20.06.2016

Minutes of Meeting

Minutes of 3rd meeting of "State High Powered Steering Committee (SHPS) meeting under Smart Cities Mission held on 14.06.2016.

The 3rd meeting of "State High Powered Steering Committee (SHPS) under Smart Cities Mission was held on Tuesday, 14th June 2016 at 04:00 PM in the Committee Room No.-1 of Secretariat under the Chairmanship of Chief Secretary, Government of Rajasthan.

List of participants is enclosed at Annexure-A.

At the outset, Principal Secretary, LSGD cum State Mission Director, Smart Cities Mission welcomed all member of the SHPS and initiated agenda wise with a brief presentation. It was informed that, in the Round I Challenge, Jaipur and Udaipur were selected from Rajasthan and in the round II Challenge, the Smart City proposals of Kota and Ajmer are to be recommended to MoUD for their approval. Further, the Action Taken Report on the 2nd SHPS meeting held on 07.12.2015 was presented.

I. Udaipur

The Progress update for USCL was presented by Sh. Siddharth Sihag, IAS CEO and the details are as follows:

- a. The SPV for Udaipur namely Smart City Ltd (USCL) have been registered on 12.03.2016 under the Companies Act 2013.
- b. Addl. CEO have been posted
- c. Dedicated account has been opened and funds have been transferred.
- d. Status of fund transferred to the SPV :

Date	GoI	GoR	ULB
31.03.2016	159.2 Cr.	Nil	Nil
06.04.2016	34.80 Cr.	Nil	Nil
27.04.2016	Nil	40.79 Cr.	Nil

- e. The Technical Bid for Project Management Consultants have been completed and following two Consultants have qualified for opening of Financial Bid
 1. M/S EPTISA Servicios de Ingenieria, SL
 2. M/s Tata Consulting Engineers Ltd

The Financial Bid was opened on 13.06.2016 and is under Negotiations.

- f. The Status of the quick win projects identified for Implementation are as follows:

Project Name	Implementing Agency	Project Cost (in Crs.)	Status	Tentative Dates	
				Starting	Completion
Sewerage Works in walled City Area (Convergence with AMRUT)	USCL	5.75	Bids under evaluation	25.6.2016	24.6.2017

Development of Recreational, social welfare activity with enhancing tourism potential at Gulab Bag	USCL	0.15	LOA issued	25.6.2016	24.7.2016
Heritage Conservation of Bazars:	USCL	6.58	Tender finalized	25.6.2016	24.12.2017
Smart Classrooms:	USCL	0.80	Bids under evaluation	25.6.2016	24.9.2016
NMT with Developing Cycling Facility: (PPP Mode)	USCL	0.50	Notice to proceed issued to contractor	25.6.2016	24.9.2016
	Total	13.78			

- g. The DPR for IPDS was prepared by AVVNL for Rs 126.05 Cr and has been sent to Ministry of Power, GOI for approval on 05.05.2016
- h. The LOA for Roof top solar power Plants at 7 places with a capacity of 200 KW amounting to Rs 1.61 Cr has been given to Rajasthan Electronics & Instrumentation Ltd, Jaipur and the work is expected to be completed within 2 months

II. Jaipur

The Progress update for JSCL was presented by Sh V. Saravana Kumar, IAS CEO and the details are as follows:

- a. The SPV for Jaipur namely Jaipur Smart City Ltd (JSCL) have been registered on 12.03.2016 under the Companies Act 2013.
- b. Fulltime CEO has been posted
- c. Dedicated account has been opened and funds have been transferred
- d. Status of fund transferred to the SPV:

Date	GoI	GoR	ULB
31.03.2016	186 Cr.	Nil	Nil
06.04.2016	8 Cr.	Nil	Nil
27.04.2016	Nil	13.99 Cr.	Nil

- e. The Technical bids for Project Management Consultants were opened on 30.05.2016 and 3 out of 5 were shortlisted, the evaluation has been completed & financial bids will be opened by 16.06.2016

- f. The Status of the quick win projects identified for Implementation are as follows:

Project Name (Local Area Based)	Implementing Agency	Project Cost (in Crs.)	Status of Work	Dates	
				Commencement	Completion
Facade Development of Jaipur Bazars	JSCL	13.00	16.6.2016 (Retendering)		
Conservation, Restoration, Adaptive Reuse of Rajasthan School of Art	JSCL	3.00			
Installation & Commissioning	JSCL	0.81	W.O. issued	25.6.2016	Ongoing

of Roof Top Solar Power Plants					
Beautification of Ramnivas Garden	JDA	9.00	W.O. issued	31.12.2016	Ongoing
Public Bike Sharing Scheme (PPP mode)	JMC	1.00	MoU signed	25.6.16	Ongoing
	Total	26.81			

- g. The DPR for IPDS for the ABD area has been prepared by JVVNL for Rs 26.50 Cr and the same have been sent to Ministry of Power , GOI for approval on 24.04.2016
- h. The LOA for Roof top solar power Plants at 3 places with a capacity of 100 KW amounting to Rs 0.81 Cr has been given to Rajasthan Electronics & Instrumentation Ltd, Jaipur and the work is expected to be completed within 2 months

Observations:

The Chief Secretary, Government of Rajasthan, showed his displeasure on the slow progress of JSCL and instructed that implementation should be done on time bound manner.

III. Kota

Sh. Shiv Prasad Nakate, Municipal Commissioner, Kota presented the Smart City proposal. The salient points of the proposal are as follows:

- A. The total investment plan for the Mission period is **Rs. 1455.00 Cr.** The breakup is as follows:
- Area based development (Retrofitting) = 1067.00 Cr
 - Pan City Development = 319.00 Cr.
(Rs. 69.00 Cr. Contingency, PMC fee etc extra)
- B. The proposed sectors in the proposal are as follows:
- Area based development(Retrofitting):** Pedestrian friendly city with recreational facilities, Development of tourism activities, Provide hard infrastructure, Environmental sustainability and water body conservation, Development of Dusshehra ground, Redevelopment of Ghodewala Baba Slum.
 - Pan City Development:** Water Management with use of improved technology, Integrated Traffic Management system, Solid Waste Management.
 - The mode of Area Based Development is Retrofitting earmarked after intense citizen consultation.
 - The area selected is the central located twin lakes known as Kishor Sagar & Kotri Talab and its nearby area totaling 1459 Acres.

IV. Ajmer

Sh. Gaurav Goyal, Collector, Ajmer presented the Smart City proposal.

The brief of the proposal is as follows:

- A. The total investment plan for the Mission period is **Rs. 1947.62 Cr.** The breakup is as follows:
- a) Area based development(Retrofitting) = 1731.94 Cr
 - b) Pan City Development = 215.68 Cr.
- B. The proposed sector in the proposal are as follows:
- a) **Area Based Development (Retrofitting):** Heritage, Art & Culture, Tourism, Transportation & Mobility, Pristine Environment & ecofriendly recreational projects, development of Economy & Innovation Hotspot .
 - b) **Pan City Development:** Integrated Traffic Management, Security & Surveillance system, Intelligent Street lights, City E-governance.
 - c) The mode of Area Based Development is Retrofitting earmarked after intense citizen consultation.
 - d) The area selected is the northern and central part of the city surrounding Ana Sagar lake covering 1526 Acre of the land. The area comprising 13 wards which includes a Holistic, inclusive and transformatic retrofit development of area extending from Martin Dale Bridge, covering railway station, Gandhi Bhawan Chowk, Madar Gate, Bus Stand, JLN Hospital, Daulat Bag, Gaurav Path, Pragati Nagar, Civil Lines, Vaishali Nagar etc.

Observations:

1. Mrs Roli Singh, Secretary Tourism, suggested that the Micro tourist circuit and heritage walks should be included in the proposal and the Façade restoration and other heritage development works should merge with the local landscape and should retain the basic fabric and culture of the area.
2. Mr Akhil Arora, Secretary DoIT, suggested that the specifications of various ICT related Interventions and activities should be included in the Tenders. This is for both Ajmer and Kota Cities.

V. Decision taken:

SHpsc approved Smart City proposals of Ajmer & Kota by incorporating relevant observations for submission to MoUD, GoI for its consideration and approval.

The Meeting ended with a vote of thanks to chair.


(Dr Manjit Singh)
6/6/16 Pr. Secretary LSG cum
Mission Director Smart Cities

Copy to the following for information & necessary action:

1. Secy. to Hon'ble Chief Minister, Rajasthan
2. SA to Hon'ble Minister LSG & UDH, Govt. of Rajasthan
3. DS to Chief Secretary, Govt. of Rajasthan
4. Addl. Chief Secretary, UDH, Govt. of Rajasthan
5. Addl. Chief Secretary, PWD, Govt. Of Rajasthan
6. Dr. Sameer Sharma, IAS, Addl. Secretary Cum Mission Director, Smart City Mission, Govt. of India
7. Pr. Secretary, PHED, Govt. of Rajasthan
8. Pr. Secretary, Transport, Govt. of Rajasthan
9. Pr. Secretary, Finance, Govt. of Rajasthan
10. Pr. Secretary, LSGD, Govt. of Rajasthan
11. Pr. Secretary, Tourism, Govt. of Rajasthan
12. Secretary, Planning, Govt. of Rajasthan
13. Secretary, DoIT, Govt. of Rajasthan
14. Project Director, RUIDP, Jaipur
15. District Collector- Jaipur/ Kota/ Ajmer / Udaipur
16. Mayor, Municipal Corporation- Jaipur/ Kota/ Ajmer / Udaipur
17. Executive Director, RUDSICO, Jaipur
18. Director & Ex-officio Special Secretary, Local Bodies, Rajasthan
19. Commissioners Municipal Corporation- Jaipur/Kota/Ajmer / Udaipur
20. CEO of JSCL, Jaipur / USCL, Udaipur
21. Chief Town Planner, Rajasthan
22. Guard File



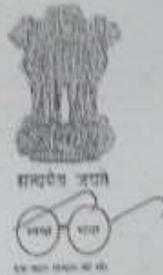
(Dr B.L. Jatawat)
Executive Director
RUDSICO, Jaipur

List of Participants in the meeting of 3rd SHPSC held on 14.06.2016

S.No.	Name of Officer	Designation
1	Shri Ashok Jain, IAS	Additional Chief Secretary, UDH, GoR
2	Shri D.B. Gupta, IAS	Additional Chief Secretary, PWD, GoR
3	Dr. Manjit Singh, IAS	Principal Secretary, LSG, GoR
4	Shri Nirmal Nahata	Mayor, Jaipur
5	Shri Chandra Singh Kothari	Mayor, Udaipur
6	Shri Mahesh Vijay	Mayor, Kota
7	Shri Akhil Arora, IAS	Secretary, DoIT, GoR
8	Ms. Roli Singh, IAS	Secretary, Tourism, GoR
9	Shri Hemant Gera, IAS	Municipal Commissioner, Jaipur
10	Shri Subir Kumar, IAS	Secretary, PHED, GoR
11	Dr. B.L. Jatawat, IAS	Executive Director, RUDSICO, Jaipur
12	Shri Sidhdharth Mahajan, IAS	District Collector, Jaipur
13	Shri Priyavrat Pandya, IAS	Municipal Commissioner, Ajmer
14	Shri Ravi Kumar S., IAS	District Collector, Kota
15	Shri Gaurav Goyal, IAS	District Collector, Ajmer
16	Shri Rohit Gupta, IAS	District Collector, Udaipur
17	Shri V. Sarvana Kumar, IAS	CEO, JSCL
18	Shri Shivprasad Nakate, IAS	Municipal Commissioner, Kota
19	Shri Sidhdhart Sihag, IAS	Municipal Commissioner, Udaipur
20	Shri Rakesh Sharma, RAS	Additional Commissioner, JMC
21	Shri G.L. Rao	Chief Engineer & Adnl. Secretary, PWD
22	Shri A.K. Jain	Managing Director, REIL
23	Shri S.K. Goyal	Project Director (UI), RUDSICO, Jaipur
24	Shri P.N. Sharma	Dy. General Manager, REIL
25	Shri Jitendra Kumar	Dy. General Manager, REIL
26	Ms. Avantika	Associate Analyst
27	Ms Meenal Keasarwani	Associate Analyst, ICRA
28	Shri Shrinivas Deshpande	IMACS

4.6. Supporting documents related to schemes/ work under implementation considered for convergence by AMC and other para statal bodies

M. PRASAD
SECRETARY



Government of India
Ministry of Urban Development
Nirman Bhawan, New Delhi-110011

D.O. No. 28012/10/2014-HC(PI)

Dated 21st May, 2015

Dear *Shri Rajan,*

As you are aware, the National Heritage City Development and Augmentation Yojana (HRIDAY) Scheme was launched on January 21, 2015 with the aim of bringing together urban planning, and heritage conservation in an inclusive manner covering 12 Cities in the Country. In your state, the city of Ajmer has been selected under the Scheme, a total of Rs. 40.04 Crores has been earmarked for Ajmer. A copy of the guidelines of the Scheme is enclosed for your reference.

For the implementation of the Scheme, some institutional arrangements at the city level are envisaged in the guidelines. A City Level Advisory and Monitoring Committee (CLAMC) is to be set up consisting of members/stakeholders ranging from elected representatives such as Mayors, MPs, MLAs / officials from the line departments / institutes / representatives of NGOs, with the District Magistrate as the Convener. You are requested to nominate two eminent local citizens to be a part of the CLAMC and also to notify the Committee.

As stated in the guidelines, the essential role of the CLAMC is as under:

- Provide a platform for exchange of ideas, and oversight of projects
- Oversee, review and monitor the performance of the scheme.
- Provide an enabling framework by facilitating for coordination between Centre, States and implementing agencies for implementation of the projects.
- Coordination with local committees and communities.
- Recommend mid-course correction in the implementation tools.

The other key player in the institutional arrangement is a HRIDAY City Anchor (assigned for each City) for the purpose of planning, advising, and supporting the City

Mission Directorate for successful implementation of the Scheme. After a competitive selection process, the City Anchor finalized in your State is as under:-

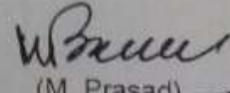
City	Selected HRIDAY City Anchor
Ajmer	Dronah (Lead) in consortium with Indian Heritage Cities Network Foundation (IHCN) & ICLEI

It goes without saying that your guidance to the Scheme will be the key to its success. Apart from notifying the CLAMC early, I would also suggest that you meet the City Anchors and share your views. Separately, we are advising them to call on you as well. I am confident that under your leadership, the Scheme will be successfully implemented in the state.

Encl: As above

with regards,

Yours sincerely,


(M. Prasad)

Shri C. S. Rajan
Chief Secretary
Government of Rajasthan
Secretariat, Jaipur

Copy:-

Dr. Arshi Malik, District Collector, District Collector Office, Ajmer-305001, Rajasthan

भारतीय गैर न्यायिक

एक सौ रुपये

Rs. 100

₹. 100

ONE
HUNDRED RUPEES

भारत INDIA

INDIAN NON JUDICIAL

राजस्थान RAJASTHAN

Z 466474

This AGREEMENT is made on 04th this day of
FEBRUARY 2015 between

M. C. AJMER, Government of Rajasthan acting through
its Representative C. E. O. C. R. Meena
(hereinafter referred to as the "ULB" which expression
shall, unless the context otherwise requires, include its
administrators, successors and assigns) of First Party;

And

Energy Efficiency Services Limited having its office at 4th Floor,
IWAI Building, A-13, Sector - 1, Noida - 201301 (UP) acting
through its Representative Shri Vivek Talwar, Regional Manager
(hereinafter referred to as "EESL") of Second Party.

ULB

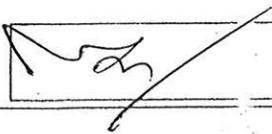
EESL

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 ULB	 EESL
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	ULB		EESL
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1 PARTIES TO THE AGREEMENT

This AGREEMENT is between the following two parties

1. Urban Local Body, Government of Rajasthan
2. Energy Efficiency Services Limited (EESL)

2 BACKGROUND

LSG has invited EESL to facilitate the supply, installation, commissioning, service and maintenance of LED Street Lights including their post installation maintenance and warranty replacement during the project period. In response thereto, EESL has agreed to facilitate installation of the latest LED street light technology as replacements to the existing conventional streetlight fixture. EESL shall facilitate the achievement of energy savings, O&M works which are needed to ensure a healthy system, rectification work based on consumer complaints and establishing project monitoring cell in coordination with the respective ULB.

3 Concept of the Project

The complete investment for the project would be borne by EESL. The project financing would be done using debt and equity in the ratio of 80:20. EESL shall undertake project implementation on its own or through an implementation partner, with EESL acting as a facilitator. All capital investment and operational expenditure required for the in-scope project tasks shall be arranged by EESL. The cost recovery of the same shall be done by monetizing energy savings achieved as part of the project implementation done, through retrofitting of conventional street lights fixtures with LED street light fixtures.

The repayment to EESL shall be on deemed savings basis, which would be calculated based on the results of the pilot & the total number of street lights installed in the respective ULB; these repayments would be spread over sufficient period of time to cover all costs.

4 SCOPE

This AGREEMENT provides a framework for implementation of energy efficiency measures in street lights in the ULBs under the administrative control of LSG in the State of Rajasthan. The implementation will be done by EESL or jointly with any implementation partner or through an implementation partner with EESL acting as a facilitator. The entire upfront capital cost of energy efficiency interventions, including field audit, annual maintenance, warranty replacement, establishment of project monitoring cell, dedicated call centre for handling complaints, O & M, needed pole cabling work for making a healthy system, shall be through EESL.

EESL shall replace the existing conventional streetlight fixtures with LED streetlight fixtures; and the wattage of the LED fixtures shall be determined as suitable in accordance to maintain or improve existing lux levels. In

	ULB		EESL
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case of any variations in the specified numbers of fixtures as declared by participating ULBs, the same shall be accounted and will be brought to the notice of LSG and ULBs before replacement and such adjustment in quantity variations, at actual, shall result in adjustment of annuity receivable by EESL from LSG & ULBs.

EESL, as per the directions of the ULB, will take up implementation of LED based energy efficient street lights in the respective Urban Local Bodies (ULBs) in a manner that the entire ULB is appropriately covered, in a time span of 12-16 weeks.

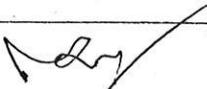
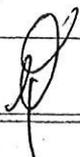
5 OBLIGATIONS OF THE PARTIES

5.1 ULB

1. ULB shall provide all approvals, permissions and necessary support as required during project preparation, implementation and service period under this agreement.
2. ULB shall provide, grant of all such permissions, authorizations which EESL or their authorized vendor/representatives may require or is obliged to seek from ULBs, in connection with implementation of the project and the performance of its obligations under this agreement.
3. In case of dispute or an ambiguity between the EESL and ULB, the LSG shall have the obligation to resolve the dispute/ambiguity.
4. LSG shall facilitate deployment of third party inspection which can be by SDA Rajasthan /BEE or any other mutually agreed party. The expenditure of third party inspection shall be as per actual and charged as per the project cost.
5. ULB shall appoint a nodal officer (for the respective ULB), who will be the part of project monitoring cell and shall work with EESL to enable successful LED project implementation, in the respective ULB.

5.2 EESL

1. Baseline estimation to assess- reduction on actual energy consumption, number of street lights in actual operation for each type, hours of operation of each type and tariff.
2. EESL shall conduct only one pilot in one of the mutually identified ULBs and the outcome of the same shall be added in the MoU as annexure.
3. Project Management including calculation of energy savings, project preparation, issuance of bids, evaluation and selection of implementing agency based on open competitive bidding, as per prevailing Rules.
4. Implementation of LED lights including supply, installation and commissioning, as per the agreed schedule. A tentative schedule is placed at Annexure 1.

 ULB	 EESL
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5. Operation & Maintenance of the lights during the contract period. For AMC payments and its escalations, kindly refer "Payment Terms" section.
6. EESL shall hand over the existing street lights which have to be replaced by LED, to respective ULBs, at actual condition. If there is no fixture found on the pole, the same should be recorded by concerned official of EESL and respective ULB. The receiving certificate, of the same shall be issued by the competent authority of the respective ULB.
7. EESL shall facilitate in ensuring ULBs undertake necessary infrastructure development (identified & included as part of the project cost) as maybe required to ensure healthy uninterrupted operation of LED lights that may include-- providing appropriate pole cabling, phase wire work, fuse box, surge protector, earthing arrangements, clamps, nut-bolts, brackets and arm only, where ever necessary.

Project Implementation Deliverables:

1. EESL shall rectify LED faults within 48 hours of intimation failing which a penalty of Rs. 25 per day per lamp shall be deducted from EESL's monthly payments.
2. EESL shall maintain a minimum uptime of retrofit luminaries of 95% excluding the period of non-availability of power supply. The following will be the performance requirement for replacement that EESL agrees to under this MoU:
3. (a) To replace the defective/ non burning LED lights within 48 hours of the reported failure. Starting of failure period for record will be based on the report from CCMS system. In the absence of CCMS starting of failure for record will be by ULB authorized representative. Penalty for non-fulfillment after 48 Hrs is reckoned as follows.

Penalty= 2 [(wattage of defective LED lights) X 11 hours X no. of days of default beyond 48 hours X tariff]

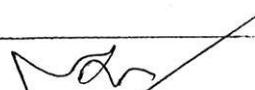
(b) To keep adequate quantities of spare LED lights in order to enable speedy replacement.

(c) In case of default by EESL on any of the above, including maintaining uptime of lights of 95%, a penalty equivalent to 2 times the monetized value of energy savings from the defective/ non burning lamps will be deducted from EESL monthly payment. The penalty will be reckoned as follows.

Penalty= 2 [(wattage of defective LED lights) X 11 hours X no. of days of default beyond 48 hours X tariff]

Note: Penalty shall be given as per points 1 and 3 (a) as above, whichever is higher.

4. EESL shall replace all existing conventional streetlight fixture, with LED fixtures, (excluding LED fixtures already installed) in the jurisdiction of ULBs
5. The LED fixtures shall be replaced as point to point replacement of existing conventional streetlight fixtures i.e., both functional/non-functional fixtures shall be considered for replacement.
6. The existing conventional streetlight fixtures shall be replaced with LED streetlight fixtures and replacement wattage of LED streetlight fixtures shall be lesser than the existing streetlight fixture wattage and it shall be focused to improve the illumination level compared to existing lux levels. The

 ULB	 EESL
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output of the LED lux level shall meet the standards, where the road-pole configurations are as per NLC/IS.

7. EESL will replace the conventional street lights with appropriate LEDs to ensure minimum 50% energy savings as a whole, at the same time meeting existing/or higher illumination levels.
8. Pilot project should be implemented in one ULB, where maximum types of LED street lights can be installed. Findings of the same shall be replicated to all ULBs. The maximum no of lights installed in pilot project is 100.
9. Alternate arrangements include Light Off/Dimming options may be adopted during 12 PM to 5 AM for saving aspects.
10. To enable healthy lighting system, O&M and any additional work carried out by the company cost of the same shall be borne by ULB.
11. Direct points shall be replaced by LED Lights along with an auto on / off switch and/or CCMS, whichever applicable.
12. All OFF Lights connected in the CCMS system, should be identified by the master panel and same shall be rectified by the company. This would not be applicable where only auto on/off switch is installed and where there is no dedicated CCMS system.
13. A dedicated toll free number would be established for managing public complaints.
14. New LED Lights (including replacements) installed by EESL only, shall be maintained by EESL for the entire contract period.

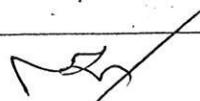
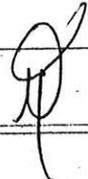
6 Agreement Term

This Agreement commences on 4th FEB, 2005 and will remain in force for 7 years from the date as mentioned, unless rescinded by either party. The Agreement can be extended further by the mutual consent of all the Parties.

7 Payment Terms

ULBs shall make payment to EESL as per the following principle:

1. All capital costs shall be on actual, as per competitive bidding and will be included in project cost
2. EESL pre tax return on equity will be 21% per annum.
3. The debt equity ratio will be 80:20
4. The interest rate on debt will be on actual, subject to a maximum rate of 12.5%.
5. AMC charges including fixtures and accessories shall be Rs 300 per point per annum, for first year and shall have 5% annual escalation, throughout the contract period.
6. All statutory taxes/duties will be reimbursed by ULB to EESL on actual. Tax presently applicable is service tax at the rate of 12.36% of total pay-out to EESL.

	ULB		EESL
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7. Primarily the concerned ULB will make the payment through its electricity unit savings, annual purchasing cost of fixtures (Capital Cost) and O&M Charges. Payments shall be made from Urban Cess and any shortfall will be paid through the grant provided to ULB, by LSG.
8. Payment of monthly annuity charges shall be arrived on the basis of the baseline arrived during the pilot phase, as annexed in MoU and the exact total number of street lights installed. The format for the same is placed at Annexure 2, which would be signed by the competent authority of respective ULB.
9. The power savings due to non-availability of power supply cannot be considered for calculation of energy savings.
10. Tariff used for calculating monetary savings shall be the applicable tariff for street lighting by state regulatory commission.
11. Annuity amount determined shall be paid to EESL on monthly basis as agreed in this agreement. The fixed annuity amount payable to EESL during the contract period shall be assured through an ESCROW arrangement.
12. Not later than one month from the date of completion of the LED project implementation, ULB shall through a schedule bank open ESCROW account for monthly payment which will have a balance of three months of annuity and that will be reviewed annually.
13. LSG shall facilitate payment security for investment of EESL by way of ESCROW/ State Government Guarantee/ Revolving Letter of Credit as decided by LSG in consultation with EESL and ULB from time to time.
14. EESL will insure the fittings during the period of the contract against any natural disaster such as fire, earthquake and safeguarding theft. The cost of insurance, including premium, will be charged on actual, as part of the project cost. It is incumbent on the ULB to issue necessary documentary support for the damage/theft to the assets with reasons for the same, as these assets are owned by the respective ULB.
15. The expenditure for installing MIS System [which includes-fault status, energy monitoring and On/Off status of streetlights], project monitoring cell and call centre shall be charged on actual, as part of the project cost.
16. The expenditure for conducting pilot, shall be charged at actual as part of the project cost. If the LSG or ULB do not undertake the project implementation, post the initiation of the pilot implementation, the cost of undertaking pilot implementation shall be reimbursed to EESL, at actual.

8 PROCEDURES FOR AMENDMENT, CANCELLATION, ARBITRATION AND EXCLUSIVITY

1. This AGREEMENT may be renegotiated, if at any time during its term, the work or environment of the LSG and EESL, is so altered that the contents of the Agreement are no longer appropriate.

 ULB	 EESL
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2. This Agreement embodies the entire understanding of the parties as to its subject matter and shall not be amended except in writing executed by all the Parties to this agreement. Any changes are to be recorded in writing and inserted or attached to this Bilateral Agreement and this will have the effect of updating the Bilateral Agreement.

9 TERMINATION FOR DEFAULT

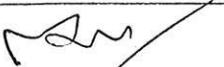
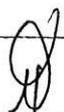
9.1 The "ULB" Events of Default

Each of the following events or circumstances, to the extent caused by a default of the "ULB" and if not cured within the Cure Period, which shall be 30 (thirty) days (unless provided otherwise in this Agreement), from the date of notice of default (the "Default Notice") from the "EESL", shall be considered for the purpose of this Agreement as events of default of the ULB.

1. The ULB is in breach of its obligations under this Agreement, which has a Material Adverse Effect upon the "EESL" or the Project and this breach is not cured within a Cure Period of 30 days from the date of Default Notice.
2. The ULB is in breach of any representation or warranty made under this Agreement or it repudiates this Agreement.
3. Dept. of Local Self Govt. or any Competent Authority has by an act of commission or omission created a circumstance that has a Material Adverse Effect on the "EESL" and the ULB has failed to compensate the EESL for the same through an adjustment.
4. The ULB and / or LSG fail to pay the EESL the consideration as applicable.

9.2 Termination by the "EESL"

Without prejudice to any right or remedy, which the "EESL" may have under this AGREEMENT, upon occurrence of Default or Event of Default by the "ULB", the "EESL" shall be entitled to issue a Termination Notice to the "ULB". The Termination Notice shall grant the "ULB" a further period of 30 (thirty) days (the Termination Period) to make a representation, and if, during the Termination Period the "ULB" takes suitable steps to remedy the situation, the "EESL" shall be entitled to withdraw the Termination Notice. If the Termination Notice is not withdrawn within the Termination Period, this Agreement will automatically terminate on the expiry of the Termination Period. In case of termination, EESL shall issue notice in writing. The notice given on the address given in the title article of this AGREEMENT will be considered as a valid notice.

	ULB		EESL
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9.3 EESL Event of Default

Each of the following events or circumstances, to the extent caused by default of the EESL, and if not cured within the "Cure Period which shall be 30 (thirty) days from the date of notice of default (the "Default Notice") from the "ULB", shall be considered for the purpose of this AGREEMENT as Events of Default of the "EESL":

1. The "EESL" is in breach of its obligations under this AGREEMENT, which has a Material Adverse Effect upon the "ULB" or the Project.
2. The "EESL" is in breach of any representation or warranty made under this AGREEMENT or it repudiates this AGREEMENT.
3. The "EESL" abandons the Project or any of its material obligations as provided under this AGREEMENT.

9.4 Termination by the "ULB"

Without prejudice to any other right or remedies which the ULB may have under or be entitled to terminate this AGREEMENT by following the procedure set forth under this AGREEMENT, upon occurrence of "EESL" Event of Default, the ULB shall be entitled to terminate this AGREEMENT by following the procedure set forth hereinafter:

1. The ULB shall be entitled to issue a Termination Notice to the "EESL". The Termination Notice shall grant the "EESL" 30 (thirty) days (the "Termination Period") to make a representation, and if, during the Termination Period the "EESL" takes suitable steps to remedy the default situation, the "ULB" shall be entitled to withdraw the Termination Notice.
2. If the "EESL" fails to cure the defaults within the Termination Period the agreement stands terminated by the respective ULB.
3. In case of termination, ULB shall issue notice in writing. The notice given on the address given in the title article of this AGREEMENT will be considered as a valid notice.

10 CONSEQUENCES OF TERMINATION

Upon termination of this AGREEMENT for any reason, the terms specified in this AGREEMENT shall cease to exist and are not enforceable.

	ULB		EESL
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10.1 Termination Payment for Termination by "EESL"

1. Upon Termination by the "EESL" on account of the "ULB" Default under Articles 9.1, the "EESL" shall be entitled to receive from ULB by the way of Termination Payment a sum equal to the consideration of the Project as specified in section "Payment Terms" of this AGREEMENT minus the amounts paid till termination of the AGREEMENT minus the interest not applicable for the balance period of the AGREEMENT after termination.
2. Payments due to the "EESL", as calculated under section "Payment Terms" shall be made within 30 (thirty days) days of termination of the AGREEMENT pursuant to article 9.1, "The "ULB" Events of Default".
3. In case of termination of AGREEMENT, either party will have no claims against each other.

10.2 Termination Payment for Termination by ULB

1. Upon Termination by the "ULB" on account of default by the "EESL" during period of this AGREEMENT, in accordance with the provisions of Articles 9.3, "EESL" Event of Default", the "EESL" shall not be entitled to receive any payment from the ULB by the way of Termination Payment.
2. However, if the Termination by the ULB is on account of the default by the "EESL" before supplies are affected in terms of this AGREEMENT, then the "EESL" shall not be entitled for any Termination Payments.

10.3 Other rights and obligations upon Termination

1. Upon Termination of this AGREEMENT and payment of Termination Payment to the "EESL" as applicable in full, the ULB shall:-
 - a. Take control of the Project forthwith;
 - b. Take control of all Energy Efficient LED Street Lights supplied under this AGREEMENT.
2. Upon Termination of this AGREEMENT it shall be the responsibility of the "EESL" to co-operate with the ULB and comply with all reasonable requests thereof including the execution of any documents and other actions, provided the ULB bears any reasonable Costs incurred by the "EESL" relating thereto.

11 FORCE MAJEURE

11.1 Force Majeure Event,

In this AGREEMENT "Force Majeure" means an event occurrence in India of any or all of the Non-Political Force Majeure Event, Indirect Political Force Majeure Event and Political Force Majeure Event described in this

	ULB		EESL
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section, hereinafter which prevents the Party claiming Force Majeure (the "Affected Party") from performing its obligations under this AGREEMENT and which act or event:-

1. Is beyond the reasonable control of and not arising out of the fault or negligence of the Affected Party or the failure of such Party to perform its obligations hereunder;
2. The Affected Party has been unable to prevent by the exercise of due diligence and reasonable efforts, skill and care and
3. Has a Materially Adverse Effect on the Project.

11.2 Non-Political Force Majeure Events

For the purposes of Article 11.1, Non-Political Force Majeure Events shall mean one or more of the following acts or events:

1. Acts of God or events beyond the reasonable control of the Affected Party which could not reasonably have been expected to occur, extreme adverse, weather or environmental conditions, lightning, earthquakes, heavy rains, cyclones, tempest, whirlwind, landslides, storms, floods, volcanic eruptions or fire (to the extent originating from a source external to the Facility or not designed for in Implementation Works);
2. Radioactive contamination or ionizing radiation;

11.3 Indirect Political Force Majeure Event

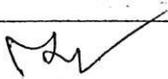
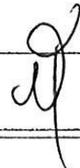
For the purposes of Article 11.1, indirect Political Force Majeure Events mean one or more of the following acts or events:

1. An act of war (whether declared or undeclared), invasion, armed conflict or act of foreign enemy, unexpected call up of armed forces, blockade, embargo, rebellion, riot, religious strife, bombs or civil commotion, sabotage, terrorism which prevents normal operations of the "EESL" for a continuous period exceeding 6 (six) months from the Compliance Date.
2. Industry wide or state wide or India wide strikes or industrial action for a continuous period exceeding 6 (six) months from the Compliance Date.

11.4 Political Force Majeure Event

For the purposes of Article 11.1, Political Force Majeure Events shall mean one or more of the following acts or events by or on account of the ULB, Govt. of Rajasthan, Government of India or any other Competent Authority:

1. Appropriation or compulsory confiscation, by any Competent Authority any Project Assets or rights of the "EESL" or of the Contractors; or

	ULB		EESL
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2. Any unlawful or unauthorized or without jurisdiction, revocation of, refusal to renew or grant without valid cause any consent or approval required by the EESL" or any of the Contractors to perform their respective obligations under this AGREEMENT (other than a consent, the obtaining of which is a condition precedent) provided that such delay, modification, denial, refusal or revocation did not result from the EESL or any contractor's inability or failure to comply with any condition relating to the grant, maintenance or renewal of such consents or permits.

11.5 Exceptions Applicable to the "EESL"

The "EESL" shall not have the right to consider any of the following circumstances to be an event of Force Majeure that would suspend the performance or excuse the non-performance of its obligations under this AGREEMENT other than the circumstances resulting from an event of Force Majeure:-

1. Delay in performance by the "EESL", Subcontractor(s), agents and employees of the "EESL"; or
2. Breakdown or ordinary wear and tear of materials, equipment machinery or parts relating to the Project.

11.6 Exceptions Applicable to the "ULB"

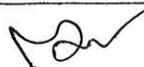
The ULB shall not have the right to consider any of the following circumstances to be an event of Force Majeure that would suspend the performance or excuse the non-performance of its obligations under this AGREEMENT:

1. The appropriation, confiscation, nationalization or requisition of the Project, Project Assets by the ULB;
2. The imposition of any blockade, embargo, import restrictions, rationing or allocation by the ULB or any Competent Authority; or
3. Change of Governments or administrators of ULB.

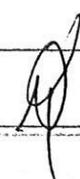
11.7 Effect of Force Majeure after Compliance Date

Upon occurrence of any Force Majeure Event after the Compliance Date, the following shall apply:

1. Where the Force Majeure Event occurs after the Compliance Date the critical time limits set forth in this AGREEMENT shall be extended by the period for which such Force Majeure Event shall subsist;
2. All cost arising out or concerning such Force Majeure Event shall be borne in accordance with provisions of article 11.8.



ULB



EESL

11.8 Allocation of costs during the subsistence of Force Majeure

Upon occurrence of a Force Majeure Event after Compliance Date, the cost arising out of such event shall be allocated as follows:

1. When the Force Majeure Event is a Non Political Event, the Parties shall bear their respective costs and neither Party shall be required to pay to the other Party any cost arising out of any such Force Majeure Event;
2. Where the Force Majeure Event is an Indirect Political Event, the costs attributable to such Force Majeure Event and directly relating to the Project (the Force Majeure Costs), shall be reimbursed by the ULB to the "EESL" within 30 (thirty) days from the date of receipt of EESL claim therefore;
3. Where the Force Majeure Event is a Political Event, the Force Majeure Costs to the extent actually incurred and duly certified by the Statutory Auditors shall be reimbursed by the ULB to the "EESL" in one lump sum not later than 30 (thirty) days after the end of the Force Majeure Event and receipt of notice by the "ULB" to that effect.

11.9 Termination Notice

If the Force Majeure Event subsists for a period of 270 (two hundred seventy days or more within a continuous period of 365 (three hundred sixty five) days either Party may in its sole discretion terminate the agreement by giving 30 (thirty) days Termination Notice in writing to the other Party without being liable any manner whatsoever, save and except as per the provisions of in Article 11

11.10 Termination Payments for Force Majeure Events

Upon Termination of this AGREEMENT pursuant to Article 11.9, the Termination Payment to the "EESL" shall be made in accordance with the following:

1. If the Termination is on account of Non Political Event, the "EESL" shall be entitled to receive from the ULB by way of Termination Payment an amount equal to 90% (ninety percent) of the consideration of the project as specified in section "Payment Terms" of this AGREEMENT minus the amounts paid till termination of the AGREEMENT minus the interest not applicable for the balance period of the AGREEMENT after termination.
2. If the Termination of this AGREEMENT is on account of an Indirect Political Event, the "EESL" shall be entitled to receive from the "ULB" by the way of Termination Payment an amount equal to the consideration of the project as specified in section "Payment Terms" of this AGREEMENT minus the interest not applicable for the balance period of AGREEMENT after termination.
3. If the Termination of this AGREEMENT is on account of a Political Event, the "EESL" shall be entitled to receive from the ULB, by the way of Termination Payment an amount equal to the consideration of the project as specified in section "Payment Terms" of this AGREEMENT minus the amounts paid till

	ULB		EESL
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termination of the AGREEMENT minus the interest not applicable for the balance period of the AGREEMENT after termination.

11.11 Termination Payments

The Termination Payments pursuant to the Article 11.10 shall become due and payable to the "EESL" by the ULB in one lump sum not later than 30 (thirty) days after the end of the Force Majeure Event and notice to the ULB to that effect.

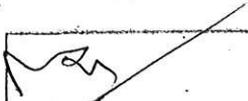
12 Dispute Resolution

12.1 Dispute

Any dispute, difference or controversy of whatever nature regarding the validity, interpretation, implementation or the rights and obligations arising out of, or in relation to, or howsoever arising under or in relation to this AGREEMENT between the Parties, and so notified by either Party to the other Party (the "Dispute") shall be subject to the dispute resolution procedure set out in this section. It is specially clarified here that in case of any ambiguity regarding the works, the practices existing at the time of submission of the proposal as per Good Industry Practice would prevail.

12.2 Direct discussion between Parties

The Parties agree that any Dispute that may arise between them shall be first submitted for direct discussion between the Parties. For this purpose, the notice of Dispute (the "Notice of Dispute") sent by one Party to the other Party under this AGREEMENT shall be considered as invitation for direct discussion, and it should specify a reasonable time and venue for the conducting of negotiation proceedings. In addition, the Notice of Dispute shall specify the basis of the Dispute and the amount claimed. In the direct discussion proceedings, each Party shall be represented by their representatives/officials or employees with sufficient knowledge and authority over the subject matter of the Dispute in order to have a meaningful discussion. At the discussion proceedings, the Party that has given the Notice of Dispute shall present an offer of settlement, which may form the starting point of discussions between the two Parties during the discussion proceedings. The direct discussion meeting as stated above will be held at the Office of the Project In-charge of respective ULBs. The proceedings of this meeting shall be recorded by the Project In-charge.

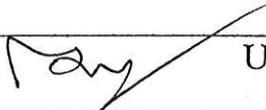
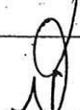
	ULB		EESL
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12.3 Arbitration or Adjudication

1. In the event that the parties are unable to resolve the Dispute through Direct Discussion under Article 10.2, the Parties shall submit the Dispute for arbitration in accordance with the Arbitration and Conciliation Act, 1996. There shall be a board of 3 (three) arbitrators of whom 1 (one) shall be appointed by the ULB, 1 (one) shall be appointed by the "EESL" and the third appointed by the 2 (two) arbitrators appointed as aforesaid and shall be the Principal Secretary LSG.
2. The arbitration proceedings shall be conducted in the English language only.
3. The cost incurred on the process of arbitration including inter alia the fees of the arbitral tribunal and the cost of the proceedings shall be borne by the parties in equal proportions. Each Party shall bear its own legal fees incurred as of any Dispute under this Article.
4. The arbitration proceeding shall be conducted at Jaipur, Rajasthan.
5. If any dispute goes to the court of law, the jurisdiction of the court shall be the Court of Jaipur, Rajasthan. This is only subject to adjudication of dispute resolution through arbitration.

13 Cooperation

1. ULB and EESL will consult with each other, whenever it may be appropriate, on the matters covered by this AGREEMENT and will use their best endeavors to ensure that staffs of the organizations cooperate in good faith with one another.
2. All Parties should apprise / keep each other informed on project related matters. If any issue or dispute arises between ULB and EESL, they will use their best endeavors to resolve the dispute promptly.

	ULB		EESL
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14 SIGNATURES

Both parties shall, in principle agree to the above points and its implementation in the ULBs shall be as per the approval by PPP Cell guideline as per rules of Govt. of Rajasthan.

IN WITNESS WHEREOF, the Parties have entered into this AGREEMENT, the day and year as mentioned above.

1. 

Name C.R. Meena.

Designation **कार्य. अधिकारी**
नगर निगम, अजमेर

Executed for ULB
By its duly Authorized
Representative

Witness 1

y note
5/10/2015
Sampad Singh

Witness 2

5/10/2015
(Sampad Singh)

2. 

Name VIVEK TALWAR

Designation Regional Mgr

Executed for EESL
By its duly Authorized
Representative

Witness 1

RB

[ROUNIZ BANDOPADHYAY]

Witness 2

Mukesh Sen.
(Mukesh Sen Ray)

	ULB		EESL
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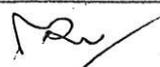
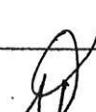
15 Annexure 1

TENTATIVE SCHEDULE FOR STREET LIGHTING PROJECTS FOR 1 ULB AT RAJASTHAN

The entire implementation is done in a span of 12-16 weeks from initial discussions or 12-13 weeks from the date of signing of Implementation agreement, whichever is later. The draft work-plan to be adhered for each of the ULB is listed below.

PROJECT IMPLEMENTATION SCHEDULE FOR 1 ULB FOR STREET LIGHTING ESCO PROJECT BY EESL																
Project Milestone Envisaged	Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11	Wk 12	Wk 13	Wk 14	Wk 15	Wk 16
Preliminary study and Initial discussions & Inventory Data Collection	█															
Field Survey and Baseline Estimations		█														
Finalization of Implementation modalities and Signing of Implementation agreements		█	█													
RFP and solicitation of bids by EESL				█	█											
Pre-Bid Meeting & Issuance of amendments						█										
Bids opening and Issuance of LOA							█	█								
Ramping Up/Initialization Period									█							
Supply and commissioning of street lights by EESL/Vendor										█	█	█	█	█	█	█
Post project PMV by EESL & ULB											█	█	█	█	█	█
Completion certification from ULB and Annuity Calculations																█
O&M for 7 Years																█

7 years from the date of commissioning of 1st Street Light

 ULB	 EESL
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16Annexure 2

[Kindly Refer Section "Payment Terms"]

We hereby done verification of the LED Street Light Project implementations and the final deemed energy savings and annuity calculations are as hereunder:

Particulars	Unit	Different Types of Conventional Street Lights				
		Type 1	Type 2	Type 3	Type 4	Others
Quantity						
Wattage of existing Street Lighting						
Losses						
Total Wattage of existing Street Lighting						
Wattage of LED Street Lighting						
Hours of Usage						
Hours of Usage						
Operating days per year						
Existing Energy Consumption per year						
New Energy Consumption per year						
Energy saved per year						
Energy Saved per year						

Financial Calculation for Street Lighting Project									
1	Cost per LED Watt (INR)								
2	Cost per Driver (INR)								
3	Cost per CCMS (INR)								
4	Total number of Street Lights to be replaced								
5	Total LED Watts to be replaced								
6	Infrastructure Development Cost								
7	Project Management Consultancy %								
8	Capital cost of the Project								
9	Project life								
10	Financial Years								
11	Equity portion								
12	Debt portion								
13	Debt at the beginning of the Financial year								
14	Debt at the End of the Financial year								
15	Principal payout annually								
16	Interest Rate/ Interest amount								
17	Annual maintenance charges (Warranty, Maintenance & Manpower) @ Rs 300 per LED with 5% annual escalation								
18	Recovery of equity investment								
19	Annual repayment to be made to EESL Excluding Service Tax								
20	Service Tax @ 12.36%								
21	Annual repayment to be made to EESL including Service Tax								
22	Trade-Off between Annual Payments to EESL and Savings in Electricity Bill								
23	Energy Savings per Annum in units								
24	Tariff Rate per Unit (INR)								
25	Benefit: Annual Savings in Electricity Consumption (INR Crores)								
26	Benefit: Annual Savings in Maintenance Cost (INR Crores)								
27	Payout- Payment to EESL (INR Crores)								

1.

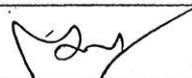
Name

Designation

2.

Name

Designation

 ULB	 EESL
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17 DEFINITIONS

The following expressions shall have the following meanings:

Expression	Meaning
"MOU"	Memorandum of Understanding
"ULB"	Urban Local Bodies
"LSG"	Local Self Government
"EESL"	Energy Efficiency Services Limited (A Joint Venture Company of PSUs of Ministry of Power, Govt. of India)
"NLC"	National Lighting Code
"IS"	Indian Standard.
"PSU"	Public Sector Undertaking
"AMC"	Annual Maintenance Charge
"SDA"	State Designated Agency

	ULB		EESL
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SMART CITY

STATUS OF INTEGRATED POWER DEVELOPMENT SCHEME (IPDS)

The Govt. of India has launched Integrated Power Development Scheme (IPDS) for the urban area with the following targets:

- i. Strengthening of Sub-transmission and Distribution network in urban areas to ensure 24x7 power supplies for consumers and reduction of AT & C losses.
- ii Metering of feeders/ distribution transformers/ consumers in urban areas.

Scope of Work: The projects under the scheme has formulated for urban areas (Statutory Towns) only with following scopes:-

a) Strengthening of sub-transmission and distribution network:

- i. Creation of new sub-stations including Gas Insulated Sub-station along with associated 66 KV / 33 KV/ 22 KV/ 11 KV lines.
- ii Augmentation of existing sub-stations capacity by installation of higher capacity/additional power transformer along with associated equipment/ switchgear etc.
- iii. Erection of HT lines for reorientation/ re-alignment including augmentation of existing lines.
- iv. Installation of new distribution transformers and augmentation of existing distribution transformers along with associated LT lines.
- v. Installation of capacitors
- vi. Renovation and Modernization of existing sub-stations and lines
- vii. Laying of under-ground cables in densely populated areas and areas of tourism and religious importance
- viii. High voltage distribution system (HVDS)
- ix. Aerial Bunched Cable for theft prone areas

b) Metering:

- i. Installation of suitable static meters for feeders, distribution transformers and all categories of consumers for un-metered connections, replacement of faulty meters & electro-mechanical meters.
- ii. Installation of Pillar Box for relocation of meters outside the premises of consumers including associated cables, service cables and accessories
- iii. Installation of prepaid / smart meters in Govt. establishment
- iv. AMI, Smart meters in the towns where SCADA being established under R-APDRP.
- v. Boundary meters for ring fencing of Non-RAPDRP Towns with population more than 5000
- vi. AMR for feeders, Distribution transformer and high load consumers

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we may include this in smart city projects

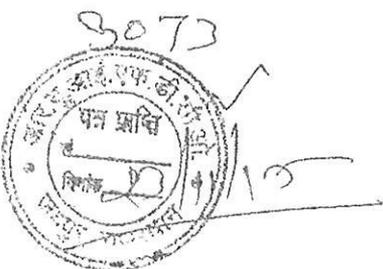
(Dr. Manoj Singh)
Pr. Secy, LS

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- As per Guidelines of IPDS, the funding mechanism is proposed as under:

GoI	Grant	60% of Project Cost
Discom	Contribution	10% of Project Cost
	Lenders/ Bank	30% of project Cost

- Under this Scheme the GOI have selected 66 nos. statutory towns under Ajmer Discom for implementation of IPDS.
- DPRs of 12 nos. Circles (having 66 nos. towns) have been prepared amounting Rs. 605.49 Crore and sent to Distribution Reforms Committee (DRC) through Agenda dtd. 04.04.2015.
- DRC vide meeting held on 08.04.2015 recommended the same to the Monitoring (Steering) Committee through Power Finance Commission (PFC).
- PFC after scrutinizing and curtailing the scope of work, the DPRs amounting as Rs. 408.30 Crore appraised for further approval of Monitoring Committee.
- Major Items Curtailed are: -
 - a) Underground HT and LT cable reduced to zero.
 - b) Augmentation of LT Line reduced to zero.
 - c) Distribution transformer Renovation & Maintenance reduced to zero.
 - d) Augmentation of 33 KV & 11 KV line reduced.
 - e) New 33/11 KV GSS reduced.
 - f) Capacity enhancement of 33/ 11 KV GSS reduced.
 - g) Renovation & Maintenance of 33/11 KV GSS reduced.
 - h) Metering reduced.
 - i) Installation of AB Cable reduced.
- District wise committee have been made functionalized vide order no. F.15 (42) Energy/ 2014 dated 15.05.2015. The above DPRs are required to be recommended by District level committee.
- Monitoring Committee in the meeting held on 06.08.2015 approved in-principal the DPRs of 12 Nos. Circles for Rs. 408.20 Crore and PMA Component 2.04 Crore, however sanction shall be issued based on the fund availability as intimated by letter no. 02:10:R-APDRP:2009:17:Rajasthan Dated 01.09.2015.

IPDS IN PURVIEW OF AJMER TOWN

Summary of Project Cost

SN	Particular	Unit	Qty	Project Cost from lib & lic Rs. In Lac
A	33/11 KV S/S : New	Nos.	12	2878.56
B	33/11 KV S/S : Additional Transformer	Kms	0	0.00
C	33/11 KV S/S : Transformer capacity enhancement	Nos.	12	692.18
D	Renovation & Modernisation of 33/11 kv SS	Nos.	0	0.00
E	New 33 KV new feeders/Bifurcation of feeders:	Kms	17	624.09
F	33 KV feeders Reconductoring/Augmentation	Kms	0	0.00
G	33 kv Line Bay Extension at EHV station	Nos	0	0.00
H	11 kv Line : New Feeder/ Feeder Bifurcation	Km	73	358.43
I	11 kv Line : Augmentation/Reconductoring	Km	0	0
J	Arial Bunched Cable	Kms	65	146
K	UG Cable	Kms	0	0.00
L	11 KV Bay Extension	Kms	0	0.00
M	Installation of Distribution Transformer	Nos.	23	87
N	Capacity enhancement of LT sub-station	Nos.	0	0.00
O	LT Line : New Feeder/ Feeder Bifurcation	Kms	5	22
P	LT Line : Augmentation/Reconductoring	Kms	0	0
Q	Capacitor Bank	Nos.	0	0.00
R	HVDS	Nos.	0	0.00
S	Metering	Nos.	12426	148
T	Provisioning of solar panel	Lot	108	75.60
U	RMU,Sectionaliser, Auto reclosures, FPI etc.	Lot	0	0.00
V	Others	Lot	1796	3832
	GRAND TOTAL			8,864.71

IPDS IN PURVIEW OF UDAIPUR DISTRICT

Summary of Project Cost

SN	Particular	Unit	Qty	Project Cost from lib & lic Rs. In Lac
A	33/11 KV S/S : New	Nos	6	573
B	33/11 KV S/S : Additional Transformer	Nos.	0	0
C	33/11 KV S/S : Transformer capacity enhancement	Nos.	0	0
D	Renovation & Modernisation of 33/11 kV SS	Nos.	3	73
E	New 33 KV new feeders/Bifurcation of feeders:	Kms	15	301
F	33 KV feeders Reconductoring/Augmentation	Kms	11	305
G	33 kV Line Bay Extension at EHV station	Nos	1	7
H	11 kV Line : New Feeder/ Feeder Bifurcation	Kms	27	154
I	11 kV Line : Augmentation/Reconductoring	Kms	22	108
J	Arial Bunched Cable	Kms	35	65
K	UG Cable	Kms	8	47
L	11 KV Bay Extension	Kms	3	59
M	Installation of Distribution Transformer	Nos.	47	109
N	Capacity enhancement of LT sub-station	Nos.	0	0
O	LT Line : New Feeder/ Feeder Bifurcation	Kms	16	36
P	LT Line : Augmentation/Reconductoring	Kms	44	99
Q	Capacitor Bank	Nos.	0	0
R	HVDS	Nos.	0	0
S	Metering	Nos.	24240	256
T	Provisioning of solar panel	Lot	6	14
U	RMU,Sectionaliser, Auto reclosures, FPI etc.	Lot	0	0
V	Others	Lot	0	0
	GRAND TOTAL			2,205.29

Minutes of Meeting of the Distribution Reforms Committee held on 08.04.2015 in the Chamber of Chairman Discoms, Vidyut Bhawan, Jaipur to discuss & recommend the Detailed Project Reports of 12 nos. Circles of Ajmer Discom having 66 nos. towns under Integrated Power Distribution Scheme.

The following are present:-

1. The Principal Secretary (Energy), GOR- Chairman.
2. The Managing Director, Ajmer Discom, Ajmer.
3. The Managing Director, Jaipur Discom, Jaipur.

The Chief Engineer (IPDS), AVVNL, Ajmer and Superintending Engineer (PW), AVVNL, Ajmer are associated in the meeting.

It was apprised to the committee that:-

The Govt. of India have launched Integrated Power Development Scheme (IPDS) for the urban area with the following targets:

- i. Strengthening of Sub-transmission and Distribution network in urban areas to ensure 24x7 power supplies for consumers and reduction of AT & C losses.
- ii. Metering of feeders/ distribution transformers/ consumers in urban areas.

Under this Scheme the GOI have selected 66 nos. Statutory towns covered under twelve O & M Circles of Ajmer Discom. The detail of DPR's was placed before the DRC members, the Circle wise list of these towns along with the cost of project proposed in the DPR of respective Circles are given below:

S. No.	Name of Circle	S.No.	Name of town	Project Cost as per DPR (in Rs. lacs)
1	AJMER CITY CIRCLE	1	AJMER	✓ 10858.39
		2	Pushkar	✓ 303.49
Sub. Total				11161.88
2	AJMER DISTRICT CIRCLE	3	KEKRI	259.10
		4	KISHANGARH	1345.79
		5	NASIRABAD	114.75
		6	BEAWAR	2966.21
		7	BIJAYNAGAR	804.03
		8	SARWAR	92.37
Sub. Total				5582.25
3	BHILWARA	9	ASIND	392.64
		10	GULABPURA	449.37
		11	SHAHPURA	346.41
		12	GANGAPUR	606.90
		13	BHILWARA	2031.79
		14	JAHAZPUR	416.60
		15	MANDALGARH	396.74
Sub. Total				4540.45
4	NAGAUR	16	MAKRANA	574.45



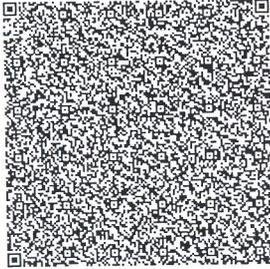
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INDIA NON JUDICIAL

Government of National Capital Territory of Delhi

e-Stamp

Certificate No. : IN-DL082609940700330
Certificate Issued Date : 27-Jan-2016 11:47 AM
Account Reference : IMPACC (IV)/ dl889403/ DELHI/ DL-DLH
Unique Doc. Reference : SUBIN-DL889403150604513350690
Purchased by : MINISTRY OF POWER GOI
Description of Document : Article 5 General Agreement
Property Description : Not Applicable
Consideration Price (Rs.) : 0
(Zero)
First Party : MINISTRY OF POWER GOI
Second Party : AJMER VIDYUT VITRAN NIGAM LTD AND G O RAJASTHAN
Stamp Duty Paid By : MINISTRY OF POWER GOI
Stamp Duty Amount(Rs.) : 150
(One Hundred And Fifty only)



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This e-Stamp forms an integral part of the Tripartite Memorandum of Understanding dated 27th January, 2016 executed amongst Ministry of Power, Government of India, Government of Rajasthan and Ajmer Vidyut Vitram Nigam Limited.

Statutory Alert:

1. The authenticity of this Stamp Certificate should be verified at "www.shcilestamp.com". Any discrepancy in the details on this Certificate and as available on the website renders it invalid.
2. The onus of checking the legitimacy is on the users of the certificate.
3. In case of any discrepancy please inform the Competent Authority.



**TRIPARTITE MEMORANDUM OF UNDERSTANDING
AMONGST
Ministry of Power, Government of India
AND
Government of Rajasthan,
AND
Ajmer Vidyut Vitran Nigam Limited**

For achieving turnaround of Ajmer Vidyut Vitran Nigam Limited

This TRIPARTITE MEMORANDUM OF UNDERSTANDING (hereinafter referred to as the “**Tripartite MOU**”) is made this 27th day of January 2016

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BY AND AMONGST

Ministry of Power, Government of India, having its Office at Rafi Marg, Sansad Marg Area, New Delhi - 110001 which expression shall unless it be repugnant to the subject or context thereof, include its successors and assigns, of the **FIRST PART**;

AND

Government of Rajasthan (hereinafter referred to as “GoR”) which expression shall unless it be repugnant to the subject or context thereof, include its successors and assigns, of the **SECOND PART**

AND

Ajmer Vidyut Vitran Nigam Limited (hereinafter referred to as “Ajmer DISCOM” or “AVVNL” which expression shall unless repugnant to the context or meaning thereof includes its successors and assigns) of the **THIRD PART**.

The Government of India, the Government of Rajasthan and Ajmer DISCOM are hereinafter also referred to collectively as the “Parties” and individually as the “Party”.

Definitions:

“Effective Date” means the date of signing of the MOU

“Cut-off Date” means 30th September 2015

“Bonds” mean the bonds issued by the Ajmer DISCOM under the Central FRP Scheme- 2012 and UDAY.

“Outstanding Debt” means the debt of the Ajmer DISCOM including Bonds and capex as well as short term loans of Banks and FIs

Preamble:

The Ajmer DISCOM has been reeling under severe financial stress. The DISCOM had the revenue deficit during FY 2013-14 of Rs 4,843 Crores and revenue deficit of Rs 3,593 Crore in FY 2014-15. The accumulated losses have reached to the level of Rs. 26,844 Crore at the end of FY 2014-15. The outstanding debt level of the DISCOM has reached Rs. 26,597 Crore at the end of September 2015. Also, the interest and finance cost burden of nearly Rs 2.01 per unit during FY 2014-15 was significantly higher than the national average of Rs 0.44 per unit only. The ARR is insufficient to meet the ACS, with a cost recovery of only 70%.

The Government of India, GoR and the Ajmer DISCOM have decided to enter into a tripartite MoU in order to improve the operational and financial efficiency of the Ajmer DISCOM to enable financial turnaround of the DISCOM.

NOW IT IS HEREBY AGREED BY AND AMONG THE PARTIES HERETO as follows:

1. Obligations/ Commitments:

1.1. The Ministry of Power, Government of India to take following measures:

- a) Facilitating GoR to take over Rs. 13,298.28 Crore (50% of the outstanding debt) of the DISCOM as on 30th September, 2015 in the year 2015-16 and Rs. 6,649.23 Crore (25% of the outstanding debt) in the year 2016-17. The lender-wise loan details are attached as **Annexure-A**;
- b) Facilitating Banks/FIs not to levy any prepayment charge on the DISCOM's debt. Banks/FIs shall waive off any unpaid overdue interest and penal interest on the DISCOM's debt and refund/adjust any such overdue / penal interest paid since 1st October 2013. 50% of DISCOM's debt as on 30th September 2015, as reduced by any waivers by Banks/FIs shall be converted by the Banks/FIs into loans or bonds with interest rate not more than bank's base rate plus 0.1%. Alternately, this debt may be fully or partly issued by the DISCOM as state guaranteed DISCOM bonds at the prevailing market rates which shall be equal to or less than bank base rate plus 0.1%;
- c) Facilitating through Ministry of Coal, increase in supply of domestic coal to Rajasthan Rajya Vidyut Utpadan Nigam Ltd (RVUN);
- d) Ensuring rationalization of coal linkages;
- e) Liberally allowing coal swaps from inefficient plants to efficient plants and from plant situated away from mines to pithead plants;
- f) Rationalizing coal prices based on Gross Calorific Value (GCV);
- g) Ensuring correction of coal grade slippages through re-assessment of each mine;
- h) Directing Coal India to supply 100% washed coal for G10 grade and above by 1st October 2018;
- i) Ensuring supply of 100% crushed coal from Coal India by 1st April 2016;
- j) Faster completion of ISTN Lines;
- k) Allocating linkages to States at notified price based on which the State shall go for tariff based bidding. This will help in getting cheaper power and revive stressed assets;
- l) Facilitating NTPC to provide handholding support for improving operational efficiencies of the State generating units;

- m) Devising a suitable review mechanism with representation from the Ministry of Finance (MoF) to ensure a close monitoring of performance on the monthly basis to prevent any slippage; and
- n) Facilitating timely permission from Department of Expenditure, Ministry of Finance, over and above the borrowing limit of the GoR (3% of the GSDP) required under Article 293 (3) of the Constitution of India to raise non-SLR Bonds through RBI, in order to enable the GoR to takeover DISCOM debt.

1.2. The Government of Rajasthan (GoR) to take the following measures:

- a) Taking over of Rs. 19,947.51 Crores (75% of the debt of the DISCOM as on 30th September, 2015);
- b) Rs. 13,298.28 Crores (50% of the outstanding debt) shall be taken over in the financial year 2015-16 while Rs. 6,649.23 Crores (25% of the outstanding debt) shall be taken over in the financial year 2016-17;
- c) The GoR shall take over the debt according to the following timelines:
 - i. Year 2015-16: Last Quarter of the financial year-50% of the outstanding debt as on 30.9.2015
 - ii. Year 2016-17: Second Quarter of the financial year- 25% of the outstanding debt as on 30.9.2015
- d) The borrowings made by the state to takeover DISCOM debt during 2015-16 and 2016-17 shall be utilized by Government of Rajasthan solely for the purpose of discharging the DISCOM debt and transfer to DISCOM as a mix of grant, loan or equity. The breakup of the amount into loan, equity and grant to be given to the DISCOM in FY 2015-16 and FY 2016-17 would be provided after the approval of Budget by the Legislative Assembly;
- e) For the borrowings made by the State to takeover DISCOM debt, Government of Rajasthan shall take prior permission of Department of Expenditure, Ministry of Finance under Article 293 of the Constitution of India before approaching Reserve Bank of India to raise loans, over and above the permissible borrowing limit of the State (3% of the GSDP);
- f) The borrowings made by the state to take over DISCOM debt during 2015-16 and 2016-17 shall be over and above the normal permissible net borrowings ceiling of the state determined by Department of Expenditure, Ministry of Finance under the recommendations of 14th Finance Commission.
- g) The GoR shall issue non-SLR bonds to raise funds for providing grant / loan / equity to the DISCOM;

- h) The takeover of the debt shall be in the order of debt already due, followed by debt with highest cost;
- i) The GoR shall take over the future losses of the DISCOM in a graded manner and shall fund the losses as follows:

Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Previous year's DISCOM's loss to be taken over by GoR	0% of the loss of FY 2014-15	0% of the loss of FY 2015-16	5% of the loss of FY 2016-17	10% of the loss of FY 2017-18	25% of the loss of FY 2018-19	50% of the loss of FY 2019-20

The previous year's actual losses will be used for calculation for each year instead of using current year's estimated losses.

- j) All outstanding dues from the State Government Departments to DISCOM for supply of electricity shall be paid by 30.03.2016;
- k) GoR shall guarantee repayment of principal and payment of interest for the balance debt remaining with DISCOM/ bonds issued by DISCOM;
- l) Henceforth, Banks/FIs shall not advance short term debt for financing losses; current losses after 1st October, 2015, if any, shall be financed only upto the extent of loss trajectory finalized by Mop with the State, and such financing will be done through bonds issued by Discoms backed State guarantee, to keep borrowing within limits and cost of borrowing low. In case Discoms fail to raise the bonds to meet their requirements then, GoR will arrange remaining funds after considering the fiscal space available with State Government.
- m) GoR shall ensure replacement of street lights with LEDs in all municipal towns through urban local bodies;
- n) GoR shall take steps for improving efficiency of generating plants of RVUNL, for which NTPC would handhold;
- o) GoR shall endeavor that all operational targets as enumerated in Section 1.3 are achieved;
- p) GoR shall endeavour to reduce transmission losses from 4.2% (FY 2014-15) to 3.5% (FY 2018-19);
- q) GoR shall review the performance of DISCOM on monthly basis at State Government level in the presence of representative of the Finance Department; and
- r) GoR shall take measures to promote the PAT (Perform, Achieve, Trade) scheme of BEE for improving energy efficiency in industries;

1.3. The Ajmer DISCOM to take the following measures:

- a) For the 50% of the debt remaining with it as on 31st March, 2016, DISCOM shall fully/ partially issue state government guaranteed bonds or get them converted by

Banks/FIs into loans or bonds with interest not more than the Banks base rate plus 0.1%. DISCOM to ensure timely payment of lender's dues towards principal/interest for the balance debt remaining with them.

- b) The DISCOM shall pay interest to the GoR on the outstanding GoR loan in a financial year at the rate at which GoR issued non-SLR Bonds (if asked for by GoR);
- c) The DISCOM shall endeavour to reduce AT&C losses from 26.8% in FY 2014-15 to 15% by FY 2018-19 as per the following trajectory:

Year	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19
AT&C loss	24%	20%	17.5%	15%

However, if the target in a particular year is not met, then the DISCOM shall strive to achieve the targets in the subsequent years so as to achieve the desired target of 15% AT&C losses by FY 2018-19.

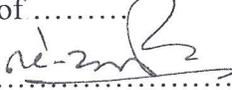
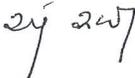
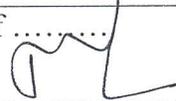
- d) DISCOM shall restrict power supply in areas with high or increasing AT&C losses from 1st April 2016;
- e) The DISCOM shall endeavour to eliminate the gap between ACS and ARR by FY 2018-19. Detailed computation of year wise ACS-ARR gap along with financial projections have been attached as **Annexure-B**;
- f) The DISCOM shall achieve operational milestones as specified in DDUGJY & IPDS;
- g) The DISCOM shall take the following measures for loss reduction:
- (i) Undertaking 'name and shame' campaign to control power theft from time to time;
 - (ii) Preparing loss reduction targets at division/ circle/ zonal level and making concerned officers responsible for achieving the loss reduction targets; the loss reduction targets at the division level have been attached as **Annexure-C** of MOU;
 - (iii) Implementing performance monitoring and management system (MIS) for tracking the meter replacement, loss reduction and day to day progress for reporting to top management;
 - (iv) Achieving 100% Distribution Transformer (DT) metering by June 2018, as per DISCOM policy;
 - (v) Achieving 100% feeder metering by 30th June 2016;

- (vi) Undertaking energy audit up to 11kV level in rural areas by September 2016;
 - (vii) Undertaking Feeder Improvement Program for network strengthening and optimization, to be completed by March 2017;
 - (viii) Undertaking Physical Feeder Segregation by March 2018 based on availability of funds sanctioned for the purpose under relevant schemes;
 - (ix) Installation of AMR for all consumers with consumption above 500 units/month by June 2018 and for other consumers with consumption above 200 units/ month by June 2020, subject to cost benefit analysis;
 - (x) Providing electricity access to 30 lakh unconnected households as per trajectory finalized in the '24x7 Power for All' document by FY 19; and
 - (xi) Implementing ERP systems for better and effective inventory management, personnel management, accounts management etc. to reduce costs and increase efficiencies by March 2018;
- h) The DISCOM shall undertake various measures for Demand Side Management and Energy Efficiency such as:
- (i) Providing LED for domestic consumers under DELP Programme through EESL;
 - (ii) Undertaking consumer awareness programmes for optimum utilization of resources and to foster long-term behavioural changes; and
 - (iii) Replacing at least 10% of existing agriculture pumps with energy efficient pumps by March 2019.
- i) The DISCOM shall undertake the following tariff measures:
- (i) Quarterly tariff revision particularly to offset fuel price increase;
 - (ii) Timely filing of Tariff Petition before the RERC so that Tariff Order may be issued for the year as early as possible; and
 - (iii) Timely preparation of annual accounts of the DISCOM, which shall also enable timely filing of the Tariff Petition;

- j) The DISCOM shall undertake the following measures to increase employee engagement:
- (i) Initiating capacity building of employees to enhance technical, managerial and professional capabilities at induction level and in subsequent refresher trainings; and
 - (ii) Devising Key Performance Indicators (KPIs) for each officer in-charge on areas of AT&C loss reduction and improvement in meter/billing/ collection efficiency. The performance of officer in-charge shall be linked to KPIs achieved and will attract incentive/ penalty.
- k) The DISCOM shall implement the following Customer Service Strategy:
- (i) Setting up of Centralized Customer Call Center for timely resolution of complaints related to no current and other technical complaints, harassment by official, reporting of theft and safety related complaints; and
 - (ii) Introducing more avenues to consumers for bill payment, which could be in terms of e-payment through net banking, credit/ debit card etc.
- l) The DISCOM shall procure power through transparent process of competitive bidding; and
- m) CMD/MD of DISCOM shall monitor the performance of DISCOM on monthly basis.

Detailed action plan for implementation of the targeted activities in order to improve financial viability and achieve turnaround is attached as **Annexure-D** of the MOU.

IN WITNESS whereof the Parties hereto have executed these presents the day, month and year first herein above written.

<p>SIGNED AND DELIVERED BY (on behalf of MOP, Govt. of India)</p> <p>Signature </p> <p>Name & Designation Dr. Arun Kumar Verma, Joint Secretary (Distribution), Ministry of Power, Government of India नई दिल्ली-110001 / New Delhi-110001</p>	<p>in the presence of</p> <p>Signature </p> <p>Name & Designation Narinder Singh</p> <p>Address..... U.S. - MOS</p>
<p>SIGNED AND DELIVERED BY (on behalf of Govt. of Rajasthan)</p> <p>Signature </p> <p>Name & Designation Sanjay Malhotra, Principal Secretary (Energy) Government of Rajasthan</p>	<p>in the presence of</p> <p>Signature</p> <p>Name & Designation</p> <p>Address.....</p>
<p>SIGNED AND DELIVERED BY Ajmer Vidyut Vitran Nigam Limited</p> <p>Signature  (D. K. Sharma) Director(Tech.) AVVNL; Ajmer</p> <p>Name & Designation D K Sharma Director (Technical) Ajmer Vidyut Vitran Nigam Limited (AVVNL), Jaipur</p>	<p>in the presence of</p> <p>Signature </p> <p>Name & Designation D.K. Jaiswal CTO</p> <p>Address..... Jaipur Discom</p>

Government of Rajasthan
Directorate of Local Bodies, Jaipur

11-3, Rajmahal Residency Area, Civil Line Phatak, 22 Godown, C-Scheme Jaipur
Telefax: 0141-2222403 Email- dlbrajasthan@gmail.com

File No. F.59/DLB/STP/Bicycle Mobility Services/15/2489

Date: 31-08-2015

LETTER OF INTENT

M/S Greeno-lution
A-13, Hill View Apartments
Vasant Vihar
New Delhi-110057, India

Sub.- Letter of Intent for "Bicycle Mobility Services" in Jaipur and Ajmer-Pushkar

Ref.- Your offer in reference to RFP no F.59/DLB/STP/Bicycle Mobility Services/15 dated 21.04.2015

Sir,

In reference to your "Request for Proposal" on the subject mentioned above, we are pleased to accept your offer and issuing Letter of Intent for providing "Bicycle Mobility Services" in Jaipur and Ajmer-Pushkar on the following financial bid:

- Rent of Bicycle Rs. 10/- per hour to be charged from the user.
- Revenue sharing with concerned ULB – Rs.2000/- per cycle shelter.

The other terms & condition are as follows:

A. Role of M/S Greeno-lution

- Procurement of bicycles, as per specification agreed in RFP.
- Identification of Locations for Stations in consultation with concerned Urban Local Body.
- Design of stations (with approval of the ULB). Design to be in Local Architectural Style.
- O&M of complete infrastructure installed for 7 years extendable up to 3 more years depending on satisfactory services.
- Stations to be manned or docked.
- Bicycles shall be equipped either with GPS or with RFID or any other technology for tracking the location of Bicycle.

BA

- Customer payment collection system to be decided by the service provider. Payment to ULB shall be on bio monthly basis as per the payment clause in the Tender Document.
- Advertising space can be up to maximum 20'x10' as per the availability of space at the station location.
- Minimum 15 location locations for Jaipur and minimum 10 Station locations for Kota each shall be identified by the Service Provider in consultation with ULB.

B. Role of Municipal Corporation Jaipur and Ajmer/Municipal Board Pishkar.

- Facilitating Loan for execution of Project, if required.
- Identification of Stations in consultation with the Service Provider.
- Construction of station as per the drawing provided by the Service Provider maximum size of 25' x 10' (Numbers as per requirement).
- Information Kiosk to be provided by Service provider with maximum size 6' x 6' within the area of station.
- Providing advertising Rights to Service Provider with maximum adventures space of 20'x10' on the station.

You are requested to take following actions immediately.

- (i) Contact the Commissioner, Municipal Corporation and execute the Agreement.
- (ii) Start identification of stations in consultation with ULB officials.
- (iii) Procure the Bicycles as specifications prescribed in RFP document.
- (iv) Technical advice to ULB in designing & construction of stations.
- (v) Start operation of the Project by 31st October 2015.

You are further requested to send your plan of action immediately.

This bears the approval to competent authority.

Yours Sincerely



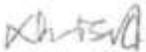
(Purushottam Biyani)
Director & Joint Secretary,

File No. F.59/DLB/STP/Bicycle Mobility Services/15/ 2490-93

Date: 31-08-2015

Copy to the following for information:-

- PS to Principal Secretary, Local Self Government, Rajasthan, Jaipur.
- Commissioner, Municipal Corporation, Jaipur.
- Commissioner, Municipal Corporation, Ajmer.
- Executive Officer, Municipal Board, Pushkar.


(R.K. Vijayvargia)
Senior Town Planner

Bicycle Stand

Broad Specifications

- a) Frame; Cabin made up of tubular steel structure for supporting floor, walls, ceiling, false ceiling, roof sheeting, structure for 25 ft X 10 ft electrical and having stability to be lifted with four nos. lifting lugs so as to facilitate reusability and transportation of the cabin in future. The frame shall be able to support the loads due to the 20ft X 10ft hoarding coming at the top of cycle stand and the structure for hoarding to be supplied with ACP cladding
- b) Roof cladding; shall be provided with 0.5mm thick colour coated sheet of TATA Bluescope/ Bhushan/ Jindal make.
- c) Wall cladding around cycle stand; shall be provided with 2.5mm thick perforated M S Sheet, duly joined fixed on porta MS Frame, front locking frame and painted with epoxy primer and P U Paint finish of Asian, Nerolac, Berger make.
- d) Flooring; 4mm chequered plate covered with 2mm PVC Tiles.
Parking rings for docking the bicycles.

Cabins shall be lift and shift type and they do not require any foundation or civil works and require only plain compacted ground.

4.7. MoU with mentor organizations like CII for Smart City Ajmer



Press Release:



Confederation of Indian Industry
Northern Region – Rajasthan State Office
3, Shivaji Nagar, Civil Lines, Jaipur - 302006
T : 0141 - 2221441 - 43
F : 0141 - 2221411
E : cii.rajasthan@cii.in
W : www.cii.in/northern

स्मार्ट सिटी बनाने के लिए सीआईआई ने अजमेर नगर निगम के साथ साइन किया एमओयू

कंफेडरेशन ऑफ इंडियन इंडस्ट्री (सीआईआई) ने अजमेर नगर निगम (ऐएमसी) के साथ स्मार्ट सिटी को लेकर एक मेमोरेंडम ऑफ अंडरस्टैंडिंग साइन किया है। सीआईआई ने यह मेमोरेंडम ऑफ अंडरस्टैंडिंग नगर निगम को सपोर्ट करने और उनको पेश आने वाले चैलेंज को दूर करने के लिए किए हैं।

सीआईआई का उद्देश्य है कि किस प्रकार से सिटी को स्मार्ट सिटी में कनवर्ट किया जाए। सीआईआई द्वारा साइन किए गए एमओयू में सीआईआई राजस्थान के डायरेक्टर और स्टेट हैड श्री नितिन गुप्ता, ऐएमसी के कमिश्नर श्री एच गुडते, अजमेर नगर निगम ने हस्ताक्षर किए। यह एमओयू श्री धर्मेन्द्र गहलोत, मेयर, अजमेर और श्री राजीव तोषनीवाल, मेम्बर, सीआईआई राजस्थान स्टेट काउंसिल एवं प्रबन्ध निदेशक तोषनीवाल इंडस्ट्रीज लि. की मौजूदगी में किए गए।

स्मार्ट सिटी पर चलने वाले सीआईआई के इस राष्ट्रीय अभियान के तहत सीआईआई ने विश्व की कई फर्म के साथ टाइप किया है, जिससे कि भारतीय शहरों को स्मार्ट सिटी बनाया जा सके। इसी मिशन के तहत जर्मन, यूएस, इंडियन, स्पेनिश और जापानी के व्यापारिक संगठनों से भी टाइप किया गया है।

सीआईआई राजस्थान के डायरेक्टर और स्टेट हैड श्री नितिन गुप्ता के अनुसार इस साझेदारी का उद्देश्य सभी इंटिग्रेटेड पैकेज की पूरी रेंज उपलब्ध करवाना है। ऐसा कोई भी नहीं कर सका है, इसीलिए स्मार्ट सिटी प्रोजेक्ट में सीआईआई ने यह कदम उठाया है। सीआईआई स्मार्ट सिटी मिशन के अनुसार सीआईआई की कोशिश है कि यह नीतियाँ प्रोजेक्ट और कोस्ट पर आधारित हो। उन्होने आगे बताया कि सीआईआई के इस अभियान का उद्देश्य है कि प्रोजेक्ट और कोस्ट पर आधारित नीतियों के कांसेप्ट को आगे बढ़ाना जो कि स्मार्ट सिटी प्रोजेक्ट के अंतर्गत सबसे आवश्यक हैं। श्री गुप्ता के अनुसार अजमेर की अपनी संस्कृति और हैरिटेज है। यह एक होली सिटी के साथ ही ग्लोबल टूरिज्म डेस्टिनेशन है।

श्री राजीव तोषनीवाल, मेम्बर, सीआईआई राजस्थान स्टेट काउंसिल एवं प्रबन्ध निदेशक तोषनीवाल इंडस्ट्रीज लि. के अनुसार सीआईआई ऐएमसी एकसाथ काम करेंगे। जो एमओयू साइन किया गया है उसमें सीआईआई और ऐएमसी इंडस्ट्री के सदस्यों के साथ ही अन्य सभी का हितधारकों का भी ध्यान रखते हुए काम करेंगे। सीआईआई द्वारा ऐएमसी को अजमेर स्मार्ट सिटी प्रोजेक्ट के लिए नीतियों को निर्धारित करने में भी सहयोग दिया जाएगा।

इस मौके पर श्री नितिन गुप्ता ने कहा कि सीआईआई स्मार्ट सिटी प्रोजेक्ट में अग्रणी है और राज्य और सेंट्रल गवर्नमेंट के साथ मिलकर प्रोजेक्ट कर रही है। यह एमओयू इसी का एक इनीशिएटिव है।

अजमेर

18 दिसम्बर 2015

4.8. MoU/Agreement of Government of Rajasthan & USTDA

MEMORANDUM OF UNDERSTANDING

BETWEEN

**THE UNITED STATES TRADE AND DEVELOPMENT
AGENCY**

AND

THE GOVERNMENT OF RAJASTHAN

OF THE REPUBLIC OF INDIA

ON COOPERATION

TO SUPPORT THE DEVELOPMENT OF

SMART CITIES IN RAJASTHAN

The U.S. Trade and Development Agency (“USTDA”) and the Government of Rajasthan of the Republic of India (the “Government of Rajasthan”) (collectively referred to as “the Parties”) hereby acknowledge the following:

RECOGNIZING:

In September 2014, the Prime Minister of India, Shri Narendra Modi, and the President of the United States of America, Mr. Barack Obama, held their first bilateral summit, and welcomed the wide range of collaborative activities undertaken to improve their citizens’ lives, while agreeing to revitalize the existing partnership and find new areas for collaboration and mutual benefit.

The U.S.-India Joint Statement related to the bilateral summit, dated September 30, 2014, in which the Government of the United States welcomed India's offer for U.S. industry to be the lead partner in developing smart cities in Ajmer (Rajasthan), Vishakhapatnam (Andhra Pradesh) and Allahabad (Uttar Pradesh).

In support of developing new areas of collaboration and mutual benefit in the development of smart cities in India, USTDA and the Government of Rajasthan have held discussions to collaborate on the development of smart cities in Ajmer and elsewhere in Rajasthan.

WHEREAS:

USTDA, through early project planning assistance, supports infrastructure development in emerging markets and links U.S. businesses to global infrastructure opportunities; and

The Government of Rajasthan is committed to the development of smart cities within the state of Rajasthan.

NOW THEREFORE, the Parties understand the following:

1. The Parties are interested in supporting the development of smart cities in Rajasthan, particularly in the city of Ajmer.
2. In support of this interest, USTDA intends to contribute funding for feasibility studies/pilots, study tours, workshops/trainings, and any other projects mutually determined. Specifically, USTDA intends to invite a Smart Solutions for Smart Cities Reverse Trade Mission delegation to the United States, including delegates from Rajasthan.
3. USTDA intends to support smart city infrastructure development for Rajasthan by contributing funding towards advisory services to support the development of a smart city in Ajmer.

4. USTDA intends to collaborate with other U.S. government agencies, such as the Department of Commerce, the U.S.-Export Import Bank, and other trade and economic agencies to promote greater U.S. – India infrastructure development cooperation and to support the development of smart cities in Rajasthan.

5. USTDA also intends to call upon U.S. industry organizations to mobilize private sector expertise and resources to address important aviation and energy-related infrastructure connected to developing smart cities.

6. The Government of Rajasthan, and other relevant divisions within the state, intends to provide resources in support, coordination and facilitation of the development of smart cities, to include but not be limited to:

- a. Technical information and data related to smart cities planning;
- b. Staff, logistical and travel support; and
- c. State budgetary resources.

7. USTDA support for the development of smart cities in Rajasthan, shall be subject to the availability of funds and subsequent written agreements with relevant parties.

8. As a Memorandum of Understanding, this does not constitute a commitment or obligation of funds by the Parties.

9. Cooperation under this Memorandum of Understanding is intended to commence upon its signature by the Parties. Any of the Parties may discontinue its participation in this MOU upon thirty (30) days prior written notification to the other Party.

10. This MOU may be modified or amended at any time by the prior written consent of the Parties.

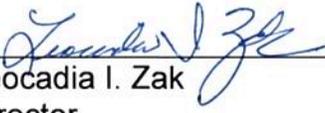
11. Any issues arising out of the interpretation and application of this MOU should be settled in good faith by consultation between the Parties.

IN WITNESS WHEREOF, the Parties have caused this MOU to be executed by their duly authorized representatives on the date indicated below.

Signed at *New Delhi* on *25 Jan* 2015 in two originals in the English Language.

FOR THE U.S. TRADE AND
DEVELOPMENT AGENCY

FOR THE GOVERNMENT OF
Rajasthan



Leocadia I. Zak
Director
U.S. Trade and Development
Agency



Chief Secretary
Government of Rajasthan



BRIEFING ROOM

ISSUES

THE ADMINISTRATION

PARTICIPATE

1600 PENN



HOME · BRIEFING ROOM · STATEMENTS & RELEASES

Briefing Room

Your Weekly Address

Speeches & Remarks

Press Briefings

Statements & Releases

White House Schedule

Presidential Actions

Executive Orders

Presidential Memoranda

Proclamations

Legislation

Pending Legislation

Signed Legislation

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Nominations & Appointments

Disclosures

The White House
Office of the Press Secretary

For Immediate Release

June 07, 2016

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FACT SHEET: U.S.-India Economic Cooperation and People-to-People Ties

Economic and people-to-people ties form a key pillar for the growing U.S.-India Strategic Partnership. Two-way trade and investment between our nations continue to reach new heights. The two governments continue to expand existing cooperation and efforts as well as launch new initiatives to bring about mutual economic prosperity as well as to collaborate to address global challenges.

Below are the key highlights since President Obama's visit to New Delhi in January 2015:

Infrastructure and Smart Cities Collaboration

India Smart City Development: In support of Prime Minister Modi's Smart Cities initiative, the U.S. Trade and Development Agency (USTDA) is catalyzing U.S. private sector expertise, technology solutions and best practices to mobilize smart city development in Ajmer, Allahabad, and Visakhapatnam. USTDA will host a series of reverse trade missions to connect officials from Uttar Pradesh and Rajasthan, and the cities of Allahabad and Ajmer, to U.S. best practices and technologies. The visits will complement initiatives that both states and their respective cities are presenting in their Smart City Challenge proposals. These upcoming trade missions follow a similar successful visit by officials from Andhra Pradesh in February 2016. USTDA is also partnering with a consortium of leading U.S. companies and the State Government of Andhra Pradesh to provide a planning framework, development strategy, and a list of high-priority investment projects for smarter urban development in Visakhapatnam. The technical assistance is leveraging innovative U.S. technologies, data analytics, and delivery approaches to enhance citizen services and improve efficiencies throughout city operations.

Indo-Pacific Economic Corridor (IPEC): Recognizing the complementarity of India's Act East Policy and the United States Indo-Pacific Economic Corridor initiative, the United States is supporting increasing economic linkages among South Asian countries and with Southeast Asia by collaborating on physical infrastructure, trade, and human and digital connectivity. A more integrated South Asia will lead to sustainable and inclusive economic growth where markets, economies, and people are more likely to thrive and prosper. To this end, at the inaugural experts-level U.S.-India-Japan Joint Working Group on Regional Connectivity on April 22 in New Delhi, the three sides pledged to explore areas for potential trilateral cooperation that support broader economic integration and private sector investment.



4.9. High Level Sector Report by USTDA

INDIA SMART CITIES INTEGRATED PLANNING TECHNICAL ADVISORY PROJECT 2015-2016



Sponsored by USTDA



Emerging Markets Infrastructure LLC

in collaboration with



3E Consulting, LLC
Turning Knowledge into Value

SmartCitiesCouncil
LIVABILITY | WORKABILITY | SUSTAINABILITY



StudioPOD
PEOPLE ORIENTED DESIGN

High Level Sector Reports Ajmer, India

June 23, 2016



Introduction

In January 2015, the U.S. Trade and Development Agency (USTDA) entered into a Memoranda of Understanding with the Indian states of Andhra Pradesh, Rajasthan, and Uttar Pradesh, which outline USTDA's intention to deploy its program tools to support smart cities development in these three Indian states. To support this commitment, USTDA hired a technical advisory team to work alongside city partners to provide on-the-ground support in each of the three states and recommend solutions to their urban planning and infrastructure development objectives. The technical advisory team includes U.S. and Indian experts from Emerging Markets Infrastructure (EMI), working in cooperation with the 3E Consulting, Smart Cities Council, Cimperium, and Studio POD.

As part of the USTDA's India Smart Cities initiative, the USTDA Technical Advisory Team visited Ajmer May 23 – 27, 2016 to meet with municipal officials and other stakeholder, tour specific infrastructure sites, assess the current infrastructure, discuss and advise on the Smart Cities Challenge Phase 2 proposal, and assist with smart city project identification and planning. The following team members participated in the visit: Doug Shuster, President, Emerging Markets Infrastructure (EMI) - Team Lead and Project Manager, Tilak Gamage - Water and Wastewater Expert, Rabindra Chakraborty - Information and Communications Technology (ICT) Expert, Mani Vadari, Director - Smart Cities Sector Services, Smart Cities Council - Energy/ICT/Power Grid Expert, and Mahesh Waghdhare - Partner, StudioPod, Urban Planner.

Based the knowledge and data collected on this trip, the Technical Advisory Team developed several high-level sector reports describing current infrastructure and proposing solutions that should be considered by Ajmer city stakeholders that are planning their smart city project initiatives to better serve their citizens. The reports also aim to identify near term studies and pilot project opportunities that could implemented in support of the Smart City initiatives.

High Level Sector Reports for Ajmer focus on the following:

- Report No. 1: ICT, Internet of Things (IoT), and eGovernance
- Report No. 2: Cross-Sector – Integrated GIS, SCADA, Customer Information Management; and Smart Street lighting
- Report No. 3: Water and Wastewater
- Report No. 4: Urban Planning and Transportation
- Report No. 5: Energy – Renewable Energy, Smart Grid, Utility Business Models
- Report No. 6: Solid Waste Management

Report No 1: ICT, IoT, and eGovernance

1 Executive Summary

This high level sector report summarizes the observations in the area of ICT, eGovernance and Internet of Things (IoT) for the City of Ajmer and proposes possible solutions that are pertinent and should be considered towards the Smart City effort. The report also tries to identify near term studies and pilot opportunities that could be funded to support Ajmer's Smart City planning.

The analysis and recommendation follow the below main guidelines for Ajmer:

- The City of Ajmer has the vision of using Smart City technology to strengthen its already existing image as a city of heritage, tourism and learning. All efforts identified are aligned with the city's vision.
- Ajmer, an old city, has gone through a natural evolution of development causing highly varied wealth distribution. The proposed solution should align with the affordability for those different tiers of wealth.
- A Smart City solution that is considered a viable opportunity should contain benefits for all - high, medium, and low income groups.
- The City of Ajmer needs to capitalize on various schemes undertaken by the Government of India and the State of Rajasthan and work in harmony with them in order to achieve best results so efforts are not duplicated.

Like power, water or transportation, Information and Communication Technology (ICT) is basic infrastructure of a smart city. It plays an enabling role and facilitates easy ways of connecting, collaborating, auditing, controlling, and forecasting functions among various city departments [1]. It also becomes a platform for providing various eGovernance applications aimed at providing citizen-centric services, conveniences and increased cooperation with other governmental agencies. Smartness of a city is directly proportional to the ICT connectivity and predictive capability using the historical and real time data coming from all relevant data sources.

On a high level, ICT infrastructure typically has three parts:

1. Computing power: consisting of processing power and storage capacity
2. Communication speed, e.g., available bandwidth
3. Access technology, e.g., end user device, laptops, mobile, desktops, and kiosk

With the adoption of the cloud concept, ICT today can simply be a data center (or cloud) to house data and an easy communication technology e.g., TCP/IP, WiFi, Bluetooth with adequate bandwidth and an accessing device, such as laptop, mobile or IoT devices.

eGovernance Applications are software applications that are used in any city to provide any of three kinds of conveniences, shown in Figure 1. Example applications in each category that could be relevant to Ajmer are also indicated in Figure 1.

- Government to Government Applications: These applications are required for either internal functioning of the city government such as an Enterprise Resource Planning

(Financials/Accounting, Human Resource etc.) software or for coordinating activities between other government bodies e.g., City, State and Central Government or with other public sectors, such as between Ajmer Municipality and Ajmer Development Authority.

- **Government to Citizen Applications:** These set of applications are required for providing mission critical services directly to its citizens such as property records, birth/death registry and certificate production system, crime/neighborhood watch applications.
- **Citizen or Visitor Centric Applications:** These applications focus on conveniences for both citizens who live in the city and tourists/visitors. Examples of such applications are a tourism management system or road repairing warning systems.

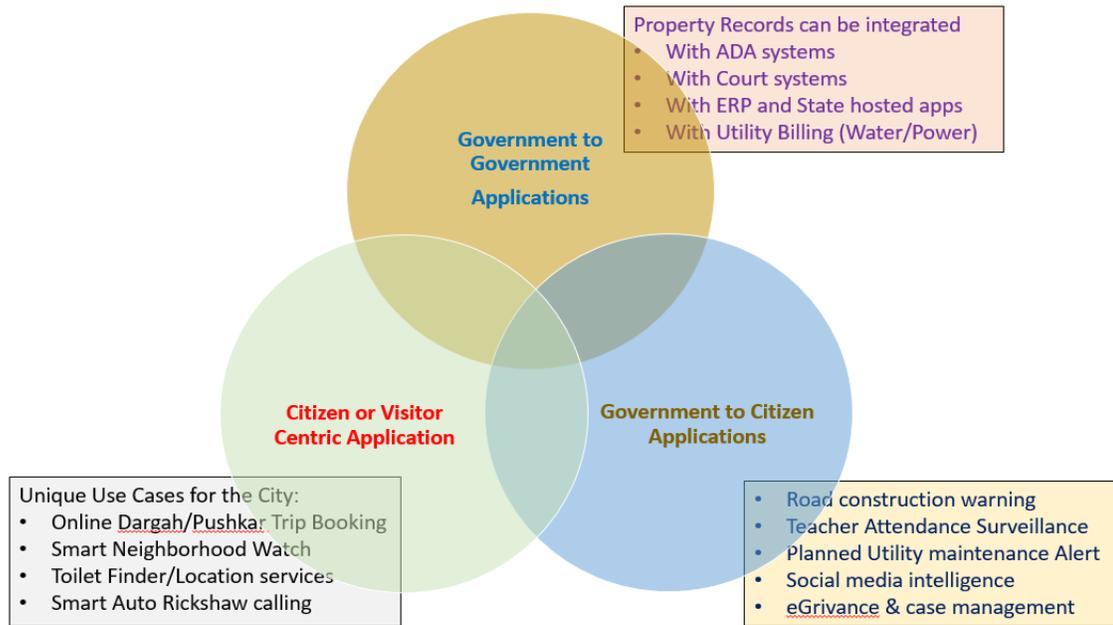


Figure 1: eGovernance Applications

The Internet of Things (IoT) aligns with the Cloud and access technology model, but adds more intelligence by enabling other types of data sources beyond data stored in conventional relational databases. These types of data primarily originate from various sensors, e.g., camera, light sensors, flowmeter, thermometer etc. or from user entered data on social media platforms e.g., Facebook, Blogs etc. Data originated from the social media are often called “unstructured data”, data originated from the sensors are typically known as “semi-structured” or Time Series data. All kinds of sensors are grouped as “IoT devices”.

ICT, IoT and eGovernance have interdependence although initiatives can be run in parallel.

Figure 2 is a simplified diagram that shows how the priorities around ICT, eGov and IoT are built one on another in complementing or enriching the services and citizen experiences.

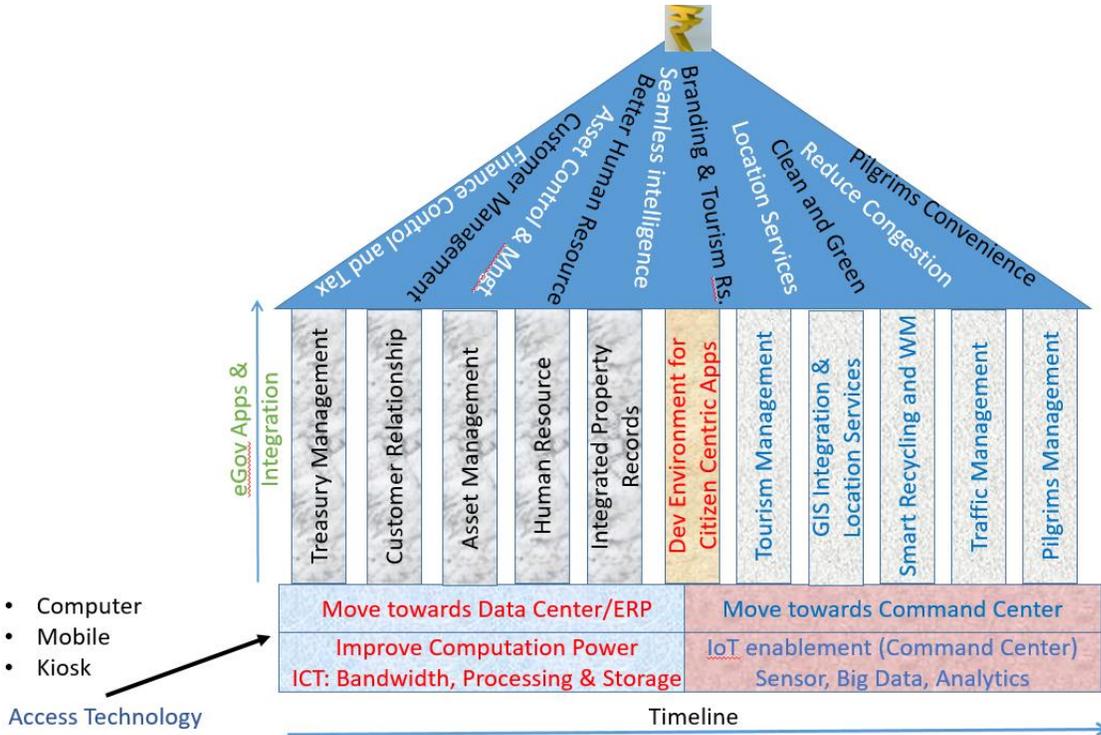


Figure 2: ICT-eGov-IoT Model

2 Sector and Technology Background

2.1 Global Experience

Smart City is not a project, but a journey. It is a way for city governance and citizens to interact and form an ecosystem of ancillary services offered by organizations, government bodies and private sector entities. Smart City initiatives are unique to a city.

In the U.S., Boston, Chicago, Kansas City, Philadelphia have been on a similar journey already. Chicago adopted to move to Gigabit broadband communication speed to facilitate a more dynamic and competitive marketplace. Chicago hopes high-speed broadband combined with a competitive price point will be an incentive for digital technology companies to move or relocate to Chicago [2].

In Boston, the 21st Century Learning program became an important part of the Smart City initiative to deliver convenient, integrated and life-long learning to the citizens of Boston. Boston is unique in exploring newer applications around education such as, Autism/Assistive applications and Classtalk applications to help teachers and students coordinate better [3].

Being a Smart City means prioritizing use of legacy investments, retrofitting existing assets — streets, buildings, equipment — with sensors and communications. New, low-cost technologies make it possible to connect legacy assets. Examples include:

- Electric power utility-doesn't have to replace old transformers, instead add transformer monitors to report operating conditions.
- Achieve operational optimization. Taking steps to arrive at best decisions for overall system. Involves balancing tradeoffs to achieve best results. Today, infrastructure and system

optimization is piece-meal. In future smart city optimization-data from sensors and subsystems integrated with computing power and analytics to find best path forward.

- Achieve asset optimization. Smart cities gain the maximum lifetime value from assets by applying advanced analytics to data. Good asset management systems-optimize asset performance, determine criticality of asset, and perform condition-based maintenance, thus preventing premature asset failure.
- Emergency response - integrate old, analog radios with state-of-the-art IP-based communications, stitching them together into a seamless network.
- Enable real-time monitoring and real-time alerts. Health and public safety are improved when citizens are alerted to fires, floods, air quality issues, public disturbances, pipeline leaks, downed electricity lines, chemical spills, snowstorms and snow plows, metro lines, bus locations, etc.
- Create citywide situational awareness. Situational awareness delivered in many ways-dashboards, visualizations, command and control centers, alerts delivered to computers or phones. Giving operators full situational awareness has many benefits - safety; reliability and resiliency; efficiency. Wide area view of system makes it easier for operators to exercise right choices and trade-offs. Visualizing city's traffic, energy, gas and water networks, helps ensure reliability and resiliency of those essential services.

2.1.1 Technology Trends

Many cities in the U.S. and other technically advanced countries around the world have been on the smart city path for a long time; however, with the advent of the Internet of Things (IoT) and analytics technologies smartness can be harnessed from many new types of data sources that were not possible earlier. Today, data can come from sensors, social media and other relevant sources that can enrich the insight around a situation.

In terms of adoption of technology and methodology of implementation, the U.S. clearly has an advantage. The progression of city governance in the U.S. began when the ICT infrastructure was laid out at the city level, then continued by building many eGovernance and citizen centric applications including mobile applications. As IoT technologies are becoming more and more available today it is a natural progression to integrate the sensor data and social data with eGovernance data in order to process the data using Big Data and IoT Engines and predict upcoming situations to proactively handle events. Current scope and role of ICT in Smart Cities in the U.S. varies widely; typical common initiatives include:

- Enable Predictive Analytics and Big Data Engines;
- Enable IoT infrastructure and provide integrated services; and,
- Establish urban command and control centers to enhance control.

The newer suite of public services includes proactive crime control and public safety, predictive maintenance for city utilities e.g., public works, intelligent waste management system, intelligent street lighting, disaster recovery and emergency control etc.

2.1.2 Case Studies/Examples

Below is a case study of the city of Rio de Janeiro, where the city collects information from 30 different departments about the state of transportation, water, energy, weather, and other conditions. Then it communicates those conditions to powerful computers, which crunch the data and present it to a unified

Control Center that the city developed with IBM shown in Figure 3. Not only does the city gain full situational awareness, it can even predict some conditions in advance, such as where a flood will occur during heavy storm, rain [4].



Figure 3: Rio de Janeiro Control Center

2.1.3 Regulatory & Policy Issues

The implementation and adoption methodology of technology for the cities in the U.S. is also somewhat unique because it reflects the power and autonomy of city governments. In this model, a city tries to be self-sufficient by collecting required revenue from its public services including utilities, public safety, public parks and recreations, and other services in addition to revenue collected from various taxes, whereby the city is responsible to scope out and implement their technology needs.

The policies and guidelines for city initiatives are carefully decided in the context of each need for that particular city as shown in Figure 4.

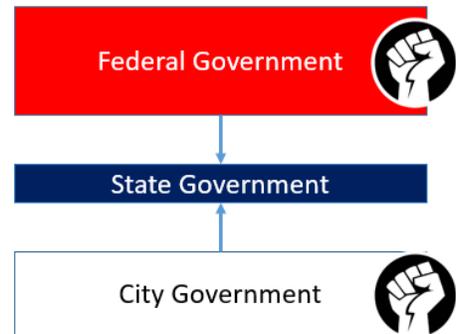


Figure 4: Autonomy at Federal and City Level Government

2.1.4 Cost Benefit

The benefits of a Smart City is obvious, however cost-benefit analysis for the same is not. Most of the benefits are in terms of convenience, efficiency and predictive control on disaster which are difficult to put a value against. Also a cost benefit analysis should be done by each project that delivers differentiating services, not just against ICT.

According to the study provided by IBM, The Memphis Police Department, is unlocking and analyzing enormous volumes of crime data with a single application. Strong leadership and statistical data improved officer reaction time and positioning, and the city’s crime rate has been reduced by 27% over four years. And Infinity Property & Casualty Corporation is employing predictive analytics to help identify potential recovery and fraudulent claims— which has achieved a 403% return in just three months [5].

2.2 India Experience

India plans to develop 100 smart cities in the next 5 years. Investments of about \$1.2 trillion is estimated over the next 20 years across areas like transportation, energy, public security, and ICT to build these smart cities. Cloud computing could evolve into a \$4.5 billion market in India by 2016 and broadband connections of 175 million users are expected by 2017. Under the flagship “Safe City” project, the Union Ministry proposes \$333 million for seven big cities (Delhi, Mumbai, Kolkata, Chennai, Ahmedabad, Bangalore and Hyderabad) to focus on technological advancement rather than manpower. The Government of India and the World Bank signed a \$236 million agreement to reduce disaster risks in the coastal villages of Tamil Nadu and Puducherry [6].

India’s grand plans for Smart City and urban infrastructure development have become synonymous in many cases, which pose a great opportunity as well as newer challenges. Unlike the cities that already had the basic infrastructure where making the cities smart meant connecting data collection, processing and predicting technologies, the Indian Smart City initiatives require commissioning of new infrastructure with built in smartness and backport to existing infrastructure.

The Government of India recognizes this challenge and launched various schemes, such as DIGITAL INDIA, HRIDAY, AMRUT to tackle different facets of the urban problems [7]. Although this sounds like the right approach, execution without excellent coordination between these efforts will not yield positive results.

2.2.1 Technology Trends

In India, enabling better broadband, Wi-Fi hotspots, intelligent street lighting systems, CCTV cameras for better security, intelligent traffic management systems, and telemedicine applications are some of the common topics talked around the smart city goals. For example, Pune plans to develop an ICT platform to provide Smart City services and Mumbai intends to develop an environmental database for readiness of climate change.

2.2.2 Case Studies/Examples

The Cisco Smart City in Bangalore features networked smart parking, connected cafes, recreation and relaxation rooms, a rooftop solar power system and indoor “neighborhoods” designed for employees to quickly meet (in person or virtually), collaborate, innovate and deliver wherever they are located [8].

To help citizens plan better, the city of Hubli in Karnataka is partnering with a civic startup to develop a system that would alert residents 30 minutes in advance that water was about to be released for their neighborhood [9].

The Greater Visakhapatnam municipality needed an efficient system for assessing and collecting property taxes. In order to boost property tax collection, the municipality introduced new collection systems and practices. As a result within a few years, Visakhapatnam reached 100% coverage and 85% tax collection efficiency [10].

In Rajkot, Gujrat, G-Auto was launched which allows customers to use an online or mobile application to book an auto rickshaw. G-Auto has also created a transparent, metered payment system, and an online feedback form. The city government played a key role in enabling the solution by introducing

reforms and working with various city stakeholders, such as the regional transport office, traffic police, driver unions and service providers [11].

2.2.3 Regulatory & Policy Issues

Today, the Government of India’s Smart City initiatives mostly operate under a top-down approach as shown in Figure 5. Various schemes by the central government are rolled out to the modernize cities through the state managed projects. The ICT sector is no exception. New policies that promote models for ICT project implementation that are city driven are needed for sustainable long term ICT and Smart City project implementation. The SPV model under the Smart Cities Challenge grant program could be a model for this type of development but it is not clear that the State Government is prepared to hand over control to the cities or that the cities are willing to take the initiative to take on this responsibility.

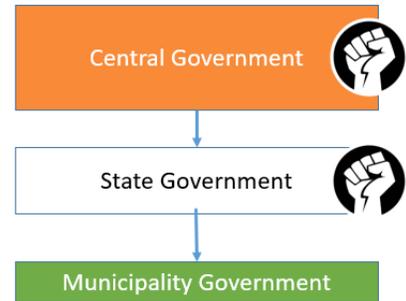


Figure 5: Top down approach in India

2.2.4 Cost Benefit

In India the benefits from Smart City initiatives can be priceless, especially if the solution is targeted towards solving issues are around basic citizen needs such as mobility, 24X7 water and electricity supply. ICT is an enabler for Smart City success. Since this initiative is relatively recent, the true cost benefit analysis has not yet been established for the Indian cities.

3 City/State Situational Analysis

In Ajmer, the municipality is not directly spearheading any projects in the ICT sector, rather it is following the direction and decisions taken from the state which builds the infrastructure such as data centers and hosts a common set of applications in its data center and provides a uniform set of citizen services across the state. For Ajmer, this data center is located in Jaipur.

The current approach has the obvious pros and cons, which are listed below:

Pros	Cons
<ul style="list-style-type: none"> • No headache at the City Level. Key ICT strategy, capacity planning, apps development, maintenance, and upgrades at State Level. • No risk, no cost, no skills planning at City Level. • Common city applications such as bill payment, e-tendering, public records e.g., birth/death certificate issuance etc., are developed centrally at state level and deployed across the cities. By doing this, the cost of application development, maintenance and upgrade needs are not replicated by each city. 	<ul style="list-style-type: none"> • City Level specific applications are missing. • The City remains dependent on the State and solution deployment hierarchy. It is not the right approach if cities are expected to become autonomous and self-sustaining. • The City has less say in the application features, timeline and specific changes as they almost do not pay for the ICT, eGov costs. To the city it comes almost like benefits/perks. The ICT vision at the city level is controlled and limited.

Information and Communication Technology:

The table below lists the summaries of our findings around the current state of the Information and Communication Technology and ongoing infrastructure initiatives in the City of Ajmer.

ICT Infrastructure	Current State
<ul style="list-style-type: none"> Three initiatives on Bandwidth Connectivity 	RajNET, RSWAN, NOFN (Please see below)
<ul style="list-style-type: none"> RajNET 	RajNET is envisaged as a platform to provide network connectivity through multimode (i.e. VSAT and TERRESTRIAL) connectivity throughout Rajasthan state. It would establish a centralized integrated network operating center (CINOC) for monitoring of multimode connectivity in the state. Under RajNET, the expansion of connectivity is proposed through VSAT up to Gram Panchayats. RajNET shall ensure connectivity availability to the Gram Panchayat level through multiple mechanisms, e.g. Broadband, SATCOM, OTA, LAN, SWAN etc. RajNET is installed in 172 out of 182 Panchayat.
<ul style="list-style-type: none"> RSWAN 	<p>RSWAN is to provide fast internet connectivity across districts to Government. Offices and an Intranet framework for all government department offices at district and block/ tehsil HQ.</p> <ul style="list-style-type: none"> Total PoP Rooms: 12 (1 DHQ + 11 BHQ & Tehsil) Government Office connected: 172 Bandwidth for District HQ & Their offices: 58 Mbps <p>Block HQ & Their offices: 4 Mbps</p>
<ul style="list-style-type: none"> NOFN 	Initially run as a pilot project in Ajmer district in all the 30 Gram Panchayat (GPs) of Arian Block which are connected through Optical Fiber Network of BSNL. Now all the blocks (Panchayat Samiti) are covered under NOFN. All the Gram Panchayat of Pilot Block Arain have benefitted by Telemedicine, Mandi online, E-Mitra services, Digital Knowledge Centers (in 5 GPs) etc.
<ul style="list-style-type: none"> Rajasthan State Data Center (RSDC) 	<p>The Rajasthan State Data Centers are providing central repository (database consolidation), application consolidation, online delivery of services, common security infrastructure, storage infrastructure, back-up infrastructure, directory infrastructure, web servers, application servers, and database servers for Government to Government (G2G), Government to Business (G2B), and Government to Citizen (G2C) services. RajComp Info Service Limited (RISL) has been designated as State Implementing Agency (SIA) for implementation of the SDC project under NeGP.</p> <ul style="list-style-type: none"> SDC is based on 2-Tier Architecture with 99.749% Uptime Bandwidth connectivity of 1Gbps under National Knowledge Network (NKN). Integration of Mobile Service Delivery Gateway for sending SMS STQC Audit has been done

	<ul style="list-style-type: none"> • Database Cluster of Oracle, SQL Server and Postgre SQL has already been established. MYSQL is also available in production as well as staging environment • ISO 27001 and 20000 certification (in Oct. 2012) • National Data Center, Shastri Park at New Delhi has been identified as Disaster Recovery (DR) site for RSDC. DeitY, GoI has provided replication hardware. DR implementation would be done by m/s HCL Comnet. • Virtualization environment on 6 physical servers established and presently total 66 virtual machines are running • Specially engineered Machines for Database and Application software (Oracle Exa-data and IBM-PureApp) are installed at RSDC to cater the need of high-end computing power.
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eGovernance Applications

The table below lists the current eGovernance Applications and their main service purposes in use in the City of Ajmer. These applications are hosted in the State Data Center in Jaipur and maintained by the DOIT&C.

eGov Applications	Main features
<ul style="list-style-type: none"> • e-Mitra 	<p>A portal which provides door step services delivery to citizens of Rajasthan. Citizen centric services are being provided through e-Mitra kiosks network.</p> <p>Total LSP (Local Service Provider): 17 Total e-Mitra Kiosk (Rural + Urban): 1654</p> <ul style="list-style-type: none"> • Utility bills (Phed, Discom, Telephone bills) • Various Department Recruitment Exam Services <ul style="list-style-type: none"> ○ Digital Certificate Services (Bonafied, Caste) etc. ○ Ration Card ○ Bhamashah
<ul style="list-style-type: none"> • Bhamashah 	<ul style="list-style-type: none"> • Women Empowerment. • Financial inclusion. • Distribution of benefits through Bhamashah Portal • All benefits transfer directly in a bank account or closer to home. • Direct Benefit Transfer (DBT) started under Scheme: <ul style="list-style-type: none"> ○ Pension ○ NAREGA ○ PDS (RATION)
<ul style="list-style-type: none"> • Aadhaar (UID) 	<ul style="list-style-type: none"> • Aadhaar is a 12-digit individual identification number issued by the Unique Identification Authority of India on behalf of the GoI. This number will serve as a proof of identity and address anywhere in India.

	<ul style="list-style-type: none"> Any individual, irrespective of age and gender, who is a resident in India and satisfies the verification process laid down by the UIDAI can enroll in Aadhaar. Ajmer is leading District in terms of number of enrollments. Subsidy provided by the government is transferred directly to the particular account. Aadhaar is mapped with the Bhamashah database and beneficiaries who are covered under the different schemes of the state government get benefits directly in their bank account under the DBT.
<ul style="list-style-type: none"> SSDG (State Service Delivery Gateway) 	<p>The State Portal and SSDG project has been formulated under the National e-Governance Plan (NeGP) to fulfil the vision of providing easy and convenient access to citizen services through remote access primarily through Common Service Centers (CSCs/eMitra kiosk) and enabling the State Portal by implementing the key components namely SSDG, Electronic Form (e-Forms) Application and Computing Infrastructure. The following figure highlights the overall vision of NeGP and its fitment with respect to the SSDG project. Recently following departmental services are being delivered through SSDG portal via E-Mitra or direct user interface:</p> <ul style="list-style-type: none"> Employment exchange Agriculture Horticulture Social Justice and Welfare departments.
<ul style="list-style-type: none"> Rajasthan Sampark (Grievance Redressal System) 	<p>Rajasthan Sampark aims towards providing citizens with a centralized platform where any citizen of the state can log their grievances to the respective departments. It primarily consists of a State level Call Center with an integrated web portal which would act as a single point of contact for addressing and redressing various citizen centric queries and grievances related to government services. Citizens can log their grievances against any government department/ office through this portal and the grievance will further be sent to the respective office/ department for redressal. Citizens can also directly contact them through a toll free number provided by the state to register and know the status of their grievances.</p> <p>3.1.1.1.1.1.1 The Toll Free No is. 1800-180-6127</p>
<ul style="list-style-type: none"> Video Conferencing (VC setup) 	<p>The state government has established the VC Setup in all 33 district and their blocks. These VC setup available at district head quarter & BHQ (blocks head quarter) of the district.</p> <p>Ajmer has a total of 9 blocks and there are 9 VC setup available in Ajmer district (1 at DHQ level and 8 at BHQ level). District Authorities review all the schemes running in district via these VC setup. While reviewing, all the blocks officials are connected through their VC setup with the district. Soft VC provisions are implemented by the state government for communicating at the level of Gram Panchayat.</p>

<ul style="list-style-type: none"> • District Website (ajmer.rajasthan.gov.in) 	<p>Website for Ajmer district (ajmer.rajasthan.gov.in) has an account of Historical, Geographical, Social, Economic, Political, Administrative, and Business-Related information of Ajmer district. Contents of the website are written and maintained by the Office of Doit&c, established at DHQ. Before publishing the contents on website, approval of the contents done by the Head Office of Doit&c.</p> <p>3.1.1.1.1.2 The district portal can be accessed by the citizens through Touch Screen Kiosks which are installed at the district head quarter and all the blocks of the district.</p>
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Municipality Applications

Ajmer has also taken up a project on having their own eGovernance application at the municipality level. Most of this is still in concept and planning phase, except for the tax assessment system, birth and death certificate system, eTendering, eAuctioning and Ajmer 311.

No.	Ajmer Municipality ICT Applications
1.	House Tax Assessment- Billing & Assessment
2.	Urban Development Tax Assessment- Billing and Collection (2013-2014- demand: 52254516, recovery: 18572169, 2014-2015- demand: 53469719, recovery: 29353277, 2015-2016: demand- 61017028, recovery: 36561508)
3.	Lease, Billing & Collection
4	Municipal Accounting based on Double Entry System
5.	Issue of Birth & Death Certificates (birth certificates issued in 2013: 26245, 2014: 24333, 2015: 26240) & (death certificates issued in 2013: 6995, 2014: 6410, 2015: 6993)
6.	Online cash collection system
7.	Establishment & Payroll System
8.	Grievances & Redressal System
9.	Stray Animals Control System
10.	Billing And Accounting of Rental Properties
11.	Building Permission
12.	Street Light Management System
14.	MIS For Civil Works
15.	Issue Of Trade Licenses
16.	Legal Cases Follow Up System
17.	Website
18.	Solid Waste Data Management System
19.	Marriage Registration and Issue of Marriage Certificates
20.	Letter Monitoring System
21.	E Tendering- 100%
22.	E Auctioning- 100%
23.	Digital Cards for Bus Users
24.	Public Finance Management System
25.	Online application for citizen services biometric attendance, online building sanctioning, web based tracking of all construction activities
26.	Ajmer 311

4 High Level Analysis and Recommendations for Potential Smart City Projects

1. **Observation:** The City of Ajmer does not have adequate connectivity and Public Wi-Fi hotspots.

Analysis: Without connectivity and access technology, all efforts to make a city smart will become futile. Not every citizen can be assumed to have access to computing devices such as laptops, desktops or smart phones. A city needs to place smart kiosks at key locations strategically for citizens to access information with ease and carry out business with the government with convenience.

Recommendation: It is important that the city negotiates with the Internet Service Providers (ISP) such as BSNL, Vodafone, Airtel, Reliance to provide public Wi-Fi at more crowded places. Connectivity for accessing Government services should be free of cost. However, the ISPs can adopt a tiered revenue model for higher quality of services or for longer window of connectivity service duration.

2. **Observation:** The City of Ajmer needs a Scheme Management Tool and Methodology for all ongoing GOI or State driven schemes such as PRASAD, HRIDAY, AMRUT, DIGITAL INDIA that benefit Ajmer.

Analysis: Implementation of many projects are initiated by GOI, NGO or the private sectors under various schemes with the city being the target beneficiary. Unless the efforts across the schemes have a streamlined coordination approach, duplication of efforts is bound to happen. For example, the City of Ajmer is currently going through AMRUT, HRIDAY, PRASAD, IPDS and many more such Central or State driven initiatives as shown in Figure 6 to solve specific city problems, yet the city plays a very limited role in management of these projects. Often their concerns are not heard or reacted upon, and this has to change.

Recommendation: A comprehensive project management IT tool, methodology and approach should be taken in which the city can make each of the individual project management offices (PMOs) responsible for their output in terms of timeliness, quality and responsiveness to their feedback. As shown below in Figure 7, a proper scheme management layer including IT, workflow and approval tools has to be implemented by the Ajmer Municipality. This will ensure all the tasks that are simultaneously performed by all schemes are coordinated properly, e.g., digging of roadside trench for urban development can be coordinated with energy, water, wastewater, and ICT cabling efforts that are planned in that neighborhood.



Figure 6: Various ongoing schemes

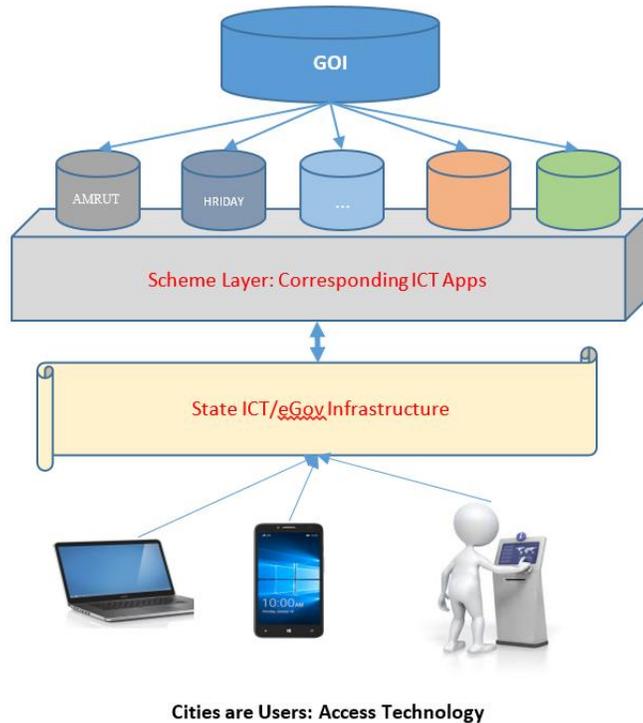


Figure 7: Implementation of Scheme Management Layer

3. **Observation:** City specific issues are not solved by engaging citizens of the city.

Analysis: The current ICT model does not focus on the city specific needs in terms of the services and conveniences for the Ajmer citizen, tourists or short term visitors beyond a set of government perceived needs. This will not solve grassroots level problems only known and felt by the local citizens, visitors and tourists that stay for a short time in Ajmer. These issues cannot be recognized or solved by higher level decision makers at State and Central Government level.

Recommendations: The City of Ajmer will need investment and initiatives to enhance computing power, communication speed and access technology; by implementing one city data center with smart city application for city specific needs. These “Ajmer City Applications” should be integrated on an as-needed basis with other ICT/eGov/IoT applications that are already implemented or are being carried out by other schemes under State or Central mandate. In order to achieve such seamlessness, the City of Ajmer needs to move to create a safe and secured platform where public private-partnership can yield the best development in a sustained manner.

The City should provide local applications developers, startups, private companies, students or academic bodies a hosted development environment with required tools, either free of charge or at minimal charge. This hosted development environment is the sandbox on which any qualified and authorized application developer or development team can deliver proof of concept applications.

Ajmer can have competitions on specific required applications as well. Once an application is selected, it has to go through the proper Application Absorption Methodology. The methodology will ensure an application can be scalable, modular, and easily deployable and can generate revenue. Once passes through all the required qualifications, the application can be absorbed as a City application and will be hosted in City clouds. Revenue generated from these applications can be shared with the developers using a revenue sharing or royalty payment model as shown in Figure 8.

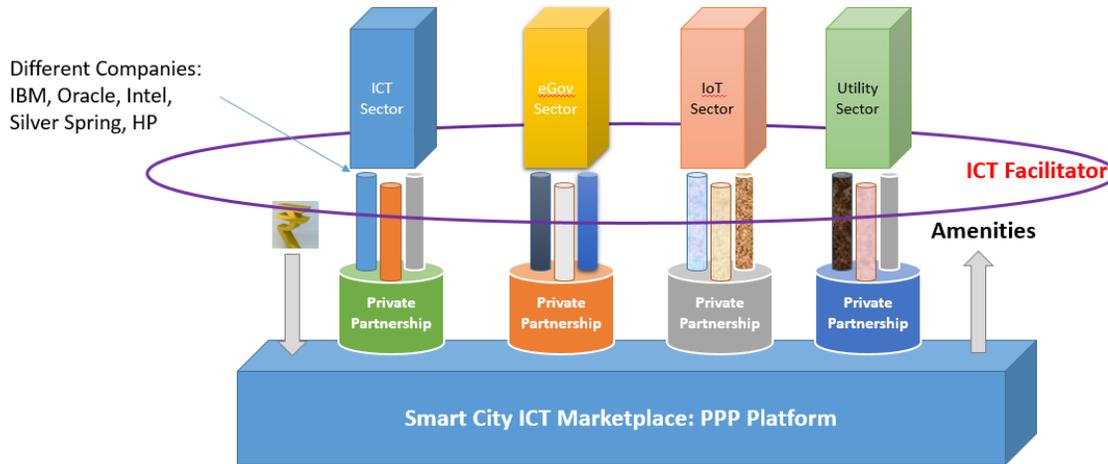


Figure 8: Model for PPP Platform

4. **Observation:** Lack of use of idea generation tools and Branding for City of Ajmer

Analysis: Today social media gives easy access to feedback from citizens and visitors which can then translated into identifying issues and solutions. The City of Ajmer needs to use this powerful social media feedback in order to make the life of their citizens and visitors better. Also currently the City of Ajmer does not have a website which is maintained by the municipality. This is required.

Public officials for the City of Ajmer, even very senior officials use Google email account which is very bad for branding and image of the city.

Recommendations: The City of Ajmer needs to move into its own email domain and should maintain at least one official city website which can make the citizens aware of the history, heritage, art, culture and festivals of Ajmer. It could also list the top places to visit, eat, live, go-for-education, etc. The most needed information should be easily available on the website. The website should be mobile device friendly and user feedback should be integrated with the social media.

Such initiatives are mandatory for branding and attracting more people to visit or live in Ajmer.

5. **Observation:** The City of Ajmer wants to move towards establishing a Command and Control Center but it is not clear if proper preparations have been made.

Analysis: The City of Ajmer is planning to move towards owning a Command and Control Center to act fast on citizen centric inconveniences, disaster control and recovery, as shown in Figure 9. This is the right move, however in order to reach this goal, the following recommendations below must be accomplished in a coordinated manner.

Recommendations:

- a. The City of Ajmer should look into system integration among existing eGovernance applications, city or citizen specific applications and other government or public sector applications. Integration is key to get more insight from historical and current data.
- b. As IoT devices become more and more accepted in daily life, there should be an easy way to digest data coming from various sensors to the cloud repository.
- c. The Control Center will need excellent data sharing between multiple GOI schemes, City and State hosted data; therefore, proper data sharing policies, securities and guidelines should be established.

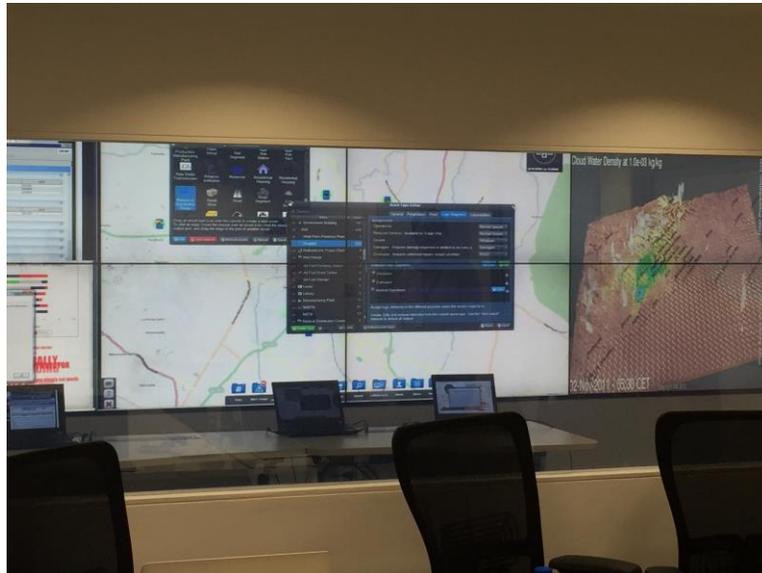


Figure 9: Command and Control Center

6. **Observation:** A lack of Citizens or Visitors Centric Applications pertinent to Ajmer.

Analysis: It is not difficult to identify the void of even simple ICT, eGov, and IoT applications that can increase the convenience to the citizens, short time visitors or tourists to Ajmer.

Recommendations: The goal is to have these needs identified by the citizens and the visitors (through social feedback mechanism) and solutions to be developed by the local ICT experts or applications developers.

Below is a list of possible applications to jump start the idea of these newer kinds of citizen centric applications:

Applications	Description
<p>Teacher Attendance or Classroom Surveillance Application</p> <p>Issue: Teachers often do not come to teach in school and then teach the same students in Private Tuition for a fee.</p>	<div> </div> <ul style="list-style-type: none"> • Use either finger printing based teacher attendance or CCTV camera based assurance of teacher attendance in school.
<p>Ajmer Tourism Management focusing on conveniences of visitors</p> <p>Specifics:</p> <ul style="list-style-type: none"> • Dargah Visits • Pushkar Visits • Online Puja/ritual arrangement • Historic walks/tours • Tap on tourists coming to other cities in Rajasthan 	<ul style="list-style-type: none"> • Promote tourism and social media branding • Online budget trip/accommodation booking • Online luxury trip/accommodation booking • Location services for convenience • Emergency helpline • Generate tourist profile that can be used nationally <div> </div>
<p>e-Toilet or Share-a-Toilet</p> <p>Issue: Scarcity of Toilets in India is a well-known problems and recognized by the UN.</p> <p>The idea is to give citizens incentive such as grant or loan from the City Government by adopting Build, Operate Share and Earn from the toilets in their premises (external to home).</p>	<div> </div> <div> </div> <ul style="list-style-type: none"> • Citizen driven Built-Operate-Share-Earn • Social media based hygiene feedback • Water supply guaranteed • Toilet Finder is being used in almost all developed countries e.g., Australia given below: https://toiletmap.gov.au/

<p>Auto-rickshaw, eRickshaw call button on Traffic Lights</p> <p>Issue: Rickshaws standing on the road side are an encroachment to the roads, many of which are not very wide and creating traffic congestion.</p> 	 <ul style="list-style-type: none"> • Rickshaw Stand should be designed on critical cross road junctions, but should be parked at tower parking solving encroachment. • Use Call Buttons based IoT Applications to call rickshaws from traffic lights at crossroads • This can be linked with Smart Street Lights Systems
<p>Smart Neighborhood Watch:</p> <p>Issue: India has a huge base of population and many underemployed, which can be used for monitoring and reporting the conditions of various public places, such as cleanliness, safety, maintenance etc., against incentives.</p>	 <ul style="list-style-type: none"> • Citizens who are willing to participate should be registered users of City Neighborhood watch program. When a smart phone user is in right vicinity (determined using GPS), messages can pop up saying, e.g., take a photo of the garbage can and send, or take a photo on the water tap and send. • In exchange of an approved photo, the user is granted facilities, such as free 1 hour wifi, pass to a city tour etc. • This effort can be linked with the smart street lighting initiative.

There can be numerous such examples of citizen centric applications that can be developed by the citizens of Ajmer or by interested professionals. The City can host competitions from time to time so engage citizens around such missions. The City can do private, public partnership or academia partnership for involving citizens towards smart city efforts.

5 U.S. Companies and Technologies:

- **Cloud Technologies:** Cloud technologies are available from many U.S. companies such as Microsoft, Oracle, IBM, Amazon etc. The cloud can be private, public or in-premise as per the choice of the City Government. The most advanced cloud technologies have some level of analytics built in.
- **Analytics Technologies:** Analytics engines are available from most large scale software vendors, such as IBM, Oracle, Microsoft etc. These help generating trend and forecasting possible outcomes based on current and historical data. Analytics and presentation of the insights is a part of the Command Control Center.
- **Compliance Technologies:** Most cities think about the compliance engine as an afterthought. Compliance is important for environment, resource preservation and renewability. IoT driven

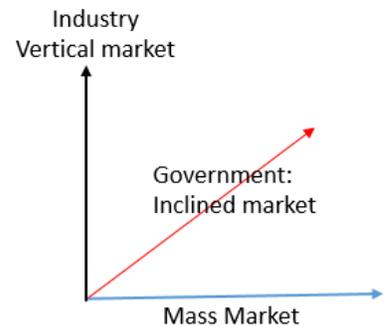
compliance is a newer area which reads the sensor data including camera data to predict upcoming non-compliances. Senslytics Corporation, General Electric solutions can be a good fit, depending upon the type of compliance City of Ajmer is interested in pursuing. This could be applied in various areas, including stray animal control, running tap water wastage control, pollution control, and mob control, and in some cases in a proactive manner.

- **Command and Control Center Technologies:** Command and Control Center helps a city react to any non-convenience, unsafe or emergency situations. IBM, Cisco, HPE are some of the known vendors of this solution.

6 Conclusions

This high level sector report summarizes the observations in the area of ICT, eGovernance and Internet of Things (IoT) for the City of Ajmer and proposes possible solutions that are pertinent and should be considered towards the Smart City effort. The report also tries to identify near term studies and pilot opportunities that could be funded to support Ajmer's Smart City planning.

Based on the observations, the City of Ajmer needs to adopt an "Inclined model" which is further explained below. The U.S. has adopted a "horizontal" model where the city improvements are owned and mostly funded by the City. The beneficiaries are the citizens and they end up paying for the improvements and services. It is similar to what is known as a "mass market" or horizontal model. India has adopted mostly a vertical "or Industry" like approach where the projects are directed by the central government through state government departments.



The City of Ajmer should look into moving towards a mixed "inclined model" which taps the benefits of cloud based Central/State government driven ICT/eGovernance/IoT applications (because it reduces the duplication of cost across common city services) and also harnesses the talent of local Citizens and private sectors by engaging them effectively.

The report concludes by recommending the following feasibility studies and pilot projects:

- Smart City Roadmap for ICT, eGov, IoT sector in Ajmer
- Study project for tourism and pilgrimage management application for Ajmer
- Study for Scheme Management Applications for all GoI, State, PPP, NGO initiatives that benefit Ajmer by integrating citizen and social media feedback
- Study on how ICT/IoT applications can help protect Child Rights and better education for all children
- Pilot or study for the need of an integrated city level compliance system to isolate violators and improve revenue

7 Appendices

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Report No 2: Cross Sector - Integrated GIS, SCADA, Customer Information Management, and Street Lighting

A. Integrated GIS, SCADA, Customer Information Management

1 Executive Summary

The City of Ajmer already provides its citizens with 24*7 electricity and has ambitious plans to make it more ubiquitous across the city. Plans are underway for modernizing the water supply system, wastewater treatment system and an integrated solid waste management system with the use of ICT. This, coupled with its plans to have citywide infrastructure for ICT, WiFi, and a more citizen-centric infrastructure present an opportunity for the City of Ajmer to develop integrated ICT infrastructure across these sectors in order to minimize capital expenditures and maximize the efficiency and effectiveness of these systems.

The electrical system for the city is already controlled by a remote-Supervisory Control and Data Acquisition (SCADA) system. Ajmer has GIS (Geographical Information System) that were developed for the electric power and water supply systems but neither is currently operational. Updating of GIS modeling for the electrical system is well underway. Ajmer is positioned to expand both the SCADA systems and GIS for all of its territories (both city and beyond). This means the following can be proposed:

- Create one SCADA system. Add the water and wastewater systems to the current SCADA implementation for the electrical systems. The system can be one and the command and control functions can still be performed from different locations if required due to jurisdictional differences.
- Combine all existing GIS mapping efforts in all services to create a single GIS map with all city-based services layered along common infrastructure along with houses, streets, streetlights, and other public infrastructure. These steps will automatically improve citizen services and bring about improvements that go across city-service silos that will require manual/process-based interventions which can be both time-consuming and expensive. The common GIS system can cut across utilities (e.g. water, sewer, gas, and electric) as well as solid waste management, tax collection and other city services (e.g. emergency services).
- Build Common applications for customer information management (CIM) and billing systems to improve service and collection across multiple sectors.

2 Sector and Technology Background

2.1 Global Experience

2.1.1 Technology Trends

A network of ubiquitous communications that support both peer-to-peer communications on top of a hierarchical command and control approach is needed in modern utilities to support key functions such as:

- Protection and control – where relays are used to protect for lines, transformers, buses, circuit breakers, and feeders
- Monitoring and control – where devices such as reclosers, voltage regulators, capacitor banks, switches, etc. are monitored and controlled remotely.
- Asset condition monitoring – where monitoring equipment measure quantities such as dissolved gas in transformer oil, moisture content, circuit breaker, load tap changer condition.
- Wide area monitoring – where we use components such as phasor measurement units for enhanced situational awareness.
- Fault indicators and sensors – used in overhead and underground systems to quickly identify and isolate faulted areas.
- Smart meters - for accurate energy usage measurement and billing in smaller time intervals.
- Sensors for water and wastewater-water level & flow sensors, pressure switches, pressure transducers, and control devices in water and wastewater treatment plants.

This architecture also leads to the implementation of SCADA at a control center supported by underlying distribution automation at the field/feeder level and enhanced system-level software like ADMS and DRMS at the control center level along with advanced analytics.

With today's GIS systems especially the ones based on the leading edge products such as ESRI – it is even OK to have the various departments for the water departments and the electric departments have different GIS's and share land information.

For example, consider that the land information office publishes a web service for their base maps showing things like streets, building footprints and even some topography. A water division could publish their water mains. The electric their electric lines. In this scenario, any one of them could (given the right permissions, of course) create a single map showing water, electric and land as well as any other map showing things like flood plains or demographics. In addition, any one of the agencies could also perform analytics on the data coming from the web service. So they could craft a query that could answer the question, show me water mains that are within two feet of an lead covered electric cable. Just because the data is coming from different GIS's, doesn't mean they can't all be combined in what we call a Web Map.

Of course, they should all be at least based on the same mapping coordinates and the same degree of accuracy. That is, the water, electric, gas etc., facilities should all be reasonably GPS accurate. Otherwise the results of the proximity query would not be accurate.

2.1.2 Case Studies/Examples

Many of the most exciting city applications come from sharing data. For instance, cities including Amsterdam, London, Philadelphia and San Francisco have instituted "Open Data" programs. They have resulted in hundreds of innovative applications, including trip planners, parking spot finders, bus locators, crime reporting and alerts, and business planning tools, to name just a few. Here are several examples of how utilities have used SCADA and GIS systems to improve system operations.

U.S.: CenterPoint Energy - Automates Fault and Outage Management

Building intelligent grid with smart meters, power line sensors, remote switches, and other automated equipment. Using grid automation to re-route and restore power, CenterPoint Energy has seen 21 percent improvement in outage response. GIS and SCADA systems were integral to this system.

South Africa: Cape Town Property Tax Valuation and Collection System

The year 2009 was a critical and busy one for the 150 staff members of the City of Cape Town's Valuations Office. Under the leadership of its Director, Christopher Gavor, the staff conducted a general re-evaluation of all of the City's 780,000 taxable properties. While this was taking place, they also began the installation process of the Aumentum system to replace their legacy SIGMA system. Thanks to the success of this GIS based online property valuation and collection system, after just three years, the City of Cape Town reduced taxpayer objections by nearly two-thirds. Since the year 2000, the city has added 236,154 properties to its tax roll with an increase in assessment of 300 percent. On January 29, 2010, the City received its sixth unqualified audit from the Auditor-General and achieved a new milestone by being the only municipality in the Western Cape of Africa to achieve a 'clean' audit. In addition, the global ratings agency Moody's International confirmed Cape Town's top rating of Aa2.za.

U.S.: South Bend, Indiana - Smart Wastewater Management

South Bend, Indiana had a serious problem: wastewater spilling into the St. Joseph River and welling up in basements. The city's wastewater pipes and treatment facilities just couldn't handle the volume. The city engaged IBM to come up with a new way to monitor and control its wastewater collection system. An innovative, affordable solution for South Bend's maxed-out wastewater system uses smart sensors (instrumentation) plus smart valves (control) plus smart software from IBM.

Helsinki, Finland – Waste Management

In the summer of 2011, the city of Porvoo, located 50 kilometers east of Helsinki, the Finnish capital, was faced with overflowing waste containers and angry customers. The local waste management authority, was having considerable challenges handling the increasing amount of waste that the many guests were generating during the summer season. To tackle the problem, the authority decided to pursue a smart city solution, installing wireless fill-level sensors at recycling. The sensor system provided by Finland-based logistics solution company Enevo, measures and forecasts when waste containers will be full. By combining the forecasts with traffic and vehicle information, Enevo's system can generate millions of different route options and suggest the most cost-efficient to the user. By installing smart sensors, the local waste management authority was able to cut the amount of collections by 51% and achieve a net savings rate of 47%.

2.1.3 Regulatory & Policy Issues

On the regulatory/policy front, there has been tremendous progress and lessons that can be learned from actions at various U.S. states. Some examples are provided below:

Utility Smart Grid Investments and policies related to Performance-Based Cost Recovery.

- Oklahoma and Ohio: investor owned utilities (IOUs) forfeit part/all of returns if O&M savings are not achieved. Returns greater than authorized rate if O&M savings higher.
- Maryland: Allows investments into rate base only after IOUs demonstrate cost-effectiveness.

- Illinois: Authorized ROI at 6% over the 30-year U.S. Treasury Bond rate. Required to reduce outages by 20% and duration by 15% over next 10 years. Missing any of 9 performance metrics reduces ROI by 0.05% each.
- California: Based on reliability metrics, require utilities to measure and verify the cost reductions and other benefits that are claimed for smart grid projects.

2.1.4 Cost Benefit

There is clearly a huge cost benefit to shared infrastructure and systems between utilities. Even if it is only shared communications system the benefits could be huge. Cost savings would come from reduced capital expenditure for SCADA, GIS, and CIM, including the software, installation and communications systems as well as operating and maintenance expenditures, whereby common O&M contracts could be used and shared in house expertise could be developed. As in Ajmer, the most common pitfall for these systems is O&M and lack of in house capacity to manage and update the systems.

2.1.5 India Experience

2.1.6 Technology Trends

India has embarked on a significant effort to bring smart grid technology to the grid. Work is being done both on the transmission side as well as distribution side. Several examples are provided below:

- Installation of a larger number of PMUs on the transmission network. Implementation of Wide Area Monitoring Systems (WAMS, using PMUs) for the entire transmission system.
- Infrastructure for AMI roll out for all consumers with load >20kW or as per prioritized target areas of utilities.
- Deployment of Supervisory Control and Data Acquisition Systems (SCADA) with Energy Management Systems (EMS) and Distribution Management Systems (DMS).
- Deployment of water monitoring networks consisting of a system of gauging stations that measure water levels and discharge rates.
- Deployment of smart metering for water to improve administrative process, meter reading, periodic billing, fraud detection, leak detection, etc.
- Installation of Water Quality Monitoring Systems.

2.1.7 Case Studies/Examples

Bengaluru – WaterMind Manages Complex Water Distribution System

The Bangalore Water Supply and Sewerage Board (BWSSB) faced significant water loss of around 45% due to physical and unauthorized connections. BWSSB used Itron's solution, WaterMind Analyzer, and installed 135,000 Itron meters and 200+ WaterMind devices. Implementing this solution helped minimize water loss by detecting large changes in water flow, through real-time monitoring, and improved customer service.

Central Pollution Control Board - Water Quality Monitoring System

CPCB in collaboration with concerned SPCBs/PCCs established a nationwide network of water quality monitoring comprising 1245 stations in 27 States and 6 Union Territories. The monitoring is done on monthly or quarterly basis in surface waters and on half yearly basis in case of ground water. The monitoring network covers 250 Rivers, 79 Lakes, 6 Tanks, 26 Ponds, 8 Creeks, 19 Canals, 18

Drains and 382 Wells. Among the 1245 stations, 695 are on rivers, 87 on lakes, 18 on drains, 19 on canals, 6 on tank, 12 on creeks/seawater, 26 on pond and 382 are groundwater stations.

Kapil Gram Panchayat - Smart Water Metering

Four hundred fifty water meters have successfully been installed in the city of Kapil Gram Panchayat, 300 kilometers southeast of Mumbai. The city has a population of 5000 people and became the first city in India to get ultrasonic water meters installed. Providing ambient water quality monitoring (automatic and manual methods; quality assurance).

Hubli: Predicting water supply through mobile technology

Water supply is unpredictable in many cities across India. The citizens of Hubli in Karnataka, too, do not have access to a regular supply of water. In many neighborhoods, water is not available for days, affecting the quality of life of residents. Predicting when an area would receive water is difficult because the municipality does not have the resources to update neighborhoods on time.

Hubli city partnered with NextDrop, a Bangalore-based civic startup, to alert residents about the availability of water in their households. Valvemmen, responsible for turning water on, notifies an automated system when they are about to release water for a neighborhood. The system sends the information to NextDrop, which in turn sends a text message to residents that have subscribed to a 10-rupee service that water would be available within 30 minutes.

Over 25,000 households in Hubli have signed up for the service. With access to timely information, users of the service find it easier to make necessary arrangements for storing water. The system has improved efficiency and allowed for better access to water.

Hari Bhari Waste to Energy Concession in Allahabad

Municipal Corporation of Allahabad (MCA) entered into a Concession Agreement with Hari Bhari Recyclable Private Limited for a period of 20 years on Build, Own, Operate & Maintain basis for Integrated Waste Management including door to door collection of waste and setting up of 150 MT Per day refuse derived fuel (RDF) to energy plant. Hari Bhari started the roll out of door to door collection operations from September 2015 and should cover the entire population under municipal limits over a phased deployment. The solution includes a GIS based solution which has a tagging device at the customer site to track collection services.

2.1.8 Regulatory & Policy Issues

Development of business models to create alternate revenue streams by leveraging smart grid infrastructure to offer other services (security solutions, water metering, traffic solutions etc.) to municipalities, state governments and other agencies will require shifts in policy and regulatory practices. Several policy initiatives or schemes have been developed that could support this integrated GIS, SCADA, CIM and/or billing system:

- **Digital India** program is a flagship program of the Government of India with a vision to transform India into a digitally empowered society and knowledge economy. Digital India has three core components: the creation of digital infrastructure, delivering services digitally, and digital literacy.

- **Atal Mission for Rejuvenation and Urban Transformation (AMRUT):** The scheme was launched by Prime Minister Narendra Modi in June 2015 with the focus to ensure basic infrastructure services relating to water supply, sewerage, management, storm water drains, transport and development of green spaces and parks with special provision for meeting the needs of children.
- **National Heritage City Development and Augmentation Yojana (HRIDAY)** was launched on 21 January 2015 with the aim of bringing together urban planning, economic growth and heritage conservation in an inclusive manner to preserve the characters of each Heritage City. Initiatives include development of water supply, sanitation, drainage, waste management, approach roads, footpaths, streetlights, tourist conveniences, electricity wiring, landscaping and such citizen services.

3 City/State Situational Analysis

The City of Ajmer already provides its citizens with 24*7 electricity and has ambitious plans to make it more ubiquitous across the city. Plans are underway for modernizing the water supply system, wastewater treatment system and an integrated solid waste management system with the use of ICT. This, coupled with its plans to have citywide infrastructure for ICT, WiFi, and a more citizen-centric infrastructure present an opportunity for the City of Ajmer to develop integrated ICT infrastructure across these sectors in order to minimize capital expenditures and maximize the efficiency and effectiveness of these systems.

The city of Ajmer has taken a significant step towards implementing SCADA that covers all the substations in the city. Using these along with advanced automation in the city has allowed it to reduce the AT&C losses from in the mid-thirties to an estimated 13%. The plans call for this to be extended to all of the substations in its territory across Ajmer district covering almost 4 million customers along with:

- Extended automation in its service territory beyond the substations into the feeders through extended sensors and controls such as fault locators
- Completing SCADA implementations for all substations
- Updating the currently nonoperational GIS implementation to cover all the electrical systems to support both operational and maintenance needs
- Extending both the SCADA and GIS implementations to include DMS.
- There is a billing system managed at the state utility level for the local electricity distribution system.

For the water & wastewater system:

- Ajmer has a GIS for the water supply system but it is currently non-operational due to failure to maintain and update the system and software licenses.
- In order to decrease non-revenue water and move toward 24*7 water for the Smart City retrofit area and beyond, the city is proposing to deploy a SCADA system.
- There is currently no metering or billing for the water system but under the Smart City plan there would be metering and billing for customers and smart meter deployment for the bulk distribution system.

- Ajmer is developing the wastewater treatment and conveyance system. GIS & SCADA will be needed to optimize efficiency and operations of this system.

For solid waste management:

- Ajmer has issued an RFP for an integrated solid waste concession.
- The RFP required a Vehicle Tracking and Monitoring System in all the vehicles used by the Contractor for collection and Transportation of MSW. The vehicle tracking and monitoring system should be able to provide the real time data related to the time, position and route taken by the vehicles and generate reports in the manner desired by the Authority.
- Currently there is no customer billing system but it is needed for long term sustainability and the USTDA team is recommending a solid waste collection fee which will require a CIM and billing system. In Allahabad, the concessionaire, Hari Bhari, uses a GIS based solution which has a tagging device at the customer site to track collection services

4 High Level Analysis and Recommendations for Potential Smart City Projects

The USTDA team has several recommendations based on our analysis.

- Improve city services by sharing infrastructure and data between the different utilities and departments.
- Create one SCADA system. Add the water and wastewater systems to the current SCADA implementation for the electrical distribution system. The system can be one and the command and control functions can still be performed from different locations if required due to jurisdictional differences.
- Combine all existing GIS mapping efforts in all services to create a single GIS map with all city-based services layered along common infrastructure along with houses, streets, streetlights, and other public infrastructure. These steps will automatically improve citizen services and bring about improvements that go across city-service silos that will require manual/process-based interventions which can be both time-consuming and expensive. The common GIS system can cut across utilities (e.g. water, sewer, gas, electric) as well as solid waste management, tax collection and other city services (e.g. emergency services).
- Build Common applications for customer information management (CIM) and billing systems to improve service and collection across multiple sectors.

5 U.S. Companies and Technologies

S&C Electric Company is a global provider of equipment and services for electric power systems. It designs and manufactures switching and protection products for electric power transmission and distribution. S&C has been in the electric power market for more than 100 years and in the automation business for about 30 years.

Schweitzer Engineering Laboratories (SEL) designs and manufactures products and services for protection, monitoring, control, automation and metering of electrical power systems. The company serves thousands of utilities worldwide, operating in 140 countries.

Sensus is a smart metering and networking company, with a technology that differentiates it from other large players in this space.

Gems™ Sensors & Controls has earned a solid reputation for accuracy and dependability in industries that require reliable instrumentation products. Both the Water and Wastewater industries are no exception. Gems manufactures an array of water level & flow sensors, pressure switches, pressure transducers, and control devices in every area of water and wastewater treatment plants.

EmNet designs and implements large and complex real time monitoring systems for challenging applications. EmNet's Real Time Control Optimization minimizes overflows and/or flooding by optimizing existing infrastructure.

GE offers Water & Process Technologies to change the way water and process operators think about things like asset maintenance and efficiency by taking disparate pieces of information from plant sensors and control rooms and turning them into powerful analytics. It has helped thousands of utilities drive intelligent water operations for greater consistency, efficiency and accountability.

OSI Systems SCADA platform is a feature-rich and flexible platform that provides real-time monitoring and control applications for various real-time processes. The SCADA platform, based on our monarch™ architecture, is a scalable SCADA product that is able to handle processes involving anywhere from millions of data points down to those requiring only a few hundred monitored points. A scalable and tiered pricing model allows cost effective implementation of the monarch SCADA platform for virtually any size application in electric, oil & gas, transportation and water industries.

Space-Time Insight provides situational intelligence solutions for asset intensive industries. Its solutions provide organizations with a unified and real-time view of the big picture, providing the context and clarity they need to make fast, confident decisions during planning and operations. Its applications for utilities correlate and analyze multiple data sources spatially, over time and across network nodes to help you make fast, confident decisions. These applications support improved safety and reliability across a broad range of corporate disciplines such as operations, engineering and customer service, and enhanced planning and budgeting that lowers costs and increases regulatory compliance.

ESRI develops geographic information systems (GIS) that provides a variety of mapping functions that can be integrated into nearly every type of organization. Esri uses the name ArcGIS to refer to its suite of GIS software products, which operate on desktop, server, and mobile platforms. ArcGIS also includes developer products and web services. In a general sense, the term GIS describes any information system that integrates, stores, edits, analyzes, shares and displays geographic information for informing decision making.

Trimble solutions are used in GPS based vehicle tracking, ICT based solid waste collection solutions, smart transport management, operations and management automation of utilities, city mapping (2D and 3D), water asset management and emergency response automation system to name a few solutions.

6 Appendices

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B. Intelligent Street Lights

1 Executive Summary

Intelligent streetlights are an easy and low hanging fruit for any city and even more so for Indian cities that are on the leading edge of converting their streetlights to LED and also adding specific technologies such as WiFi hotspots and CCTV camera. Many of these technologies can be implemented through a PPP mechanism.

Pilot, Pilot Pilot – Given the nascent nature of the technologies and the applications associated with it superimposed by the need for intense inter-departmental cooperation – we recommend that Ajmer pilot this in a specific area such as the railway station area for Ajmer.

These pilots can be implemented by incorporating specific MOUs with key US-based companies such as Silver Spring Networks, Honeywell, Cisco and others.

2 Sector and Technology Background

2.1 Global Experience

2.1.1 Technology Trends

Intelligent street lighting is a new area with a lot of interest and more importantly a lot of potential and promise. Key technology trends in this area include:

- LED bulbs linked together in a network can be individually controlled using light management software. If required, distributed across the complete urban area in a wide diversity of lighting applications. Where, when and to what intensity light is switched on and off is determined via sensors and software, either according to specific light points or in a planar fashion. This "Smartification" enables the illumination of various urban areas precisely according to needs and in a concerted way – city centers, main thoroughfares, residential streets, tunnels or parks.
- Future urban LED solutions for lighting will take a significant step further, providing not only major energy savings potential but also new services for citizens. As an example, lantern posts can become multi-functional stations that in addition to providing traditional lighting can also serve as data stations with sensors, can monitor parking spaces and communicate information about these, or recharge the batteries of an electric car.
- Future trends that are being developed in this areas include:
 - Networked Street Lighting.
 - Enables significant energy savings and better control. Implementing controlled run time and automated dimming can achieve up to 40% in operational savings.
 - Quick adjustments to lighting based on changes in weather, traffic, public events or accidents.
 - Easy to integrate other smart city devices and applications.
 - Two-way communication of real-time energy prices, DR signals to adjust lighting, etc. between street lighting sensors and utility control center.
 - Two-way communication of real-time traffic info, public events, accidents, etc. between street sensors and transportation control center.
 - Integrated security cameras and air quality monitors. Enhanced public safety, reduced crime from automated lighting.
 - Machine-to-machine communications enable smart parking, smoother traffic flow, and enhanced security.
 - Self-driving cars and self-parking cars/vehicles.
 - Adding local motion sensors to detect movement and turning them off (not all at once) when there is no movement and turning them on when movement is detected
 - Adding WiFi hotspots to them either to support provision of WiFi to citizens or for supporting city services.
 - Adding CCTV cameras that can take advantage of the electricity and WiFi to take photos/videos to support
 - Safety and security (including identifying terrorist acts) services to the police and other departments

- Identifying traffic violations and sending key pieces of information such as license plate information to the traffic police department
- Identifying movement of vehicles towards or away from intersections to influence the amount of time the light stays in a Green, Yellow or Red mode – thereby improving the flow of traffic at any time of the day.

2.1.2 Case Studies/Examples

Examples of how cities are using some of these street lighting technologies follow:

Amsterdam, Netherlands – Smart Light

Initial trials of smart street lighting will take place in the vicinity of the Amsterdam Arena. The trial is focused on various aspects of smart lampposts in public spaces. The lighting can be adjusted for a range of situations via remote operation or sensors, helping to improve security and save energy. For example, lighting can be dimmed or adjusted according to the weather, and colored lighting can control the flow of traffic and pedestrians. Movement sensors can also be used to register if the lighting needs to be brighter. Saved energy can then be used for other functions, such as powering the Wi-Fi network or measuring air quality. The trial is part of the Smart Lights in Metropolitan Areas project.

Nice, France – Connected Boulevard: The World’s Smartest Street

Boulevard Victor Hugo in Nice, France is host to a Connected Boulevard proof-of-concept zone that includes almost 200 different sensors and detecting devices. In addition to these, it also plays host to “guest” devices such as mobile phones and tablets used in the streets that get connected onto its wireless mesh network. Data captured through these “things” is being processed and analyzed to offer the city and its residents invaluable context-aware information on parking, traffic, street lighting, waste disposal, as well as environmental quality as experienced in real time. Early projections from pilot tests of smart parking services have shown a potential for up to 30 percent decrease in traffic congestion, significant air pollution reductions, combined with an increase in parking revenues.

Further benefits are also being realized from estimates in synchronizing street lighting on a need-basis. For example, by calibrating street light intensity with pedestrian and traffic peaks and real-time environmental conditions such as fog and rain, the city could potentially save 20 to 80 percent in electricity bills. On the environmental aspect, more accurate data of humidity and temperature levels, in addition to air particles are being processed for understanding context-critical patterns. This is possible because Connected Boulevard is made up of more than just sensors and devices. The Connected Boulevard equips the city with the capacity to capture data from daily life through the hybrid network infrastructure of the city that includes Cisco WiFi network. The data is processed into real-time information and converted into intelligence with the help of context-aware location analytics, before being disseminated to serve multiple services in city operations and for city dwellers. It is an Internet-centric “always-on” platform designed to be resilient, extensible, highly secure and agile, through four interoperable layers:

- Layer 1: Sensors and networked devices with mesh technologies.
- Layer 2: Data capture, processing, storage and analytics at distributed points across the city.
- Layer 3: Central data collection, including computing, storage and analytics, combined with integrated and open standard application programming interfaces.

- Layer 4: New and innovative applications and services.

2.1.3 Regulatory & Policy Issues

The key regulatory policy issue here is more about getting the various city, state regional and/or federal agencies to work with each other.

2.1.4 Cost Benefit

Silver Spring has gained insight into what makes and breaks the business case for smart street lighting, using a model of a city with 50,000 lights, an energy cost of \$0.07/kWh, a replacement of all lights over 2 years, and a total lifetime cost of ownership over 20 years. Its analysis shows that deploying networked LEDs has a faster ROI than LEDs alone and yields greater benefits.

For LED replacement alone, the time to payback is approximately 8 years. Networked LED lamps shorten the payback time to 6 years. Its analysis shows that the network adds approximately 20 percent in costs but delivers at least 30 percent in incremental benefits, which are driven by operational savings as well as increased energy savings from dimming and reduced nightly burn time enabled by the network.

20-year analysis of networked LEDs

Costs: \$572 per light
 Benefits: \$778 per light
 Benefit/cost ratio: 1.36
 Payback: 6 Years

	Costs (Year 1)	Costs (Year 2)	Benefits (Years 3 -20)
LED	\$9M	\$9M	\$3.1M
Networked LED	\$9.2M	\$9.5M	\$4.0M

2.1.5 India Experience

- India is arguably moving the fastest in the area of intelligent streetlights with the first move into converting all the streetlights into using LED bulbs, with the underlying logic being that conserving power is more economical than producing more.
- Reportedly, India has 35 million streetlights which generate a total demand of 3,400 MW. With LED, this can be brought down to 1,400 MW, saving 9000 million kWh of electricity annually, worth over \$850 million in the process. To put this into perspective, the electricity deficit in India during 2014-15 was 38,138 million kWh and 7,006 MW.

2.1.6 Technology Trends

- Use of solar LEDs is being deployed in many cities in India. Installation of solar panels with battery on streetlights is also common. Moving towards networked street lighting with communication between poles has reportedly been done in several cities, including in Vizag.
- Smart parking companies that enable customers to find last mile parking update through Mobile Apps.

2.1.7 Case Studies/Examples

Following are a few Indian-based examples:

Digital India: A Government of India Initiative

An ambitious program, initiated by Government of India, under the direction of Prime Minister Narendra Modi, to achieve digital empowerment of the country. Launched on 1 July 2015, the initiative includes plans to connect rural areas with high-speed internet networks. Has three core components: the creation of digital infrastructure, delivering services digitally and digital literacy. It aims to make high speed internet available as a core utility for delivery of services to citizens. From a governance aspect, it looks to seamlessly integrate services across departments or jurisdictions and make these services available in real time from online & mobile platforms. It strives towards digital empowerment of citizens through universal digital literacy, universal accessibility of digital resources and services in various Indian languages.

Vizag: ICT Initiatives

Vizag ICT initiatives include Wi-Fi connectivity throughout the city. Free Wi-Fi services to be provided in tourist places. Wi-Fi enabled police stations. Optical Fiber Network Cable to be laid underground and provide internet facility to every home. Digitalization of Citizen Services-services provided by the Central/State government as well as private companies to be completely digitalized. E-Governance to be implemented in all Departments and encourage participation of citizens in e-governance.

Ministry of Urban Development: Mission to Convert Street Lights to LEDs

India's central government plans to switch all street lights across the country to energy-efficient LED bulbs by the end of 2018, saving US\$6 billion a year. The LED program is being implemented as a massive energy efficiency mission. When all the 71 crore (710 million) conventional bulbs are replaced by LED bulbs it will result in a saving of 100 billion units of electricity.

The Ministry of Urban Development has ordered the state governments throughout the country to replace all streetlights with LED bulbs, which give better illumination with less energy consumption. The government has set a target to distribute millions of LED bulbs through the newly formed state-run company, Energy Efficiency Services Ltd.

2.1.8 Regulatory & Policy Issues

The National Program for LED-based Home and Street Lighting was launched by Prime Minister Modi in January of 2015. At its inception, the plan was to cover 100 cities by March of 2016, and the remaining ones by March 2019, targeting 770 million bulbs and 35 million streetlights. However, it seems street lights will be upgraded to LED ahead of schedule.

Lighting demands 18% of the electricity consumed in India. This is against a global average of just 13%. A large-scale LED adoption will bring the figure for India down to the global average, significantly cutting down the need to build more energy plants. If one also accounts for installing LED bulbs in domestic and commercial sectors, the opportunity at hand is to save a mammoth 100 billion kWh per annum (\$7 billion a year).

2.1.9 Cost Benefit

National Program for LED-based Home and Street Lighting: In Delhi, LED bulbs will be provided to all domestic consumers at an initial payment of Rs. 10 each and recovery of Rs. 10 each for 12 months from their electricity bill. Hence, the cost for an LED bulb to domestic consumer will be Rs 130 through this program due to bulk procurement, compared to the current open market retail price in the range of Rs. 350-600 for LED bulbs. The estimated annual savings for households in Delhi per LED bulb will be Rs. 162. The LED bulbs will have a warranty of 3 years.

3 City/State Situational Analysis

Here is the current status regarding energy efficient street lighting and green buildings:

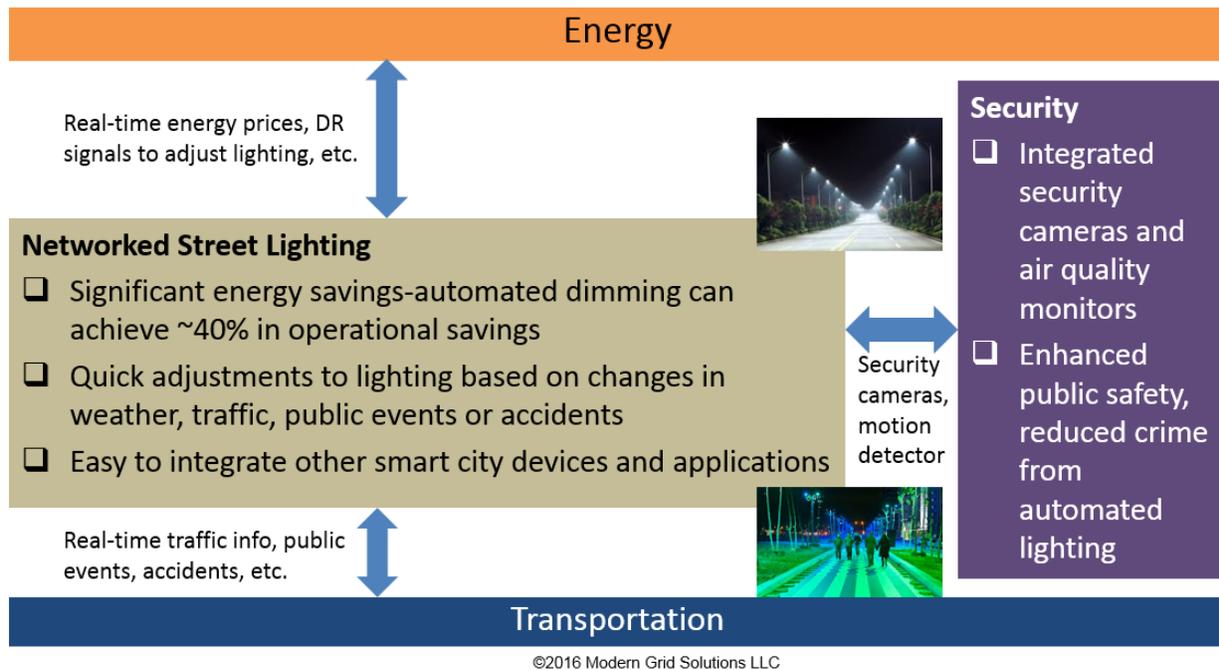
- Ajmer has a full scale program for conversion of existing streetlights to LED as well as installation of solar panels with battery on streetlights, in parks, and open spaces.
- AMC plans to use solar panels mounted on streetlights which glow in the dark using LDR sensors and PIR sensors which can detect the vibrations and infrared light causing the streetlight to turn on when a vehicle or human being passes in its vicinity.

4 High Level Analysis and Recommendations for Potential Smart City Projects

Smart street lighting makes for a great first project. A confluence of several factors make smart street lighting an excellent prospect for a first smart city project. First, the latest generation of LED lighting makes possible big savings in energy costs. Second, the same LEDs that save energy also save on truck rolls. They last much longer, so maintenance crews don't have to spend as much time replacing lamps. Third, by networking the streetlights i.e. adding communications to each one, numerous smart applications are made possible, including remote diagnostics and control. Fourth, once a canopy network is in place for streetlights (and paid for by the savings and in energy and maintenance), the network can be used for other smart city applications.

Ensure ubiquitous high-speed broadband access. Best-of-breed, high-speed broadband access across city's geography will enable networking streetlights, IoT technologies, smart parking, etc.

Connect all devices with a citywide, multiservice communications system. Move away from slow, single-purpose communications to fast, multi-service networks – enables easy future upgrades and cost savings. Investigate viability of existing public networks before building private network. Encourage cross-departmental planning and design-explore sharing single network. Investigate policies and incentives that encourage private sector to invest in building and maintaining citywide networks. Prioritize technologies and tools that manage hybrid networks.



Encourage interoperability. Technologies from different vendors must be able to work together and be able to exchange information. Open standards help cities control expenses and risk. Open standards contribute to interoperability, choice and flexibility; make maintenance easier. Free Smart Grid Standards Mapping Tool from International Electrotechnical Commission (IEC) makes it easier to discover and choose between standards.

Pursue predictive analytics. Smart cities use data to analyze what is happening in real time and make operational decisions. Use it for predictive analytics to get a glimpse of what's going to happen next. With predictive analytics cities can uncover patterns and associations, which otherwise might not be easy to discover quickly. Examples: Where crime is likely to occur; where streetlights might fail; where traffic congestion will stall morning commute, etc.

5 U.S. Companies and Technologies

Several U.S. companies offer intelligent street lighting technologies:

IBM® Intelligent Operations Center helps government leaders manage complex city environments, incidents and emergencies with a city solution that delivers operational insights. It offers integrated data visualization, near real-time collaboration and deep analytics to help city agencies enhance the ongoing efficiency of city operations, plan for growth and coordinate and manage response efforts. IBM Intelligent Operations Center provides integrated maps, online dashboards, customizable reports, multiple analytic algorithms, interactive standard operating procedures and other tools for improved city operations and incident or emergency response.

GE's innovative platform, Intelligent Environments for Cities, uses LED street lighting and wireless sensors to connect, collect and analyze data, harnessing the power of the Industrial Internet to enhance quality of life for city residents and visitors.

Cisco's offering for smart lighting, the Smart+Connected Lighting solution combines with the Smart+Connected Multi-Sensor Node to create a powerful light-sensory network (LSN). These ultra-capable standards-based systems gather a wide variety of data from the environment, including levels of humidity, CO2 and O2, UVA and UVB light, particulate matter, motion and seismic activity, video, sound, and more.

Oracle's City Platform Solution, with its three modular platforms, provides local authorities the ability to undergo steady, pragmatic and, over time, fundamental transformation in the way they deliver services and extend them through overhauling and streamlining underlying operations.

SAP solutions help cities improve, transform, and prosper to create a better urban world. With SAP solutions, cities can run better, help make it easier for businesses to thrive, and provide a safe environment for citizens.

Silver Spring Networks is a leading grid networking company with successful deployments at several utilities in North America. Its customers include PG&E, AEP and FPL, which together serve 20% of the nation's consumers. It also serves utilities in Australia and Brazil. Its communications solution provides two-way real-time communication between the field devices and the utility's control and management systems through an Internet Protocol (IP)-based platform. Silver Spring's offerings combined with its partnership with prominent players such as Cisco, ABB, GE and Landis+Gyr, will enable the company to offer solutions within various areas of the smart grid.

Honeywell. Honeywell Black is a security series developed by one of the world's leading manufacturers – Honeywell Security Group. Designed to providing world-class quality security products to small- and medium-size business (SMB) applications, Honeywell Black provides a comprehensive range of video surveillance, intrusion solutions, access control which can be applied to a city intelligent street light security solution.

6 Appendices

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Report No 3– Water and Wastewater

1 Executive Summary

The objective of this report is to provide a high level analysis of the water sector as it relates to the smart city program for the City of Ajmer (Ajmer) in Rajasthan State, India. Ajmer is located in a valley, surrounded by the Aravalli mountain range. The city has a population of 542,231 based on the 2011 census and is expected to grow to 618, 500 by 2021. Much of Rajasthan state is in a desert environment with little rainfall. Ajmer receives 550 mm of rainfall annually, primarily during July, August and September. Given this environment, water is a critical part of the city planning today and also going forward to become a Smart City.

The center of the city has a manmade lake, Anasagar, which covers approximately 3.22 sq. km., holds 7 million cubic meters of water and its depth varies from 3-16 ft. Drinking water is obtained from Bisalpur Reservoir, situated 127 km from Ajmer. Water is transmitted via two transmission mains to the City. Of the total 139 million liters per day (MLD) withdrawn from the reservoir, 85 MLD is allocated for Ajmer with the remaining for other smaller towns. The total estimated demand based on per capita consumption is 73.2MLD and projected demand for year 2021 is 83.5MLD.

Based on the information available, the water supply is adequate for current conditions. The transmission system is capable of transferring water to treatment facilities. The clear deficiency exists in the distribution system. The Non-Revenue Water (NRW) is estimated at 30% but informal sources indicate that range could be closer to 40-50%. The distribution system lacks capacity to serve consumers with regular supply, and no metering is available for accounting for water use. Currently, water is supplied directly from pumping due to inadequate capacity of the storage system.

Looking forward the non-revenue water (NRW) issue should be addressed as a priority. NRW reduction requires multiple approaches including technology upgrade, capital investment, water conservation and public education. The water distribution system requires capital investment for upgrading the pipes, control valves, and metering system. In order to properly allocate money for upgrades, a network analysis is needed. The network analysis will help identify system bottlenecks, define pressure boundaries, identify low pressure zones where booster pumps are required and determine whether additional storage is required.

In order to modernize the water supply system, the source reliability has to be assessed, and a backup source has to be identified and developed. GIS database development and SCADA integration, pumps and equipment upgrade, a bulk distribution smart metering system, and customer level metering would greatly enhance service levels, reduce energy consumption, and increase revenue while lowering NRW and operation costs.

Although the sewerage system has been operational since 1992, open drains have been the mode of disposal system in Ajmer. Much of the wastewater enters untreated through open channels, polluting lake water and causing hazardous conditions to human, and aquatic habitats. The existing capacity of the Sewage Treatment Plant (STP) is 20MLD. The 13MLD Anasagar STP was added to the treatment system in early 2016, and another 40MLD facility is being added to the existing facility at Khanpura. In all, the total treatment capacity of the STPs will be 73MLD. Assuming 80% of the water

consumption ends up as wastewater stream, the total wastewater generation is 58.5MLD and flow will be 66.8MLD by year 2021. These numbers suggest Ajmer has sufficient treatment capacity to meet the projected demand for the near future.

The planned sewer collection systems is 362KM of which 207KM is laid already and 125KM of sewer network construction is in various stages of construction and commissioning. From a broad perspective, it appears that the sewer system is reaching its target objectives in the near future. However, questions remain: Does the sewer network sufficiently cover the entire city? Does it function as planned? And most importantly, are people ready to pay for sewer connections? Although issues remain to be addressed, wastewater collection, conveyance and treatment systems are assumed to be adequate for today's needs. A comprehensive assessment is still required for sewer flow, network capacity, treatment efficiency etc. More importantly, people should be encouraged to discontinue the use of septic systems and connect to the newly constructed sewer system. The new Anasagar STP is receiving merely 0.2MLD.

Anasagar Lake is a very important feature in the city which provides enormous natural beauty, economic and environmental benefit. Unfortunately, Anasagar Lake is in very sad state. It cannot be recovered from its current condition unless untreated sewer flow coming from open channel conveyance is ended. It also needs to have floating plastic waste materials and floating debris removed. The lake sediment needs to be dredged. Water purification can be done with surface aeration and additional cascade aeration can be done along the lake front which will add aesthetic value to the area while helping oxygen transfer. Solar power can be used to power aeration systems.

Although not perfect, the sewer collection, conveyance and treatment system is adequate for current conditions. Expansion of city services and proper supply of water would subsequently add more wastewater flow beyond the capacity of the STPs. It is not known if proper planning tools have been used for the design of the collection system. A GIS based Geodatabase is required for future system visualization, operation, management and analysis of the system. Looking forward, a proper collection and conveyance system analysis using a software application such as Sewer CAD is required for system performance improvement and capital project planning.

As it appears that the fully functioning sewer collection systems is 1-3 years away, there is a need to contain wastewater flow from entering the lake. As an immediate step, temporary lift stations can be installed in channel exit locations to pump content into the wastewater collection system.

The stormwater collection system covers approximately 35% of the city area based on previous studies. However, these are mostly open channel drainage paths often polluted with organic, oil and petro-carbonic contaminants. A comprehensive hydrologic and hydraulic analysis was conducted in 2009. The study may be updated with more recent information, but basic recommendations provided in the reports are still valid, and recommended for implementation.

The city infrastructure is continuing to improve over recent years. But improvements are still needed to bring basic service up to full the coverage to meet standards. Among the projects identified in this report, improvements to city drinking water systems is considered as a top priority and cleaning up of Anasagar Lake is the second most important project to undertake at the earliest possible time. An approximate cost estimate is provided in Section 4 below in this report and complete implementation can be done in several phases.

2 Sector and Technology Background

2.1 Global Experience

The water and wastewater sector has gone through significant changes over recent years with the integration of new approaches for treatment, distribution and management. Ultrafiltration technologies, remote monitoring and control, and use of software applications with geographic information systems (GIS) are some of the examples that demonstrate how utilities change from traditional practices.

GIS provides a very effective means for graphically conveying complex information. Layouts created with a GIS are extremely useful when included in reports and presentations. A GIS database can link all of an organization's digital data together based on a location, such as address. This could enable all departments of an organization to have access to, and share the same data, and ensure all departments and individuals are using the most up-to-date information. Better access to better quality and time-relevant data may help make better decisions. GIS applications help utilities in several ways: (i) Cost saving from greater efficiency; (ii) Data driven decision making; (iii) Improved communication; and, (iv) Geographic visualization and record keeping.

GIS is not just a mapping application. It offers tools for spatial and data management when integrated with a hydraulic model. Linking GIS data to hydraulic a model enables engineers and planners to have the ability to get the most up to date results for planning and operation of utility systems.

A smart water network takes advantage of real-time data from pumps, tanks, valves and other vital distribution network points, to automate process control and support real-time operations decisions as needed. It operates with an information management system with open channels that also make operations data available accurately, securely and in a timely manner to business processes across the utility. This enterprise approach not only improves efficiency and effectiveness of treatment and distribution functions, but also supports planning, O&M coordination, customer service, and business office activities.

The monitoring, control and information management solution serving the smart water network is flexible, allowing the utility to integrate the water management technology that creates the specific functionalities it needs, such as energy optimization, demand forecasting, leak detection and water quality management. Close examination of water management technology systems in place helps the utility make more of its existing information management infrastructure and realize more smart water network returns.

Automatic Meter Reading (AMR) represents the first step toward smart water technology. However, advanced metering infrastructure (AMI) with data management systems offers a more proactive way to control water loss. Unlike AMR systems, AMI enables two-way communication over a fixed network between the utility system and the metering endpoints. These systems allow utilities to efficiently read meter data and also offers a greater visibility of customer usage. With an AMI system, sudden increases in meter readings may point to leakage, unauthorized use or an open valve that should be closed. It can prevent a small leak from becoming a big leak, minimizing breaks. However, cost for AMI at the customer level may be prohibitive as compared to the benefits. AMI can be introduced at the bulk distribution level in a system.

2.1.1 Energy Saving Opportunities in Water and Waste Water Management

Energy is typically needed for raw water extraction and conveyance; drinking water treatment; drinking water distribution and storage; and wastewater collection, treatment, and discharge. Up to 80 percent of energy consumption goes to pumping and distributing water and wastewater with the remaining for treatment. This can represent a significant percentage of a water utility's operating budget. Further, drinking water and wastewater utilities are typically the largest energy consumers of municipal governments, accounting for 30 to 40 percent of total energy consumed.

The U.S. Environmental Protection Agency (USEPA) estimates that utilities across the U.S. could reduce annual energy costs by an average of 10 percent. Important areas to research for energy savings include improved pumping and other treatment efficiencies, reduction of water loss in distribution systems, and energy and water efficiency improvements in residential water use. The New York Water Supply Agency estimated that energy consumption at most utilities in New York could be reduced by 10 to 20 percent with opportunities to reduce energy consumption in some utilities by up to 50 percent (NYSERDA 2008).

Savings can be realized through a range of actions including:

- Utilizing new, energy-efficient technologies
- Incorporating energy efficient practices into daily operations
- Taking advantage of incentives and rebates from energy providers
- Installing premium efficiency motors and variable speed drives
- Resizing pumping systems
- Developing alternative pumping schemes and pump system upgrades
- Installing controls and SCADA systems
- Operations optimization
- Building upgrades (e.g., lighting and HVAC)
- Benchmarking and energy audits
- Evaluating demand-side management opportunities to reduce energy consumption during peak hours by shifting power consumption from on-peak to off-peak hours
- Adding storage to pump and store water during off-peak electric rate periods
- Promoting water conservation and use of energy efficient products by customers
- Reducing system leaks
- Evaluating system life cycle energy costs associated with proposed projects, and
- Evaluating the use of alternative energy sources.

2.1.2 Technology Trends

The water industry has adapted to new technologies at a slow but incremental pace. In the recent past new technologies emerged that continue to be developed, tested, demonstrated, and introduced into the municipal water treatment market. Some of these technologies are membrane filtration, UV irradiation, advanced oxidation, ion exchange, and biological filtration.

Membrane filtration technology is rapidly becoming accepted in the water treatment technology in the water purification industry. Low-pressure membrane filtration (Membrane filtration Ultra

Filtration) is now replacing conventional filtration for surface water treatment. High-pressure membrane filtration (Nano Filtration and Reverse Osmosis) is used primarily for softening and total dissolved solids reduction.

The advanced oxidation processes (AOPs) include a number of processes including ozone, ozone with hydrogen peroxide addition, and UV irradiation with hydrogen peroxide addition. AOPs can have multiple uses in water treatment. Ozone in water treatment is particularly good for color removal, taste-and-odor control, and/or disinfection.

These are certainly not the only technologies being used in the water treatment industry. There is almost no contaminant that cannot be removed from water. The question becomes the cost of treatment. Smaller utilities cannot afford high capital investments to support all treatments. As the cost of these technologies continues to decrease, their applicability will steadily increase. However, as water resources become increasingly less available, the need for innovative and cost-effective treatment technologies will rise steadily.

2.1.3 Case Studies/Examples

Town of Olds, Canada - The Town of Olds in Alberta, Canada, serves as an example of how effective sensors can be. The town was in trouble because its regional supply line was nearing its maximum capacity. It faced the expensive prospect of capital infrastructure improvements to expand the supply. When a water audit using metering equipment data found that 39 percent of the water coming through its supply line couldn't be accounted for, it appeared that leak repairs might recover enough water to delay the need to increase supply. The challenge was to locate the leaks.

In 2010, the town deployed an Itron system and strategically placed acoustic sensors in service pipes that analyzed sound patterns every day, detecting new, evolving and pre-existing leaks automatically. Over time, an expanding database of historical sensor information provided comprehensive condition assessment of the entire water distribution system. In the first six months alone, 21 leaks were repaired recovering 287,691 cubic meters of water at a revenue savings of \$177,336. Most leaks in the Town of Olds are service line leaks. The leak data analysis has helped the utility to target leak locations much more accurately, and non-revenue water losses have been reduced from 39 to 29 percent.

Miami Dade, Florida – The sprawling Miami-Dade County parks system suffered from aging water infrastructure that had to be manually inspected to detect water leaks or other problems. The labor-intensive process of acquiring, integrating and analyzing historical water consumption data taxed the system's department resources. With more than \$5 million in annual water and sewer costs and a consumption of more than 360 million gallons of water, the county felt it was time to get things under control. It opted to implement an IBM solution that interfaces with sensors and intelligent meters to allow county employees to remotely monitor water consumption and detect leaks via smart devices, laptops and office computers. They can often respond in near real-time to get the problem fixed. The platform includes a web portal to easily view water consumption data to enable better monitoring and management of overall water usage and more rapidly detect leaks or potential leaks. The parks department estimates a 20-percent reduction in water use annually with a savings of some \$860,000 per year. Ref: Waterworld.com

Albuquerque, NM - Albuquerque Bernalillo County Water Utility is the largest water utility in New Mexico, providing water and wastewater services to the greater Albuquerque metropolitan area. The utility started its AMI/smart meter deployment in 2010 and expects to have the projected completed in 2020.

While their AMI project has already had positive outcomes, such as better leak detection, they still needed to attend to the thousands of existing meters that were inoperable, causing incorrect customer billing and lost revenue.

Albuquerque Water needed a workforce management solution that would move them from their paper-based service order environment to complete automation of service order work. The utility determined they required a solution that was fully integrated with their enterprise asset management system and provided clear processes to transform their field operations, and at the same time reduce costs and achieve meter maintenance.

The city chose Clevest Mobile Workforce Management to automate field operations. Now Albuquerque Water technicians in the field use Clevest's WorkBook mobile and capture data in streamlined mobile workflows. This data is sent in real-time to staff in the office and automatically updates their asset management system.

Through workforce automation technology, Albuquerque Water is reducing lost revenue from zero-read meters and achieving operational cost savings. They have achieved significant improvements in data integrity, and are improving their customer satisfaction with fewer incorrect bill estimates and faster repair times.

Ashland, Oregon -Ashland, Oregon, is a small city of approximately 20,000 people. The Water Division treats and transports an average of 6.5 million gallons daily in the summer and 2.5 million gallons daily in the winter. Annual usage is approximately 150 gallons per capita per day. Ashland experienced an accelerated population growth rate in the late 1980s. At the same time, it faced the imminent expiration of a critical water right. Initially, the city had two options available to increase water supplies.

Ashland's water conservation program became a natural addition to the city's existing resource conservation strategy, which addresses energy efficiency, regional air quality, recycling, composting, and land use. In 1991, the city council adopted a water efficiency program with four major components: system leak detection and repair, conservation-based water rates, a high-efficiency showerhead replacement program, and toilet retrofits and replacement. The city estimated that these programs would save 500,000 gallons of water per day at a cost of \$825,875—approximately one-twelfth the cost of the proposed dam—and would delay the need for additional water-supply sources until 2021.

Implementation of Ashland's Water Conservation Program began in July 1992. By 2001, almost 1,900 residences had received a water audit. Almost 85 percent of the audited homes participated in the showerhead and/or toilet replacement programs. Ashland has been able to reduce its water demand by 395,000 gallons per day (16 percent of winter use) and its wastewater flow by 159,000 gallons per day. An additional benefit of the program has been an estimated annual savings of 514,000 kilowatt-hours of electricity, primarily due to the use of efficient showerheads.

2.2 India Experience

Indian municipalities are facing the challenges of rapid urban expansion, increasing power tariffs, and acute water shortages. At present only about two thirds of the urban population has direct access to clean, affordable and reliable drinking water services. At the same time, municipal water utilities in India spend upwards of 60 percent of their budgets on energy used for water pumping. Municipal officials are often aware of the opportunities for making bulk water supply and street lighting systems more efficient, however for the most part they lack the means to take advantage of these opportunities.

2.2.1 Technology Trends

Given today's approach to water management, there is only so much growth that can be sustained. Gains in efficiency and productivity in water management and utilization can reduce these risks and enable higher levels of sustainable growth. Demand pressures include population growth and an increase in water-intensive industrial activities, urbanization and higher water-consumption behaviors. Climate change plays a role by creating additional water demand for agriculture and for reservoir replenishment. The motto for water today is wasting less, polluting less, reusing more, managing effectively which is collectively achieved by individual, collective, and industrial to reduce water stress.

2.2.2 Case Studies/Examples

Nagpur - A 2005 water audit by the Nagpur Municipal Corporation recorded water losses at 62%. Energy costs in 2004-05 were 21.1 crore rupees, accounting for nearly 50% of the city's water operation and maintenance. The city knew that it had to improve its energy management, both to save resources and to help prolong the life of the city's water supply equipment.

After the audit, the Nagpur Municipal Corporation's initiated a study of its water situation that found that pumping system efficiency was low and there was significant potential to both increase energy efficiency and decrease operational costs. The audit recommended setting up an automated water management system. Based on the recommendation, the Nagpur Municipal Corporation rationalised water distribution and pumping systems to reduce static and friction. It replaced old, inefficient pumps with energy efficient pumps; improved pump machinery; and installed remote monitoring systems to operate the pumps at prescribed efficiency levels.

The city's strategy led to a 106.96 Kwh/MLD reduction in energy consumption. It also helped the city to recover 7 MLD of backwash water and save more than 10 crore rupees in operation and management costs. Pumping efficiency rose from 40% to 75%. The Nagpur Municipal Corporation's experience shows that a structured approach, specific investment funding, and timely implementation can help to achieve tangible savings.

Vishakapatnam - Vishakhapatnam, with a population of 1.2 million, is the second largest city in the southern Indian state of Andhra Pradesh. The city has a severe shortage of water; 213 million liters per day (MLD) are required by the city. Due to waste that occurs at various points in the system, 340 MLD to be pumped from the source, However, only 190 MLD was being supplied to the city, and in some areas drinking water is supplied only once every two days.

In response to the urban water and energy challenges faced by municipalities, the Vishakhapatnam Municipal Commission (VMC) conducted a detailed energy audit of the bulk water supply systems. VMC bore 50 percent of the cost of the audit and committed to the implementation of the 20 suggested energy efficiency measures, six of which were no-cost. The consultant alliance also helped VMC incorporate energy efficiency measures at the design stage of the new pumping station for delivering water from River Godavari, by reviewing tender documents and redefining the technical specifications of pumps and motors.

VMC implemented all energy efficiency measures suggested by the consultant with an investment of only US\$24,500 from its Operations and Maintenance funds. The measures included retrofitting pumps and motors, optimizing the use of contracted demand, segregating low tension and high tension, and trimming impellers. As a result of these measures, VMC is accruing an annual energy savings of 1.4 million kWh and an annual financial savings of approximately US\$ 60,400. This has reduced VMC's annual energy bill for pumping water by about 5.4 percent, and has reduced CO₂ emissions by about 2,400 metric tonnes. The simultaneous reductions in municipal water waste, through more effective supply and distribution, will allow the municipality to deliver water to more homes.

2.2.3 Regulatory & Policy Issues

Under the constitution of India, water is a state subject, with the legislative jurisdiction of central government limited to inter-state rivers. The draft national water policy 2012 articulated the need for a national framework for water law. Although a 1972 amendment to the constitution assigns water and sanitation function to state authority, complete implementation is still in progress. In most states, state government continues to hold state and parastatal organizations responsible for water and sanitation. Institutional arrangements vary from State to State: State-level Public Health Engineering Departments (PHEDs), specialized State-level WSS Boards, specialized city-level Boards, and Municipal Corporations (MCs) and Urban Local Bodies (ULBs)

Many cities involved multiple agencies in service delivery and interagency coordination has become cumbersome yet very important. In order to improve service delivery, affluent ULBs have tried public private partnerships (PPP). Nagpur Municipal Corporation entered into a PPP model to manage NRW and provide 24/7 water service issues in the form of a separate cell within the organization.

There are many examples promoting the success of using a PPP model. Tariff and water prices are regulated and the assets and water resources remain in the hands of the public authorities. Hence, only service is put in private hands. In the recent past, there has been a significant rise in the investments by the private sector in the area of water related services. While there is some long-term data worldwide to consider and evaluate PPPs in the water sector, in India this sector is still very new. Ref: PPPindia.com

2.2.4 Cost Benefit

More often than not, water and wastewater services fall under public services, and hence are not profit oriented. Clean water and sanitation brings multiple benefits, most importantly public health which is difficult to estimate in monetary terms. In the Indian context, clean water is more critical than many other developing nations as a large section of the urban population still lives in slums where access to clean water is very low.

Growing demand, lack of adequate sources, poor quality of raw water, pollution, and agricultural and industrial demand all drive the cost of water to higher levels and many municipalities struggle to deal with the rising demand.

Adoption of advanced ultra-purification techniques such as membrane filtration and reverse osmosis process are energy intensive whereas incorporating high efficiency pumps, equipment and water conservation features yield substantial results with relatively low investment.

In practical aspect, each city and each condition is unique. For an example, Allahabad has ample resources but utilizing ground water is more cost effective compared to water obtained from the river that needs full treatment. Whereas, in Ajmer, water is transported from a very far location and ground water is much less reliable and can only be used as a backup service under current conditions. It is ultimately the balance of cost and benefit that decides which options to make for each individual case.

3 City/State Situational Analysis

A wide variety of government entities at the central, state, and city level are involved in smart cities decision-making. In order to give cities more direct control in designing and implementing smart cities projects, the Smart Cities Challenge provides a Special Purpose Vehicle (SPV) mechanism to allow for direct control of smart cities projects.

Ajmer Municipal Corporation (AMC): AMC is responsible for planning, operation, and maintenance of water supply, sewerage system, surface water management, solid waste management, municipal roads, parks, and playgrounds. AMC would be the implementing agency for the projects identified in the above mentioned sectors.

The delivery of urban water supply and sanitation service is coordinated through multiple state and central agencies, particularly with Public Health and Engineering department (PHED), RUIDP, UIT, and RHB.

3.1 Current Condition Overview – Water Supply

Ajmer is located in an arid region of Rajasthan and receives approximately 550mm of rainfall annually. The city currently receives water from the Bisalpur Dam and is able to meet the benchmark water supply of 135 Litres Per Capita per Day (LPCD). 70% of the city gets water supply every day and 30% of the city every 48 hours.

Ajmer is divided into 269 zones for water supply. Out of these 269, 34 water zones are in Pushkar and Sadwar. The total number of zones under the jurisdiction of the Ajmer Municipal Corporation is 235. Ajmer is divided into two divisions for water supply. Each division is further divided into five subdivisions. Sub-division 1-5 comes under Division-I. Sub-divisions 6-10 come under Division- II. In Division-I water is either supplied daily or on alternate days. In 38 zones of Division-I water is supplied at an interval of 24 hours, while in the remaining 94 zones it is supplied at an interval of 48 hours. Similarly, in Division-II water is supplied daily or on alternate days.

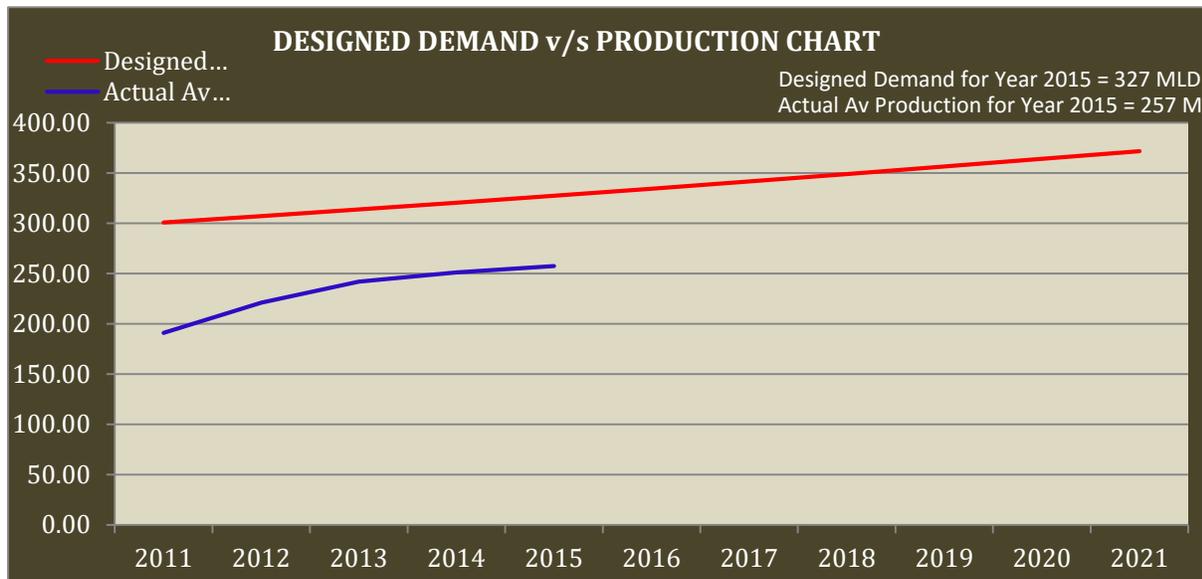
Ajmer Water Supply

Some of the basic data available for Ajmer water supply system is as follows:

Coverage of water supply connections	92%
Estimated per capita consumption	135
Household connection, but not metered	70%
Non Revenue Water	30%
Water quality of the supply	100%
Service efficiency	80%
Number of distribution zones	235
Number of households served	130,000
Communal water service locations	10,000

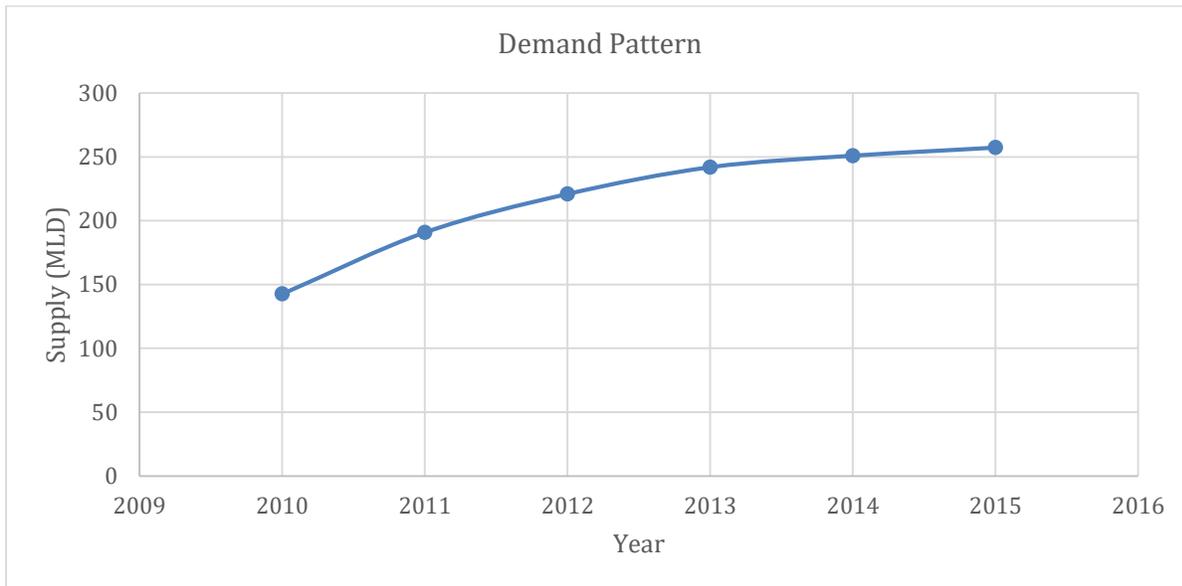
Bisalpur Dam

The chart below shows that raw water received from the Bisalpur Dam. The red line shows the design capacity of the transmission system and the blue line shows the capacity utilized. Therefore, the capacity of the transmission pipe system meets the need for current projected capacity of the city distribution system.



Bisalpur Reservoir Production Report

The graph below shows the production report from the Bisalpur Reservoir. As can be seen from the data, demand has been increasing steadily since 2010. It is not clear that the increase is due to population increase, added new service areas, increase of loss of water or a combination of all.



The total treatment capacity of two water treatment plants is reported to be 274 MLD. These two treatment facilities cover Ajmer and two other small towns. Demand for those two small towns are not available. However, treatment capacity is reaching to the current demand estimates and treatment improvements can be planned now for near term need considering time required for planning, design and construction tasks.

According to an informal discussion held with PHED, the leakage is reported at approximately 20-30% of supply. Calculating on the basis of 30% leakage, the final supply through piped connections to households is 91 MLD. The total number of household connections in Ajmer city is 120,000. Around 1-1.5 MLD of water is supplied through stand posts. Community taps serve approximately 600 households. These connections supplement water supplied through household connections. In summer months, tankers are there to fulfil excess requirements. The distribution of water by tanker are given to private and independent contractors.

Water distribution systems are clearly lacking their capacity to deliver services. The supply and demand estimates indicate that production is adequate for 24/7 basis. But the reality is that water is curtailed and that the practice results for some consumers to receive more water than others and longer than other depending on the physical location of the house.

One of the questions revealed and discussed in length during the field visits was how to lower the non-revenue water and provide uninterrupted service. The realistic estimate of non-revenue water components has not been established due to lack of information. The water loss data is very vague and changes from 40-60%. Consumers store up water in roof top containers and some let the pipe

run throughout the supply period making it even more difficult to manage supply and demand balance.

Ajmer has 1100 km of water distribution network, and it continues to add more pipelines under AMRUT program. The planned capital projects will increase distribution system up to 1,450KM by 2021. The existing distribution system lacks control and isolation valves, bulk metering, proper pressure zoning and booster pumps for elevated areas. The capacity of the storage on PHED reservoir is 71million litres (ML), and there are 4 other water storage units available in the large water supply system that covers other towns supplied by the Bisalpur reservoir. The total combined capacity of these 4 storages is 171.5 ML. It is difficult to conclude if these storage facilities help to alleviate storage capacity needs for City of Ajmer water demand. In addition, the same systems deliver 80,000 litres of water by rail to remote locations where drought has dried out drinking water supplies.

The current distribution systems do not have a metering system and water is billed as a flat fee, paid annually. Therefore, consumers have no real motive to conserve water and revenue collection is far too small.

Effluent Reuse

Effluent from STPs has multiple reuses; watering gardening, parks and open spaces, agriculture, recharge ground water, and cooling power plants etc. City of Ajmer has particular use of treated effluent that is to use it to replenish Anasagar Lake. Anasagar Lake has been already receiving water from the City neighbourhoods, and existing STPs, unfortunately those discharges are not suitable for the lake ecological function, and effluent water from new STPs is a definite source safe replenishment.

Recycled water is used for many decades. For an example, Los Angeles County's sanitation districts have provided treated wastewater for landscape irrigation in parks and golf courses since 1929. The Irvine Ranch Water District maintains one of the largest recycled water systems in the US with more than 400 miles serving more than 4,500 metered connections. In Singapore, water is given more advanced treatments and is used indirectly for drinking.

3.2 Current Condition Overview – Wastewater

The City of Ajmer does not have proper sewer collection, treatment and disposal system and most of the wastewater generated from the homes and businesses entered Anasagar Lake untreated. Many residents have septic systems but these septic systems are merely collection pits and waste soon arrives to open channels that carry waste to Anasagar Lake. Recognizing the importance of Anasagar Lake and its values at the center of the city, Ajmer Municipal Corporation (AMC), with the help of the government infrastructure development program (AMRUT), started developing plans to add sewer collection and treatment system.

The sewer network today covers two zones and each is connected to a separate sewerage treatment plant (STP). The Table below shows the baseline information. Zone 1 which covers the area of the city and flow is treated at Khanpura STP. Zone 2 covers areas north of the city and flow is treated at Anasagar STP.

Ajmer Sewer Network

Zone No	Total No of HH	HH with Sewerage Network	HH with Septic Tank	HH W/O any
Zone - 1 (City Zone - Khanpura, STP)	90,000	500 (PHED) 746 (AMC) 1000 (Housing Board)	76054	3500
Zone - 2 Anasagar Zone	50,000	Zero	19000	4500

The newly constructed wastewater treatment facility for Anasagar uses Sequential Batch Reactor (SBR) technology. The treatment capacity of this treatment facility is 13 MLD. The existing treatment capacity of the Khanpura treatment facility is 20 MLD and additional 40 MLD treatment capacity is being added to the facility. Once completed, the combined capacity of the both treatment systems will be 73 MLD.

The Anasagar treatment facility is fully operational and currently in commissioning phase. As of May 2016, this facility receives only 0.2MLD and effluent quality meets national standards. The new Khanpura treatment facility is nearly completed and plans to be operational in the next couple of months.

The city has good coverage of sewer collection systems. Many projects are still underway. While some projects are in the process of quality testing and commissioning, others are ready to use. After completion of this work, only 70% of the town will be covered under the sewerage collection system.



This picture shows the temporary method of treatment applied for drains that carry sanitary discharges. Local O&M staff refer to this treatment method as bioremediation (not the proper name in the US tech terms). It is expected to reduce BOD₅ from 80 to 30 with this bioremediation. No data is available if this system effectively reduce biodegradable material in the wastewater.

This picture shows the current state of Khanpura STP, which is running efficiently but inflow is less than 2% of the plant capacity. The plant is still in the process of commissioning. Since not sufficient quantity of sludge is produced and sludge treatment is not commenced yet. Biogas recovery is planned, but installation work has not been started yet.

Ajmer is adding more sewer infrastructure at an increasing pace and total investment by year 2019 is expected reach at Rs. 97 Cr. With this investment, the city will have additional sewer lines, residential property chambers, manage individual septic systems, and add decentralized STPs.



As the city grows and new areas are developed, the volume of sewage generated will continue to rise; laying new pipelines and augmenting the capacity of the current STPs will be difficult and expensive. Development of decentralized wastewater treatment plants can help address this issue.

The city is divided into nine circles for the management of public toilets. There are 48 public toilets in the city. Most of the toilets can be used for free, but some privately managed toilets charge Rs3/- and Rs 5/- for a single use. Source: AMRUT (Slip)

Overall, AMC has been steadily increasing sewer coverage for the entire city. Capital investment for building wastewater treatment plants are adequate to deal with current wastewater loads. However, the process of testing and commissioning has been observed slow and connecting households to sewer collection system has barely started. One of the drawbacks identified was that home owners believe that they have proper sanitary service in their premises, and therefore sewer connections are not needed. The public education of and encouragement to join is definitely a needed to render built infrastructure facilities useful.

3.3 Current Condition Overview –Stormwater/Water Resources

Foysagar, Anasagar, Bisalsagar and Khanpura are the major tanks in Ajmer city and Pushkar Sarovar in Pushkar city. There are totally 19 primary drains having a length of 40.96 Km and 43 secondary & tertiary drains having a drain length of 52.83 Km in Ajmer city. All these drains finally enter into one of the tanks mentioned above. Overflow from these tanks is rare.



Ajmer City has always been dependent upon surface water sources to meet its demand. In 1892, Foysagar Lake was constructed to support the increased population of the town. Historically, the city has had an efficient system of rainwater collection, through interlinked lakes. The Foysagar Lake, with its extensive catchment area, was connected to the Anasagar Lake, which in turn was connected to Pal Beechla through natural channels to carry surplus and run off water.

Anasagar Lake is currently fed by run-off and wastewater which until recently was not treated. Recognizing this issue, the city has recently developed two sewage treatment plants which treat the water prior to discharging into the lake. However, wastewater is still arriving from open drains. The picture shows the nature of the drain carrying surface and sanitary flow. The picture shows the current state of Nallas.

Anasagar Lake water looks green and floating debris and plastics materials are accumulated to the corner locations. Solid waste material enters water without barriers through canals. As a result, the lake is in an ecologically poor state. A large number people gather around water near the park and children are seen playing in the water. The picture shows the current state of lake water.

Based on the historical rain fall data for the last 30 years, the average rainfall is in the range of 500mm to 600mm per annum. Most of the rainfall occurs between July, August and September month. Ajmer experienced flooding due to heavy of rain in a short duration time. (Source: Meteorological department).



Ajmer is surrounded by hills and the steep hilly area situated around Durgah, Naya Bajar, Nala bajar, Madar gate area often gets flooded due to the high volume of run-off. The majority of the run-off resulting from storm events collects in open channels and drains into Foysagar and Anasagar Lakes. The city is planning on expanding the current stormwater drainage network which currently covers around 35% of the city. As the city gets a relatively low amount of rain it is vital that the rainwater is intercepted through rainwater harvesting schemes which will ensure the efficient use of rainwater and reduce the flow of untreated stormwater run-off into the lakes.

A comprehensive hydrologic and hydraulic analysis has been completed in 2009 which outlines several recommendations to stop sewer from entering the lake, pretreat convey runoff safely, and encourage ground water recharge and enhance water quality of the lake. Much has not been accomplished in this area of development. Separation of storm flow from sewer flow to avoid overflow of wastewater treatment plants is important.

4 High Level Analysis and Recommendations for Potential Smart City Projects

Ajmer City needs utility improvements in all sectors to become a smart city. Considerable capital investments have been made to water and wastewater infrastructure already, and further improvement are planned in the near future. However, based on the analysis of data and information from existing reports, field observation and interviews with city officials, the USTDA smart city advisory team identified some improvements which could produce immediate results. The sections below provide a basic outline and description of the improvements that could produce immediate tangible benefits.

4.1 Drinking Water Distribution System Study and Upgrade

As mentioned before, non-revenue water is quite high in the system and water supply is rationed. In 2010, the reservoir completely dried out and hence source reliability is not certain. It is highly desirable to have a backup source of supply, such as ground water wells, when surface water availability is restricted. A comprehensive approach to ensuring water collection, treatment, and distribution system including a revenue collection mechanism is required for a long term reliable safe water supply system. The following tasks are recommended to achieve the goal of 24/7 safe, reliable drinking water system:

- Collect existing source reliability assessment considering historical inflow conditions to Bisalpur reservoir system;
- Investigate back up alternative sources of supply for rare but possible dry years;
- Conduct demand assessment considering current and future population increase, industrial and commercial consumption etc.;
- Collect existing distribution network data and build ESRI compatible Geodatabase;
- Perform water distribution network analysis using GIS compatible software application such as H2Onet;
- Identify areas of high water leakage and arrest leaks on priority basis;
- Identify transmission, storage and distribution deficiencies; and prioritize capital investment that yield maximum results;
- Define pressure management zones, appropriate system of valves for flow and pressure control;
- Incorporate booster pumps where necessary to keep the service standards;
- Incorporate SCADA system to manage pressure, flow, water quality parameters and manage loss of water;
- Use water metering for each consumer and develop revenue collection system based on consumption, type of consumers etc.
- Add water reservoirs, as determined by network analysis;
- Conduct energy audit and explore where energy consumption for pumps and equipment can be minimized;
- Promote water efficient methods in household use such as water saving shower head, toilet features etc.

Cost of Water Supply Works:

- Develop GIS database and maps – Consulting fee – US\$ 100,000.00
- Conduct network analysis for water distribution system Consulting fee – US \$ 120,000
- Conduct pumps and equipment audit and replacement/rehabilitation/Energy conservation study –consulting fee US\$75,000
- Provide pumps and equipment (upgrade and new) – US\$ 1.5 Million
- Provide control valves, bulk meters and house connection meters – US\$ 1 million
- Provide SCADA equipment, software, hardware – US\$ 500,000.00
- Supply water saving features – US\$ 75,000.00

4.2 Anasagar Lake Clean up and Restoration

Anasagar Lake is a prime jewel of the city, surrounded by mountains, situated in the middle of the City of Ajmer. Unfortunately, Anasagar Lake is in a very poor state. The lake does not receive consistent flow from upstream and combined sewer discharge from household toilets and wastewater originating from other users arrives at the lake through open channels untreated. Stagnant water, high temperatures and highly loaded nutrients are prime conditions for harmful organism and bacteria viruses to thrive. Remediation and desilting of the Anasagar Lake and control of combined sewer arriving at the lake is paramount for the health of the lake. USTDA consultant team determined that restoration of the lake is critically important to achieve the smart city vision of City of Ajmer. The section below provides basic recommendation to develop a full scope for lake restoration program.

- Convey combined sewer channels to sewer collection system, may need lift stations;
- Initiate comprehensive water quality measurement program to understand what needs to be done and also effectiveness of solutions implemented;
- Remove floating plastic and other debris from water;
- Dredge silt deposited on the bottom of the lake. It is advisable to conduct sediment study before conduction dredging works;
- Use solar based lake aeration system;
- Use lake water for cascade aeration at some location along the lake periphery which will also add city beatification feature (water fall); and,
- Develop conditions for aquatic habitat to thrive in the water which will intern attract and birds and other aquatic creatures.

Cost of Proposed Lake Clean up and Restoration Works

Conduct lake water quality analysis, treatment options, and clean up and restoration master plan, consulting fee - \$150,000.00

Lake debris and floating material removal – \$40,000.00

Conduct pilot level aeration system, powered by solar system - \$75,000

Perform lake sediment analysis and dredging program – \$1,000,000.00

Add cascade aeration systems along the lake front - \$120,000.00

Add solar powered lake aeration system – \$300,000.00

Optional – Storm water pre-treatment lagoon system at exist point of canals – \$40,000 each location.

Optional – Sewer lift stations – temporary until proper connections of household waste line to sewer collection system – \$60,000 each.

5 U.S. Companies and Technologies

Respected U.S. Engineering and service provider companies are already doing business in India. Most notably, Black & Veatch with extensive water and energy engineering expertise, AECOM with architecture, engineering and construction experience around the world and Hazen Sawyer with excellent background water sector works, have already expressed willingness to participate in future

projects and some have participated in for number of planning meetings with city and government officials. Regarding equipment suppliers, Xylem has had interaction with city and stakeholders of the smart city project. However, there are many other engineering and equipment suppliers that are working in India in the water and waste water sector including: Fluor Daniel, Ch2MHill, Bechtel, Parsons, TetraTech, CDM, Cadno, PCT, ProMinent, Air-O-Lator Corp and Phoenix Process Equipment Co.

6 Appendices

6.1 Smart City Proposal Analysis - Recommended Activities

During field visits and consultation with stakeholders regarding Ajmer’s Smart City Proposal, the USTDA smart cities advisory team conducted a sector analysis and identified areas of improvements for Ajmer. The table below shows the initial project proposal presented under phase 1, and information gathered during field visits and stakeholder consultation and also recommendations for the phase 2 proposal development. The actions identified below provide a summary of recommendations based on what the team learned and thus it may not be regarded as a final list of work to be done.

Phase 1	What we learnt	Recommendations
Mixed storm water and sanitary sewer-Reduce capacity of collection system	Household sewer drains to open channel Nallahs	Produce comprehensive social and technical strategy to get people connected to the wastewater system
Water logging in 15 % of the area	Total of 130KM of sewer collection system is built of which 40km is still under construction and testing Near future entire collection system is build and ready to use Intended coverage is 100% for current households	Conduct network collection systems evaluation using GIS technology and software applications such as sewer CAD Integrate SCADA technology Many more small collection pipes yet to be laid to be able to get every household connected
	Total projected wastewater generation for year 2021 is 80% of the water consumption, as estimated is, 66 MLD Wastewater treatment capacity is 13MLD, 40 MLD =53MLD	(i) Current capacity is inadequate. Need extra treatment capacity, can be incorporated into near term capital investment plans (ii) Conduct analysis to assess the potential of gas production and financial viability of the investment (iii) Separate storm water from entering the STP

	<p>Decentralized STP of 5 MLD with SPS</p> <p>60 MLD Power Generation Plant Khanpura, Ajmer (power is generated from methane)</p> <p>Lower part of the water collection system is nearly flat</p> <p>WWTP meet effluent standards, but flow is very small</p> <p>Biogas production is intended but flow is so small that sludge that generate methane gas is nearly zero</p>	<p>(iv) Treat sludge to the degree that can be safely used for agriculture and gardening purpose. (Guidelines can be available from USEPA)</p> <p>(v) Use treated wastewater for lawn watering for parks and green ways, car wash facilities</p> <p>(vi) Replenish lake water levels</p>
Brick kilns in the area		
Water quality of lake bad	Lake water quality is worse than treated wastewater from WWTP (10 g/l vs 50 mg/l) approx. numbers	<p>Develop lake clean-up program which would include waste material removal, dredge, water quality monitoring and maintenance</p> <p>(i) Measure lake water quality BOD, COD, SS, P, N, S</p> <p>(ii) Stop Nallahs water getting into lake, except storm runoff</p> <p>(iii) Remove floating debris and bottom sediments from the lake</p> <p>(iv) Determine appropriate technology for treatment Surface aeration, cascade aeration on designated location along the lake front –Gives aesthetic of water fall and provide necessary oxygen transfer</p> <p>(v) Assess viability of solar powered aeration system</p> <p>(vi) Stop solid waste thorn into lake, placing appropriate solid material collection and disposal system</p> <p>(viii) Install barriers, screens to arrest solid water entering the lake from open channel</p> <p>(ix) Stop sediment entering the lake</p>

		Install water quality sensor of important locations such as STP outfall, Nalas exits to the lakes, outlet location, floating sensor in the lake
Rain water harvesting for all the building	Roof top storage of rainfall is practically difficult without retrofit	<p>Use on ground and below ground storage facilities to store and use rain water for watering lawns, gardens etc.</p> <ul style="list-style-type: none"> (i) Collect, where possible, on ground water storage tanks (ii) Store below ground where conditions allow (iii) Pretreat all the time to eliminate contaminant that cause foul water (iv) Diverted to landscape where natural green beds and flower beds (v) Allow ground infiltration with slowing down flow to natural ground depressions
	<p>Benchmark water supply of 135 Litres Per Capita per Day (LPCD). 70% of the city gets water supply every day and 30% of the city every 48 hours</p> <p>Water Demand – Year 2011 – 542331 people Demand – 73MLD Year 2021 – 610461 people Demand – 82.4 MLD</p>	<ul style="list-style-type: none"> (i) Conduct source reliability assessment (ii) Conduct network analysis using H2O net or similar software application (iii) Develop pressure and flow management system (iv) Install bulk water metering systems that integrates to SCADA system (v) Optimize pump operations for energy saving with pump and equipment update (vi) Install water quality measuring stations in selected location of the water distribution system (vii) Install water meters that are difficult to tamper – install within a chamber below ground (viii) Bill based on use groups and amount consumed
	The city has a small storm water management network which covers approximately 35% of the city	<ul style="list-style-type: none"> (i) Review and update hydrologic and hydraulic study completed in 2009 (ii) Implement recommendation given in the report DPR Stormwater drains –Ajmer-Pushker cities

		(iii) Assess storm water quality and appropriate treatment system
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7 Appendices

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Report No 4: Urban Planning and Transportation

1 Executive Summary

The City of Ajmer has a great opportunity and potential in the urban planning and transportation space. With the new Concept Development Plan (CDP) being prepared by the Ajmer Development Authority, it is extremely important to integrate the current Smart City Challenge efforts and other planning initiatives under one umbrella. People friendly interface with a citizens participatory planning approach should be adopted, which is truly inclusive. Consensus has to be built across various sectors of the citizens, stakeholders and the public and private agencies.

Smart Planning measures should be adopted that supports inclusive and holistic development of the city. A truly sustainable model for Ajmer will be to leverage its current setting and pristine environment, supporting a compact, dense livable environment that facilitates and expands its tourism potential. The most important recommendation will be to fine tune this approach with the help of a **Smart City Road Map**, which integrates different sectors and develops an integrated and holistic plan for the city of Ajmer. This model has to be backed up by an overall **Smart Mobility Plan** for the city that encompasses various modes of transportation, with the primary focus on pedestrians and people and not vehicles only. **Complete and Equitable Streets** should be the backbone of the Mobility Plan of the City, giving access to all kinds of users on the streets and specifically promoting Walkability and non-motorised transport.

Pilot planning and transportation projects could be identified that can offer quick wins at a mass scale. These projects should be smart small-scale initiatives with a large enough impact for wide-scale use in an inclusive manner. Some of these include:

- **Digital signage and information kiosks** in the entire city of Ajmer to improve way-finding and support tourism;
- **GPS-enabled buses:** to assist with bus tracking, provide live data to commuters, and allow for route monitoring for officials;
- **Smart Cards:** A single card interface could be developed for transportation within Ajmer-Pushkar area between various modes of transport;
- **Intelligent Crowd Management System** should be developed which will allow for the safe and efficient movement and dispersal of people (pilgrims) in Dargah area.

2 Sector and Technology Background

2.1 Global Experience

Smart cities are complex organisms that consist of state of the art infrastructure and are then connected using cutting edge technology solutions. For these solutions to be implemented to their full potential, it is essential that the base infrastructure i.e. the buildings, roads, buses, trains, water and sewage pipelines are provided and upgraded to meet the rising demand.

Globally, cities are embracing the challenge of upgrading their plans to ensure they can maximise the benefits of modern technologies while ensuring they have a high level of sustainability and providing the citizens a highly liveable environment.

2.1.1 Planning and Technology Trends

Planning trends

The last few decades of city-building across the developed world have seen a major shift in the thinking about the relationship of the city with its people. The factories are now systematically moved out or replaced with less polluting industries; at the same time, cities are beginning to take steps to enhance the liveability of its citizens. Innovation and research are the new drivers of economic growth and people oriented development and sustainable infrastructure planning are the key objectives. Some projects that are being taken up by cities are as follows:

Complete streets: Globally the concept of ‘Complete Streets’ has been gaining traction. Streets are being designed to allow safe and efficient movement for all street users i.e. pedestrians, bicyclists, private vehicles and public transport. This has resulted in streets and their immediate surroundings being more economically, socially and environmentally sustainable.

Transit hubs: One of the key facets of a sustainable city is to create a public transit friendly environment allowing for a large proportion of trips to be carried out by public transport. To ensure a high public transport share, it is vital to provide amenities and services that make public transport the most time efficient and easy to use mode of transit.

A multi-modal transit hub is one such amenity that makes the use of public transport a more attractive proposition as it allows for the easy interchange and enhances the travel experience. Further a transit hub assists in creating a “sense of place”, brings people together and serves as a focal point for community life.

Transit oriented development: Transport planning is intrinsically linked to land use planning and both need to be developed together in a manner that serves the entire population and yet minimizes travel needs. A transit-oriented development (TOD) is a mixed-use area designed around a public transport station / line that helps achieve the aforesaid goal. Planning a development in such a way ensures that users can easily access public transport modes by short walk or non-motorised transport (NMT) means; this encourages public transport ridership and reduces traffic to/from public transport.

Self-sustaining mixed- use neighbourhoods: Neighbourhoods planned and designed to have rich mix of uses (residential, commercial, retail, social etc.) located in close vicinity with each other enables the creation of a vibrant area that is active over the course of the entire day. Such neighbourhoods also encourage people to walk and cycle; thereby reducing the dependence on private vehicles which assists in creating an environmentally friendly and sustainable environment. Countries like India can leapfrog the mistakes of U.S. cities which moved to single use neighborhoods (e.g. commercial, residential, retail); lost the vibrancy of neighborhoods and increased traffic congestion and over time; and are now trying to recapture what was lost.

Technology Trends

GIS based Planning: Cities are constantly evolving through the introduction of new planning ideas and smart technologies. As a result planners and planning technology have to be flexible and be able to adapt to ever changing plans. To be able to keep pace with the evolving cities, planning agencies have embraced geographical information systems (GIS) which allows cities to modify and update plans with increased efficiency, allows for greater automation, improves access to governance, improves collaboration among agencies, enhances public participation, and improves accuracy.

3-D Modelling: As cities work to accommodate this influx of new residents and businesses, more skyscrapers, roads, subways, bridges, and other infrastructure will need to be built. From aesthetic changes to the skyline, to wind dynamics, aircraft flight paths, engineers and city planners must be able to understand the impact of their plans and decisions at a larger scale. With major advances in 3D modelling, cities are developing 3D models which allows them to interactively test out various scenarios which provides a better understanding of the impact of new developments and expedites the planning process.

Online citizen engagement: Cities routinely have a lot of non-emergency issues such as damaged footpaths, street lights which require changing, and often have to rely on citizens to be their eyes and ears in the field to alert them of these issues. However, many citizens don't have the time or inclination to go to report these issues. Cities are now developing mobile phone applications that lets citizens to alert the local government of such issues in a swift and efficient manner. This allows for the issue to be directed to the correct department, helps the city fix the complaint and work to address the issues more efficiently and effectively.

Intelligent transportation systems (ITS): Intelligent transportation systems (ITS) are advanced applications which, without embodying intelligence as such, aim to provide innovative services relating to different modes of transport and traffic management and enable various users to be better informed and make safer, more coordinated, and 'smarter' use of transport networks.

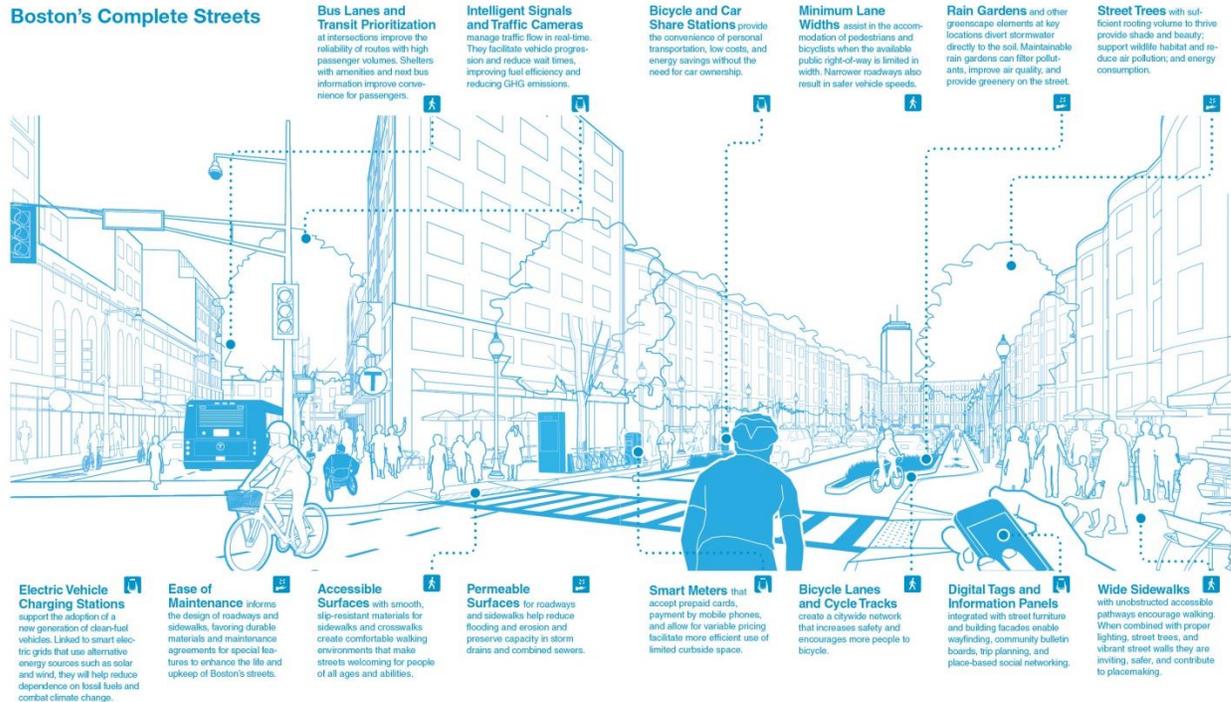
2.1.2 Case Studies/Examples

Boston Complete Streets

Boston Complete Streets approach puts pedestrians, bicyclists and transit users on equal footing with motor-vehicle drivers. The initiative aims to improve the quality of life in Boston by creating streets that are both great public spaces and sustainable transportation networks. It embraces innovation to address climate change and promote healthy living. The key project objectives are:

- Multimodal: incorporates pedestrians, people with disabilities, bicyclists, transit users, motor vehicles.
- Green: incorporates street trees, rain gardens, bio-swales, paving materials and permeable surfaces, with plants and soils collecting rain water to reduce flooding and pollution.

- **Smart:** incorporates intelligent signals, smart meters, electric vehicle sharing, car and bicycle-sharing, way-finding and social networks for greater system efficiencies and user convenience



Audubon Circle, Fenway, Boston

Audubon Circle is a historically significant gateway from the north into Boston and the Emerald Necklace park system. Located at the intersection of Beacon Street and Park Drive, Audubon Circle has a history of speeding and traffic accidents. The new design will improve safety by eliminating slip lanes, controlling left turns, and adding bicycle lanes on Beacon Street. A new urban design concept will re-emphasize the historic circle with benches, walls, trees and planters that will green the space and treat stormwater from the streets and footpaths. The project is being designed by the City of Boston using state funding and has a construction budget of approximately \$5.5 million.

Source: Project website - <http://www.cityofboston.gov/transportation/FLK/>



Figure 1: Audubon Circle Currently



Figure 2: Audubon Circle Proposed Design

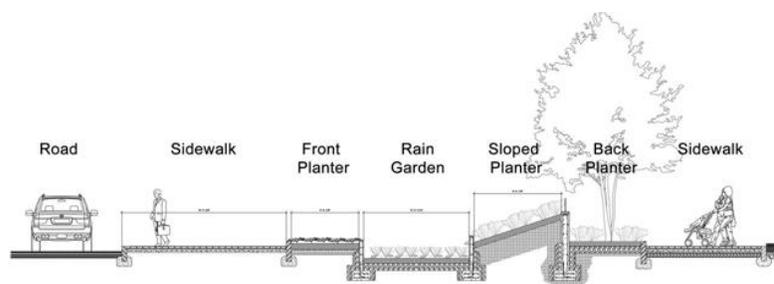


Figure 3: Proposed Street Section

Transit Hubs

King's Cross Station is a major Railway Station in London. At King's Cross Station, in addition to the platforms for long distance, there are retail shops, entry to underground metro station, bus stops for local buses, a taxi stand and a plaza for commuters.



Figure 4: King's Cross Station Transit Plaza, London England



Figure 5: King's Cross Station Platforms, London England

Source: <https://www.kingscross.co.uk/kings-cross-station>

Transit Oriented Development

Collingwood Village, Vancouver, Canada

Collingwood Village is a high-density, mixed-use urban village centred on the Joyce-Collingwood SkyTrain Station in Vancouver. It is the largest master-planned community in the state having 2,700 units spread over 11.3 hectares. The City and the developer negotiated a number of neighbourhood amenities including a community centre, daycare and community policing station that have made this a truly complete urban village. Collingwood

Village was developed within the context of a regional transportation and land use planning system that aims to focus growth around regional centres well served by transit. It is considered a highly successful transit-oriented development (TOD) that combines transit-supportive densities with good connections to the transit station and a mixed-use urban village. According to the survey of residents described later in this case study, 56 percent use transit as their main means of travel to work.



Figure 6: Collingwood Village



Figure 7: Collingwood Village Transit Line

Source: <http://www.cmhc-schl.gc.ca/en/inpr/su/sucopl/upload/66623-w.pdf>

Preservation of Heritage Neighbourhoods

Foshan Lingnan Tiandi Master Plan, China

Foshan, the third largest city in Guangdong Province, is renowned as one of China's leading centres of art and scholarship. It also is home to Foshan Zumiao, the 900-year-old Song Dynasty Ancestral Temple, which sits at the heart of Donghuali Old Town. Like other historic areas in the country, this district has been threatened by unremitting high-rise development.

SOM, a leading urban planning firm, developed a master plan that identifies ways to conserve the ancient quarters while simultaneously creating a sustainable, modern central district able to accommodate growth. Shaped through a series of meetings with planners, developers, and city officials, the scheme proposes private development outside of the historic core. Guidelines establish density levels that could support a transit-oriented, mixed-use downtown while defraying the cost of preserving and restoring Old Town and its cherished temple. The plan outlines a range of sensitively scaled building heights, as well as walkable blocks to encourage pedestrian activity.



Figure 8: Foushan heritage conservation and redevelopment master plan

Strategic Upgradation of Dense Neighbourhoods *Medellin, Colombia*

The City of Medellin has witnessed a remarkable transformation in past 20 years. From being one of the deadliest cities in 1992 to one of the most innovative city in 2012, the urban and social development of the city is remarkable; the number of violent incidents has decreased.

Traditionally, urban development projects in Colombia focus on finding specific solutions to physical problems. Medellin has opted for a different strategy to use the architecture and urbanism as a tool for social development. And it is designed as a comprehensive strategy that seeks solutions to mobility, governance and education together with the recovery of public space and green areas. The solution was to provide cheap public transport connectivity to the existing dense areas and bring about urban upgradation through strategic projects around the stations like Libraries, Community centres, Schools and public parks.



Figure 9: Strategic urban interventions and upgradation in Medellin

Source: <http://kth.diva-portal.org/smash/get/diva2:126733/FULLTEXT01>

GIS Mapping

Land use mapping – Richmond, Virginia, USA

The Division of Land Use Administration is responsible for amending the zoning ordinances and supporting the Board of Zoning Appeals and the Planning Commission. Before GIS was implemented, property maps were compiled in paper format; property maps were made at different scales as each city block was recorded on a separate page. The process for creating zoning maps and collecting data from older maps was equally onerous. With the development of a city wide GIS map, this process was highly simplified. Now anyone can search for a specific address, zoom to a desired geographical extent, determine its existing land use etc. Before GIS, producing a series of site, zoning, existing land use, and Master Plan land use maps took between five and seven hours. With GIS, it now takes less than 30 minutes.

Intelligent Transportation Systems (ITS): Traffic Management in New York City and Washington DC

Cities are leveraging Internet of Things (IoT) technologies to reduce gridlock.

1. New York City has recently piloted a programme in which they installed sensors along 23 crucial intersections that detect the number of cars waiting for a traffic light by monitoring the number of EZPass readers waiting in line. A system at the city's traffic centre then analyses the data in real-time and provides recommendations to traffic engineers to adjust traffic light patterns to help move the traffic along swiftly.
2. Washington DC is experimenting with a similar program and also looking at ways to keep traffic signals going during power outages by using a "power over the Ethernet" technique.

2.1.3 Regulatory & Policy Issues

Transportation, urban development, and civic infrastructure are handled by a variety of departments. Development of any integrated development requires the consensus and coordination of all the Government departments and stakeholders involved.

However specifically with regards to transportation, cities generally have one organisation like Transport for London (TfL) which looks after all public transportation for the city. This helps ensure good coordination and the development of well-planned public transport hubs and nodes.

2.1.4 Cost Benefit

It is a fact that public transport projects on their own are not financially viable propositions as they tend to have very high capital costs and to ensure a high ridership, fares are kept low. Leveraging of land, advertising space and retail / commercial development as a resource to help improve viability of public transport projects and infrastructure development is an established concept.

2.2 India Experience

2.2.1 Planning and Transportation Trends

City Planning

India is amongst the world's fastest growing countries with a rapidly growing urban population. The percentage of India's population that lived in urban areas in 1961 was 18% and in half a century the urban population has rocketed to 31% and is expected to continue to rise to well over 41% by 2031. To plan and help cities accommodate for the rapidly urbanising population, the Government has launched several schemes like AMRUT, SCC, HRIDAY, PMAY, SBM, etc. Some of the major planning related schemes are described below:

Atal Mission for Rejuvenation and Urban Transformation (AMRUT): The purpose of AMRUT is to (i) ensure that every household has access to a tap with assured supply of water and a sewerage connection; (ii) increase the amenity value of cities by developing greenery and

well maintained open spaces; and (iii) reduce pollution by promoting public transport and non - motorised transport.

Smart Cities Mission: 100 cities across the country shall be selected based on a national competition called the 'City Challenge'. As part of the challenge the cities shall have to develop a financing plan which shall include funds from various sources including the State Government, Central Government, PPP schemes etc.

Heritage City Development and Augmentation Yojana (HRIDAY): The Government of India, launched the HRIDAY scheme, with a focus on holistic development of heritage cities. The scheme aims to preserve and revitalise the heritage city to reflect the city's unique character by encouraging aesthetically appealing, accessible, informative and secured environment. 12 heritage cities have been identified and the projects identified shall be implemented with City, State and Central Government funds.

Transportation:

Four of the key objectives set out in the National Urban Transport Policy, 2006 (NUTP) are as follows:

- Encouraging integrated land use and transport planning in all cities so that travel distances are minimised and access to livelihoods, education, and other social needs, especially for the marginal segments of the urban population is improved.
- Bringing about a more equitable allocation of road space with people, rather than vehicles, as its main focus.
- Encourage greater use of public transport and non- motorised modes.
- Enabling the establishment of quality focused multi-modal public transport systems that are well integrated, providing seamless travel across modes.

To address the growing traffic, transportation and development issues facing cities in India, several cities have taken up a wide range of public transportation projects. Larger cities with higher volumes of public transport like Mumbai, Delhi and Chennai have developed metro rail master plans and begun implementation of the same. Cities having lower traffic volumes have taken up implementation of Bus Rapid Transport Systems (BRTS) and are also augmenting and upgrading their bus fleets.

Recognising the advantages of Transit Oriented Developments (TODs), cities are incorporating the development of TODs and monetisation of land as part of the overall project financing and operation plans. Cities are also working towards developing 'Urban/Public Transport Funds' that will create a self-sustaining source of funds for the development of public transport.

2.2.2 Case Studies/Examples

InterState Bus Terminal

Chennai Mofussil Bus Terminus – Chennai, India

The Chennai Mofussil Bus Terminus (CMBT) developed in 2002, is a modern bus terminus providing outstation bus services. The terminus has 6 platforms with 180 bus bays with a capacity to handle over 2,000 buses and 200,000 passengers a day. The terminus has a waiting facility for passengers, a transit hub that provides parking and pick/up zones for auto rickshaws, taxis, private cars and access to the Chennai Metro Station (under construction). The amenities provided include hotels, eateries, locker rooms, travel agency offices, shops, supermarkets, ATMs, dorm rooms, 24-hour Emergency Medical Care Centre, a 24- hour Pharmacy and free Wi-Fi internet.



Figure 10: Chennai Mofussil Bus Terminus

Source: [http://www.cmdachennai.gov.in/chennai_mufussil_bus_terminus\(cmbt\).html](http://www.cmdachennai.gov.in/chennai_mufussil_bus_terminus(cmbt).html)

Lake Front Development

Kankaria Lake– Ahmedabad, India

The historical Kankaria Lake having a 2.5 km perimeter was redeveloped in 2008 and several tourist / visitor facilities were planned including a toy train, food courts, walkways, linear landscaped gardens and musical fountains. A key feature of the redevelopment, in addition to the development of visitor facilities, was the cleaning and maintaining of the lake water and management of solid waste generated by the large number of visitors. The visitor response has been very encouraging with over 10 million people visiting the lake front annually.



Figure 11: Aerial view of the lake



Figure 12: Lake front promenade

Source: <http://www.kankarialakefront.in/about-us.html>

Intelligent Transport Systems

M-Indicator- Mumbai, India

M-Indicator is a mobile phone application for public transportation in Mumbai. The app provides timetables for the local railway, metro rail, mono-rail and the BEST bus system. The Taxi and Auto fares for different distances are also provided.

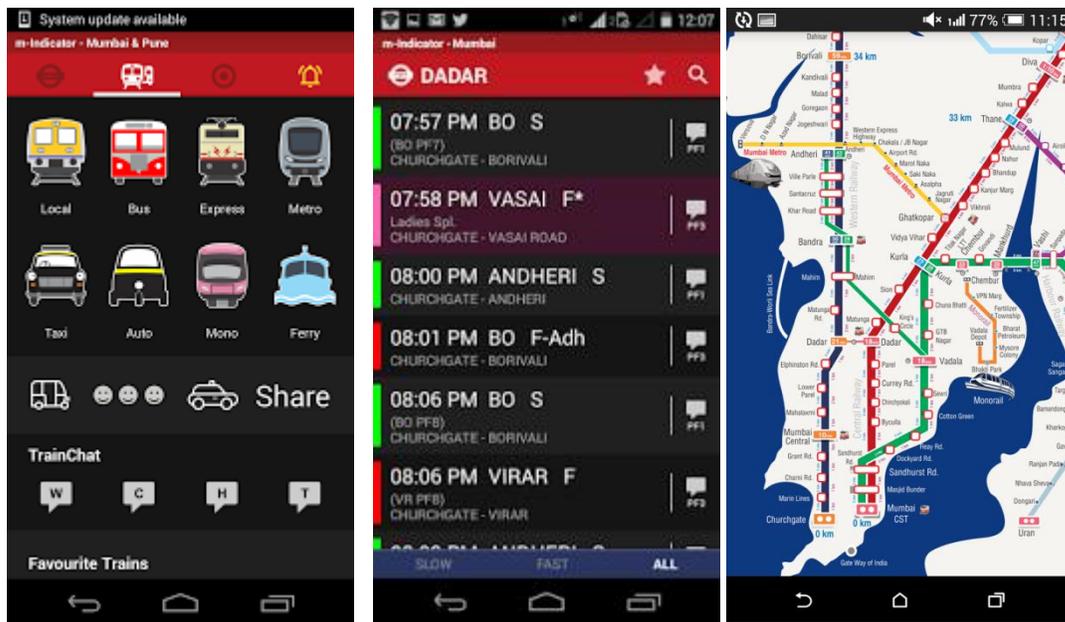


Figure 13: M-Indicator App

2.2.3 Regulatory & Policy Issues

Transportation, urban development, civic infrastructure are handled by a variety of departments. Development of any development requires the consensus and coordination of all the Government departments and stakeholders involved. At present there are a large number of agencies occasionally with overlapping responsibilities operating independently with poor coordination amongst them.

2.2.4 Cost Benefit

It is a fact that public transport projects on their own are not financially viable propositions as they tend to have very high capital costs and to ensure a high ridership, fares are kept low. The leveraging of land, advertising space and retail / commercial development is a new concept in India and is being employed in a few cities.

3 City/State Situational Analysis:

3.1 Planning at State Level

In Rajasthan, four major cities were participating under the Smart Cities Challenge – Jaipur, Udaipur, Kota, and Ajmer. Jaipur and Udaipur have already been selected amongst 20 cities in the Round 1 of the Smart Cities Challenge in February, 2016. Kota and Ajmer are participating in the Round 2 of the SCC and will be submitting their proposals to the MoUD, Government of India by June 30, 2016. Apart from the SCC, the state of Rajasthan has 28 cities under the scheme of AMRUT; Ajmer is one of them. Also, Ajmer is the only city in Rajasthan to be covered under the HRIDAY and PRASAD schemes – out of 12 heritage and pilgrim cities

in India. A lot of work is being done under these various GoI schemes/initiatives in the city of Ajmer.

3.2 Ajmer City Level Summary

City:

- Population: 542,321 (2011 census)
- As per Year 2015:
 - Total number of tourists arrived in Ajmer based on hotel stays
Indian nationals: 4,543,300 Foreign nationals: 36,421
 - Total number of tourists arrived in Pushkar based on hotel stays
Indian nationals: 3,599,960 Foreign nationals: 69,494
 - Total number of tourists arrived during Pushkar Fair based on hotel stays:
Indian nationals: 500,000 Foreign nationals: 11,000
- *Source: Rajasthan Tourism Department, Ajmer*
- Although the Dargah attracts a majority of the tourists in Ajmer, there are several other major attractions like Akbar Fort, Adhai Din ka Zhopra, Anasagar lake, Taragarh Fort, Soniji ki Nasiyan, and Pushkar area

Transportation:

- Number of registered vehicles: 598,300
- Ajmer has a total road length of 540 km
- For the years between 2013 and 2015 about 40% of the commuters relied on public transportation
- Ajmer has 35 city buses which are managed by ACTSL
- The Ajmer railway station handles 40,000 passengers per day which increases to 75,000 during festive periods
- Currently, the station has 5 operational platforms and it is planning to develop 2 more platforms

3.3 Urban Planning and Transportation - Key Activities under progress:

Concept Development Plan (Ajmer Development Authority/ADA)

The Concept Development Plan which is currently being used was prepared in 2006 and the City is now in the process of updating the same. It is vital that the new CDP includes the vision and plans set out in the SCC and places special emphasis on developing the tourism industry.

Dargah Area Rejuvenation Plan

The Dargah and its immediate surrounding area is amongst the oldest parts of the city and draws the highest number of visitors. The Dargah area is characterised by narrow roads, high density and highly congested due to encroachments on the street by the retailers and high amount of foot traffic. Several of the buildings in the area are also in a poor state of repair and in need for renovation/redevelopment.

The Ajmer Nagar Nigam is working on a rejuvenation / redevelopment plan for the old Dargah area. This redevelopment plan requires a major relocation component in an extremely sensitive urban fabric. It was recommended by the USTDA team and agreed by the

District Collector of Ajmer, Gaurav Goyal, in the meeting on May 25th, 2016, as an unfeasible plan. However, understanding the stress on the urban fabric and overcrowding during festivals and events, this area is in need of urgent attention for improved mobility, efficient crowd management, and strategy framework for urban rejuvenation and infill.

Retrofitting of the Anasagar Lake Area

The Anasagar Lake area is part of the Area Development Plan under the Smart City Proposal. The proposal includes the following recommendations:

- Development of an Eco-Mobility Corridor along Anasagar Lake including footpaths, bicycle tracks, continuous green spaces in 5.5 km stretch
- Innovative use of existing open spaces by converting parks into theme based parks
- Using the open areas for installing solar panels etc.
- Development of water sports facilities and choreographed musical fountain
- Improvement in SMART Education Infrastructure & Modernization of Hospitals (Super Specialty)
- All the public buildings are proposed to be converted into green buildings.
- Skill upgradation: Establishing an incubation center
- Visible Improvement: Removal of encroachment from footpaths and removal of hanging electricity wires by underground cabling.
- Development of disabled friendly footpaths and walkways without encroachment.
- Creating Smart Parking systems in all the market areas of the identified area
- Establishment of an Intelligent Traffic Management and Smart Parking at two locations

Projects under HRIDAY

Sr. No.	Project	Project Components under HRIDAY only	Project Cost under HRIDAY Phase 1 (INR)
1.	Naya Bazaar Heritage Walk:	a) Underground wiring, road resurfacing b) Street lighting, signage, dustbins, benches, public toilets c) Conservation of facades d) Parking zones, pedestrian access	INR 5.7 crores
2.	Dargah Bazaar Upgradation	a) Underground wiring, road resurfacing b) Street furniture, lighting, signage, dustbins, benches, c) Conservation of facades d) Parking area, public toilets	INR 7 crores
3.	(i) Anasagar and Foyasagar upgradation	a) Desilting and dredging of lakes, sewage treatment b) Lakefront areas with seating, paving, dustbins, proper signage, lighting. c) Walking/jogging track along lakefront and parking space	INR 10 crores

	(ii) Culture Park Subhash Udyan	Haat, exhibition area, jogging track, children's area, amphitheatre, food areas	INR 13.5 crores
4.	Jaipur Road precinct upgradation:	<ul style="list-style-type: none"> a) Storm water drainage, Electrification of the road-underground wiring and cabling with pedestrian and mast lighting b) Street furniture & Streetscaping - Benches, bollards, dustbins, trees c) Resident and visitor parking d) NMT (non-motorised transit) / para-transit infrastructure e) Façade conservation and palette for heritage assets and toolkit for shop-fronts and signage 	INR 5 crores
5.	Pushkar Heritage Walk:	<ul style="list-style-type: none"> a) Underground wiring, road resurfacing b) Street furniture, lighting, signage, dustbins, benches, c) Conservation of facades d) Parking area, public toilets 	INR 7 crores

Projects under AMRUT

Budget allocation has been made for the following projects under AMRUT:

- INR 30 Cr to undertake uniform water supply system, OHSR related works , metres and pipelines
- INR 60 Cr to undertake projects for sewer line, property chamber and missing links, decentralized STP of 5 MLD and septage management
- INR 10 Cr for Remodelling of Anasagar Escape Channel from private bus stand to 9 no petrol pump
- INR 5 Cr for developing green parks in the city
- INR 15 Cr for urban transport (including Mobility Plan for the entire city of Ajmer)

Ajmer Station Redevelopment Plan (Western Railways)

The Ajmer Railway Station is a major railway hub and the main entry point for visitors to the city. At present the station visitor facilities are not adequate to deal with the current and expected future visitor numbers. The traffic around the station is poorly planned and requires urgent intervention so as to improve the visitor experience and improve vehicular traffic circulation.

After meeting with the Additional Divisional Railways Manager (DRM) – Ajmer Division, and Executive Engineer in the last visit (May 27th, 2016), it was understood that the railways has developed a concept note for the redevelopment of the Ajmer railway station. Currently, the station caters to 40,000 to 75,000 passengers per day. The station redevelopment plan includes: proposed escalators, FOB extensions, Air-rights development over the station for commercial development that could be leased out (this could be done on a PPP model), doubling of waiting area capacity, VIP lounge, etc. Although, the station redevelopment plan

concept plan focuses mainly on the station building, the officials recognized the importance of a concerted effort with different departments to look at integration of next level of connectivity with different modes of transportation, including buses, taxis, rickshaws, motorcycles, bicycles and other non-motorised transportation.

Public transport system

The citizen's poll cited public transportation as one of the top priorities for the transformation of the city of Ajmer. Currently public transport is limited to inter-city buses operated by the Rajasthan State Road Transport Corporation (RSRTC) and private mini-busses which operate along fixed routes. The busses are in poor condition and require an upgrade, furthermore the bus operation is not efficient and there are minimal facilities for commuters in the form of bus stops, bus tracking, time tables, etc.

In recent past, several Non Vehicular Zones have been declared during peak hours to improve the traffic, a new Parking facility has been developed at Railway station in FY15. AMC is also undertaking a project to increase coverage of NMT facilities from 5% to 20% in next 2 years under AMRUT which includes development of footpaths, FoBs, cycle tracks, parking spaces are proposed. AMC is also planning to offer cycle on rental at different locations through PPP.

4 High Level Analysis and Recommendations for Potential Smart City Projects

1. GIS based planning

Issue: Individual departments working on their base data and development of GIS based infrastructure.

Overview: GIS based planning is an integral part of smart city planning based on actual data and identification of missing links. It is extremely important that all the departments are working off a common GIS based data system to make informed planning decisions.

Recommendation: An inter-departmental task force should be set up between Ajmer Nagar Nigam, Ajmer Development Authority, PHED, AVVNL, RTO, Railways, RSCTC, Traffic Police, Police and other necessary departments to develop, operate and maintain a common GIS platform for planning, utilities, transportation and all census data to measure future growing needs of Ajmer city. Capacity building within departments should also be an integral part of this effort.

2. Dargah Area Rejuvenation Plan

Issue: Stress on the urban fabric, congestion in the narrow streets and overcrowding of pilgrims during festivals and events in the old Dargah area.

Overview: Old historic cities world-wide have gone through these issues, where narrow streets have given into congestion and traffic problems. In Ajmer's case, the streets leading to Dargah have a lot of retail and subsequent encroachments. In addition to this, a lot of

pilgrim footfall and mix of vehicles, further narrows down the right-of-way. However, this mixed-use character of the neighbourhood is a great advantage that needs to be tapped into for a well-organized vibrant urban form.

Recommendation: The Dargah and its immediate surrounding area requires a **master plan** that will allow for the rejuvenation of the area in a manner that maintains its unique character, while providing modern amenities to residents and visitors. As the area attracts a large number of visitors especially during festivals, an **Intelligent Crowd Management System** should be developed which will allow for the safe and efficient movement and dispersal of people. Instead of road widening and a total redevelopment approach, the master plan should sensitively look at strategy based solutions that allow for policy based removal of encroachments, strict enforcement, enhanced walkability and heritage value of the area by strategic improvements, surgical improvement of the urban fabric by identifying right urban infill projects. The overall circulation of the area should be studied as part of a separate mobility study for the entire city, which can give specific solutions for NMT, better access through public transit and vehicular movement and parking strategies.

3. Anasagar Lake Area Master Plan

Issue: Geographically, Anasagar Lake is at the heart of the entire Ajmer city and is a great untapped potential for the city of Ajmer.

Overview: The Anasagar Lake area is part of the Area based development of Smart Cities Challenge Proposal. In addition to the specific identified projects in the proposal, an inclusive development approach needs to be adopted for the area.

Recommendation: There is a great potential to develop the area around the Anasagar Lake as a tourist and leisure area which can serve the needs of locals and visitors alike. The focus should be on the overall enhancement of the Anasagar Lake area, including improvement of the water quality of the lake, proper disposal of the sewage and waste water, creating a robust solid waste management strategy and its efficient implementation, development of a great waterfront promenade and development of the area around it to attract tourism. The area abutting the Anasagar Lake Area should be considered for land monetisation. At present, there are several plots of land which are underutilized and vacant. By providing incentives through increased floor space index (FSI) and land use benefits for tourism related development, the city will be able to generate funds which can be used for infrastructure and other projects.

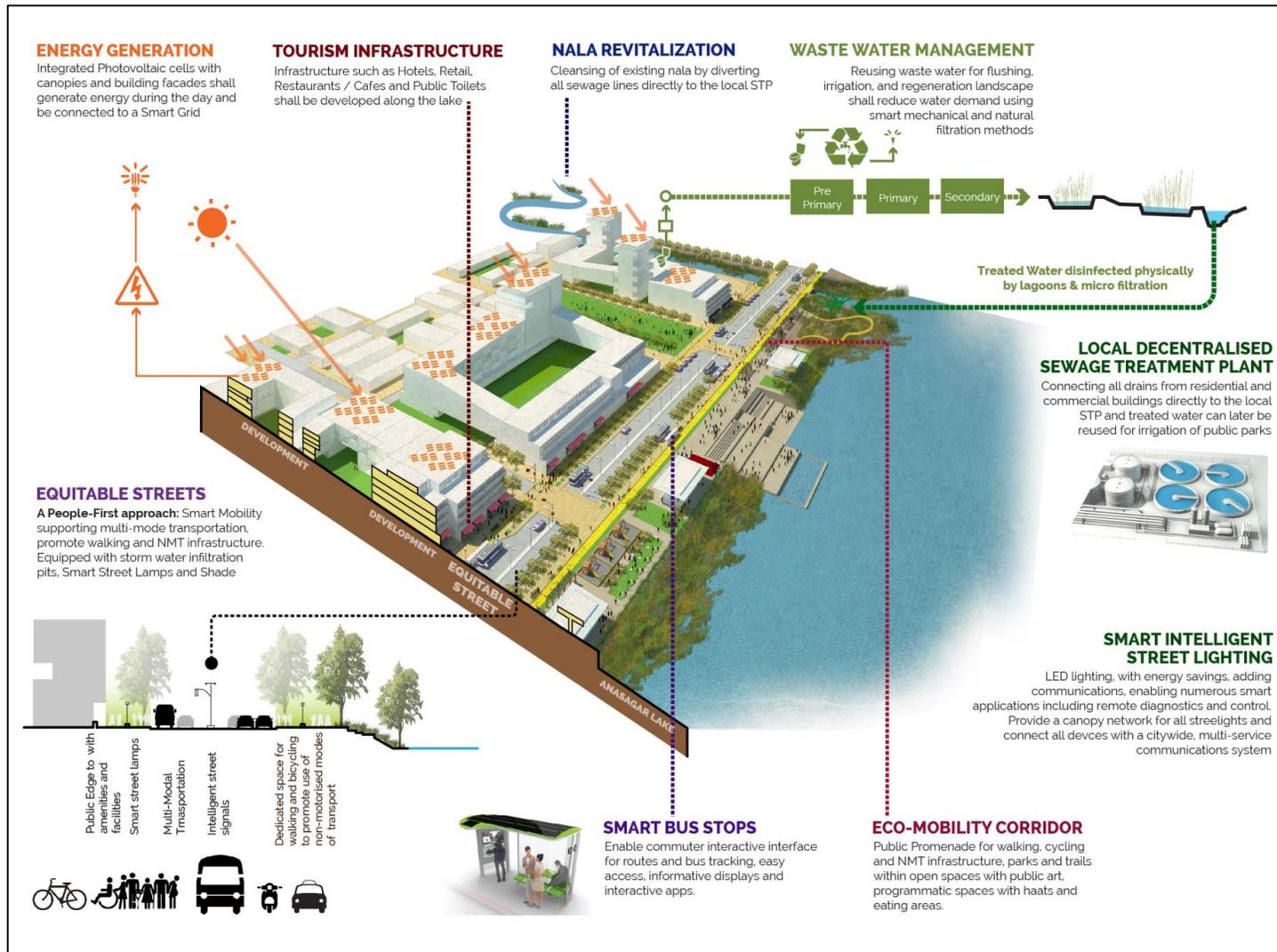


Figure 12: Integrated smart solutions and development along Anasagar Lake

4. Way-finding and Signage: Smart Digital Signs and Cards

Issue: Although Ajmer is a compact small-sized city, the sense of arrival and navigation in the city is challenging.

Overview: There is a lack of comprehensive signage systems within the city, right from the arrival point of the railway station / bus depot to any major attractions in the city. There is also a lack of easily available information at these major points of arrival into the city, about the connecting transportation, tourism related places in the city, and important city-related information.

Recommendation: A holistic **way-finding and signage strategy** needs to be developed for the city. **Digital signage and information kiosks** could be developed across the city that could provide tourism related information, maps, information to citizens. **Smart Cards:** A Single card interface could be developed for transportation within Ajmer-Pushkar area between various modes of transport. This card then can potentially be linked to other municipal facilities such as utility services (water/electricity/solid-waste/property taxes/parking, etc.), entertainment services and other financial transactions

5. Comprehensive Mobility Plan and Smart Transportation solutions

Issue: The existing public transportation network and infrastructure in Ajmer is inefficient.

Overview: The current bus network is operated by RSCTC as an inter-city bus, which is also used by the people of Ajmer for travel within the city. The mini-buses are privately operated on fixed routes, which are not effectively enforced.

Recommendation: The old city and the area around the Anasagar Lake are very compact and the urban and built form is well suited for walking and NMT use; furthermore the city also has a high walk and NMT mode share. The streets should be re-designed / re-planned to include footpaths, cycle tracks and safe crossings for pedestrians. In addition to procurement of new buses, plans need to be developed for routes and for commuter infrastructure. **GPS-enabled buses:** The existing mini-buses should be fitted with GPS which will assist with bus tracking and also provide live data to commuters. To identify the type of public transport mode, ideal routes and the phase wise transport improvements a **Comprehensive Mobility Plan** needs to be developed for the city. **Smart bus stops** could be installed that will enable commuter interactive interface for routes and bus tracking, easy access, informative displays and interactive apps.

Parking Strategy: Parking lots can be developed that can help reduce on-street parking demand and also serve as a revenue source for the local government. These parking lots need to be planned in coordination with the public transport network so that they can serve as intermodal interchange points where users can switch from public transport to private modes at one place. Once the overall strategy is in place, sensor-based Smart Parking solutions could also be implemented.

6. Station Accessibility Plan

Issue: The station area is the busiest in the city as all the traffic passes through it.

Overview: The main road along the station is chaotic with inefficient circulation system from the station and intermediate public transport vehicles like mini-buses, auto-rickshaws, and other private vehicles parked along the road edge. The Western Railways is planning a station redevelopment project, which needs to be studied along with accessibility to the station by all modes of vehicles, people and NMT infrastructure.

Recommendation: The Railway Station is the primary entry to the city and needs to be upgraded to meet the growing demand. **Station Accessibility Plan:** An integrated plan for the development of the station and its surrounding areas needs to be developed that not only accounts for the station expansion and amenities but also the passenger drop off / pick up and movement of vehicles in the vicinity of the station.

5 U.S. Companies and Technologies

Urban Design and Planning Firms

There are several US companies- who are working in the smart cities realm and have urban design and planning expertise like AECOM, CBT Architects (Boston), WRT (Philadelphia).

Smart Transportation

US companies like GE, Bechtel, IBM, CH2M, Intel can provide technologies for multimodal transportation systems with sensors and distributed communication technology, traffic monitoring, traffic light synchronization, incident response, payment cards and apps to navigate multimodal transportation systems.

Consulting firms like Transpo Group and IBI Group can provide ICT based services in transportation planning

UTC, KPMG and 3M have shown interest in Ajmer for Design-led Technology driven applications for smart parking, smart digital signs, smart traffic management, smart transport infrastructure, smart street lighting and more.

6 Appendices

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Glossary of Terms

<i>SCC</i>	<i>Smart Cities Challenge</i>
<i>AMRUT</i>	<i>Atal Mission for Rejuvenation and Urban</i>
<i>HRIDAY</i>	<i>Heritage City Development and Augmentation Yojana</i>
<i>PRASAD</i>	<i>Pilgrimage Rejuvenation and Spirituality Augmentation Drive</i>
<i>JNNURM</i>	<i>Jawaharlal Nehru National Urban Renewal Mission</i>
<i>SBM</i>	<i>Swachh Bharat Mission</i>
<i>MoUD</i>	<i>Ministry of Urban Development</i>
<i>GoI</i>	<i>Government of India</i>
<i>ADA</i>	<i>Ajmer Development Authority</i>
<i>NMT</i>	<i>Non-motorized Transport</i>
<i>TOD</i>	<i>Transit Oriented Development</i>

Report No 5: Energy – Renewable Energy, Smart Grid, and Utility Business Models

1 Executive Summary

The City of Ajmer has tremendous potential in the energy space. It already provides its many of its citizens with 24*7 electricity and is putting ambitious plans to make it more ubiquitous across the city. This, coupled with its plans to have a city-wide infrastructure for ICT, WiFi, and a more citizen-centric infrastructure, makes the need for energy even more important. This means that the city needs to spend more time to ensure that the present energy needs are met but also to ensure that growth is met through environmentally-friendly sources such as Solar PV and others.

The national Solar City scheme promotes a net zero energy approach to electric power supply – zero net increase in carbon emissions from additional energy demand in the city through energy efficiency and solar power supply. Solar requires land area and this could be met by installing first on the rooftops of municipal and public buildings (there is already PV installations on the Nagar Nigam building and ongoing installation at the Ajmer Development Authority) and the moving on to other corporate and residential buildings. Additionally, distributed energy resources using solar or other renewable energy sources or even storage could help institutional power users better manage their energy usage. Rajasthan is the leading state in India for solar PV generation and the Nagar Nigam has plans to develop a 120 acre, ~30MW solar PV project outside of the city to supply the city and potentially a green industrial park.

Ajmer should also focus on making the present grid smart by ensuring that the grid is both visible and controllable, thereby making its operations efficient and optimized. These actions and outcomes do not need smart meters in every house. We believe that the smartness comes first from the grid and can then move towards the residential locations. A smart grid provides for improved operations for everyone – and in addition to improved operations, allows for closer and more surgical operation of the grid, thereby reducing extent and duration of outages and also allows for more efficient integration of new and existing renewables into the grid.

Customer level smart meters can be added at a later stage when the costing model is more appropriate, although there is already a pilot project for customer level smart meters ongoing in Ajmer with USAID funding. Ajmer has already made tremendous strides along this route by implementing SCADA-based controls at all of its city substations and their remote control from the control center supported by near-future plans for enhancing them with a DMS.

We also believe that existing GIS mapping efforts in all services should be combined to create a single GIS map with all city-based services layered along common infrastructure along with houses, streets, streetlights, and other public infrastructure. These steps will automatically improve citizen services and bring about improvements that go across city-service silos that will require manual/process-based interventions which can be both time-consuming and expensive. With an underlying layer of GIS in place, the city can aim for broader ambitions associated with common service provision such as customer service and SCADA-based remote monitoring and control.

2 Sector and Technology Background

2.1 Global Experience

Globally, there are challenges being faced in the power industry owing to aging infrastructure, inefficient thermal generation, GHG emissions, retiring utility workforce, etc. The industry is moving towards a smarter grid that can incorporate technologies to make the electric grid more reliable and secure that can meet future demand growth, while intelligently responding to the behavior and actions of all the electric power users connected to it – delivering power in a reliable, efficient, economic, and sustainable manner.

2.1.1 Technology Trends

Grid Modernization Trends and Growth Areas

Grid Modernization & Optimization - Deployment of Digital substations, Distribution Automation equipment, and Asset Management technologies. Utilities are increasingly looking for mature technologies to modernize the grid and optimize their assets. Digital substations are being increasingly deployed to provide greater reliability, safety, and efficiency of operations. They reduce cost of ownership, and enhance situational awareness via integration with wide-area monitoring, protection, and control systems. Asset Management and Condition-Based Monitoring are being increasingly employed to optimize grid infrastructure and eliminate or defer capital costs. Distribution automation is projected to be one of the fastest growing markets world-wide and is seeing a surge in new and retrofit automation and power quality equipment. Advanced operational systems such as Wide-Area Monitoring System, Outage Management System, and Advanced Distribution Management System are being increasingly deployed by utilities for enhanced grid command and control.

Smart Grid Big Data and Analytics - Implications of Smart Grid big data and the need for data analytics. The wide-spread deployment of IEDs and PMUs on the grid has led to the creation of an increasing amount of data at increasing frequencies. This tsunami of Smart Grid big data which is of the order of petabytes or millions of GB has led to the need for data analytics. The data collected comprises of a variety of data such as asset data, smart meter data, and system operations data. All of this data needs to be cleansed, validated, estimated, and correlated using advanced mathematical techniques to actionable information that can then presented in a format that aids rapid decision-making. To manage Smart Grid big data, larger utilities are building data centers and deploying Meter Data Management and other analytics engines to extract actionable intelligence for operations, while smaller utilities are opting for managed services on the cloud.

Smart Grid Managed Services – There is a trend towards managed services. Smart Grid services are seeing a surge with smaller utilities, especially municipalities and cooperatives. They are increasingly subscribing to managed services rather than building expensive data warehouses. Meter Data Management, Demand Response and IT services are some of the areas showing promise.

Distributed Energy Resources - In addition, there is a new trend that is impacting this industry – the emergence of Distributed Energy Resources (DER). DERs encompass a broad set of technologies

that bring new sources and forms of supply into the grid. By their very definition, these are distributed in various parts of the grid, primarily at distribution level voltages. The New York Public Service commission's (PSC) REV (Reforming the Energy Vision), the state's recent initiative to reform its energy industry and regulatory practice, defines DERS the best and the list includes Solar (PV, CSP), fuel cell, wind, thermal, hydro, biogas, cogeneration, combustion generators. The PSC also include various forms of storage and demand response.

Maximizing Transfer Capability over Transmission Right-of-Way through the application of HVDC and Smart Power Electronics (FACTS). Developments in High Voltage DC technologies and advanced Power Electronics have dramatically improved the transfer capabilities of existing transmission lines. Large-scale HVDC build outs of 75 GW capacity are expected by 2020 in North America and 400 GW capacity world-wide. Smart Power Electronics called FACTS which stands for Flexible AC Transmission System, enhance controllability and increase power transfer capability, thus minimizing or eliminating the need for hard-to-obtain new rights-of-way for transmission siting. This improved transfer capability enables integration of large-scale renewables.

Renewable Energy Trends and Growth Areas

Worldwide, solar PV and CSP are among the fastest growing renewable electricity technologies—in 2014 alone, combined capacity increased by more than 28% globally. The solar industry set numerous records in 2015. Recent reports show Q1 2016, the U.S. solar market installed 1,665 megawatts direct current (MW_{dc}), up 24% over Q1 2015. This growth can be attributed to the cheaper cost of solar PV technology, newly available software monitoring tools, and increased access to third party financing. Tax incentives also drove growth in the US, in December of 2015 in the US Congress renewed an important tax credit for solar, extending it through 2019, which means the solar boom is likely to remain strong throughout 2016 and beyond. U.S. electricity capacities of biomass, geothermal, and hydropower have remained relatively stable from 2000 to 2014.

Energy Efficiency Trends and Growth Areas

There is an increasingly global need to implement energy efficiency projects on a widespread basis to reduce fossil fuel consumption, reduce greenhouse gas emissions, reduce the number of power plants being brought on line, to reduce transmission and distribution line capacity constraints, and to capture the amount of electricity lost and wasted as it travels the power lines. According to the buildings use about 40% of global energy, 25% of global water, 40% of global resources, and they emit approximately 1/3 of GHG emissions.¹ Fortunately buildings also offer greatest potential for achieving significant GHG emission reductions, at least cost, in developed and developing countries.

According to Energy Efficiency and Sustainability Consulting, the top trends in building energy efficiency are also those of operational efficiencies, meaning solutions that work together to change processes rather than changing a specific technology or behavior. While lighting retrofits are the most popular energy efficiency investment, more and more building owners are measuring and monitoring building performance and using the information to determine operational strategies and investments. Examples of this strategy would be what people refer to as “smart” or intelligent buildings where owners deploy energy management systems and sensors to capture data to monitor

¹ <http://www.unep.org/sbci/AboutSBCI/Background.asp>

consumption, building performance as well as other data to help them more efficiently monitor the building's energy consumption while maintaining the satisfaction of its occupants. Organizations often turn to ESCOs Energy Service Companies (ESCOs) when considering retrofit projects since ESCOs have extensive design and implementation experience in integrating multiple efficiency measures, mitigating technical and performance risks, and providing a financial guarantee to project lenders that the energy savings generated will cover the debt service. ESCOs integrate the project's design, financing, installation and operational elements. The main differentiator between ESCOs and other energy efficiency contractors is the guarantee of energy savings which is specified as part of the terms of an energy savings performance contract (ESPC). ESCOs have been implementing comprehensive energy efficiency retrofit projects over the last three decades and a recent Lawrence Berkeley National Laboratory report estimates that ESCO investment in energy efficiency undertakings currently runs about \$5 billion a year.²

Other key trends in building efficiency are growing demand for distributed energy resources which include on-site generation and storage systems, indicates that these solutions will play a much larger role in energy management. This is due in large part to falling prices of solar and increasing support from the utility companies. The falling cost of batteries means that business can truly go "off the grid" in 2016. When coupled with an on-site generation solution, the building can shift electricity usage off of the grid when rates are higher, and instead draw from reserve energy stored in an on-site battery or fuel cell.

From the utility's standpoint, energy efficiency can be viewed as a resource displacing electricity generation from coal, natural gas, nuclear power, wind power, and other supply-side resources. Investments in energy efficiency and the resulting resource benefits are factored directly into utility energy resource decision making about investing in new resources and operating existing systems.

2.1.2 Case Studies/Examples

Following are sample cases studies demonstrating how utilities around the world are using smart grid technology to improve operation efficiencies and integrate renewables.

U.S.: Tres Amigas Project

\$1.5 billion project. Superstation to connect America's three primary interconnections: Western, Eastern, and ERCOT. Provides access to high-capacity transmission networks for large-scale renewables. Creates market hub for renewable power.

U.S.: AEP Ohio grid SMART Project

\$150 million budget. 110,000 Smart Meters installed and operational, capable of interval data, remote connect/disconnect. Distribution Automation equipment installed on 80/90 feeders in project area, represents 89% of distribution system. IVVC being used to optimize control of voltage and VAR levels on feeders.

UK: Orkney Smart Grid

Orkney Islands smart grid has added >20MW capacity for renewable generation and saved £30 million using Active Network Management technology to relieve grid congestion by creating

² <http://www.naesco.org/what-is-an-esco>

additional capacity in existing electricity grid. Active Network Management monitors and controls grid so that power companies and utilities can use this reserve capacity for new connections. This approach can create up to two or three times more capacity to host new generation and demand.

China: State Grid Corporation Smart Grid

Roughly integrated 90 GW wind power and 8 GW solar power. Invested ~\$75.5 billion to extend UHV (1000 kV AC and 800 kV DC) grid to 40,000 km. Newly constructed 5000+ and refurbished 1000 smart substations. Implemented construction of distribution automation system in core areas of major cities 100% optical fiber for 110kV (and above).

2.1.3 Regulatory & Policy Issues

In the U.S., utilities are bound not just by state-level regulatory mandates such as Renewable Portfolio Standards and Energy Efficiency Standards, the but also by federal Environmental Protection Agency (EPA) regulation related to carbon emissions from fossil-fueled power plants.

Regulatory Mandates at the State-level include:

Reliability Metrics: Utilities must have accurate information about system performance to ensure that maintenance dollars are spent wisely and that customer expectations are met. To measure system performance, the electric utility industry has developed several measures of reliability. These include measures of outage duration, frequency of outages, system availability, and response performance. These reliability indices include measures of outage duration, frequency of outages, system availability, and response time

A Renewable Portfolio Standard (RPS): RPS is a regulation that requires the increased production of energy from renewable energy sources, such as wind, solar, biomass, and geothermal.

Energy Efficiency Resource Standards: Several states—and some countries—have passed legislation that requires utilities to reduce their expected energy load growth by improving the energy efficiency of their customers. For example, a utility with expected annual sales of five million MWh may be required to “generate” one percent of this demand by creating energy savings of 50,000 MWh.

Federal Environmental Regulations include:

The EPA’s 2015 Clean Power Plan: This plan is designed to reduce carbon pollution from power plants, the nation’s largest source, while maintaining energy reliability and affordability. EPA also issued final Carbon Pollution Standards for new, modified, and reconstructed power plants, and proposed a Federal Plan and model rule to assist states in implementing the Clean Power Plan.

Cross-State Air Pollution Rule: In 2011, the US Environmental Protection Agency (EPA) finalized a rule that protects the health of millions of Americans by helping states reduce air pollution and attain clean air standards. This rule, known as the Cross-State Air Pollution Rule (CSAPR), requires states to significantly improve air quality by reducing power plant emissions that contribute to ozone and/or fine particle pollution in other states.

Impact of Distributed Energy Resource (DER) technologies:

DER technologies are coming down in price and as a result, more of these technologies are being used in the distribution grid where historically the electric system has been planned only for one-way flow of electricity. The presence of these resources in the distribution system are changing the dynamics of the relationship between the utility and their customers requiring new regulatory and policy structures. Some examples include:

- **Individual customers:** Customers (both residential and commercial/industrial) can take advantage of these mandates/subsidies and deploy behind the meter on site.
- **Microgrids:** Taking advantage of DERs and the availability of new technologies to manage and control them is allowing university, industrial and commercial campuses to install local sources of generation and manage much of their own supply needs internally.
- **Aggregators:** Taking advantage of these technologies and control mechanisms, newer business models are coming up in which aggregators learning from the sharing economy successes of companies such as Uber and Airbnb are trying to bring those ideas into the electric grid.
- **Distribution Systems Platform Provider (DSP):** New York's Public Service Commission (PSC), as part of its "Reforming the Energy Vision" (REV) proceeding, has developed a framework to reform its energy industry and regulatory practices. PSC's order on the regulatory policy framework and implementation plan adopts a model in which utilities act as distributed system platforms (DSP) that, among other things, compensate distributed energy resource (DER) providers and their customers for the value they provide to the grid. New York's REV plan for a DSP is not new. Similar plans for a DSP have been floated around the world. The REV design calls for three main functions to be performed by the DSP (1) Grid Operations (2) Planning and (3) market operations. One of these functions is new and the other two are currently being performed by the incumbent utility. This new business unit means major changes for the utility business model all the way from rate-making to business operations to customer service and others. The business model issues associated with these major changes require the association of experts who have done these kinds of changes before – the last time it happened was when wholesale deregulation was implemented.

There are serious business model implications to these or any other options that are taken and a robust financial model needs to be created that looks at each of these options either separately or in conjunction with others under different operational scenarios so that the utilities as well as the DPS can be sure that the interests of both the utility and the customers are appropriately protected.

Tax Incentives

In the U.S. the Investment Tax Credit (ITC) has proven to be one of the most important federal policy mechanisms to incentivize the deployment of both rooftop and utility-scale solar energy in the United States. As a result of the multi-year extension of the credit enacted in late-2015, solar prices are expected to continue to fall while installation rates and technological efficiencies will continue to climb. The ITC demonstrates that that stable, long-term tax incentives can drive economic growth while reducing prices and creating jobs.

2.1.4 Cost Benefit

Power Sector

	20-Year Total (\$B)
Net Investment Required	338-476
Net Benefit	1294-2028
Benefit-to-Cost Ratio	2.8-6.0

EPRI analysis indicates that an investment of \$17 to 24 billion would be needed every year for the next 20 years to fully achieve the Smart Grid.

EPRI’s analysis also found that the benefits from this investment would far exceed the costs, by almost 6 times.

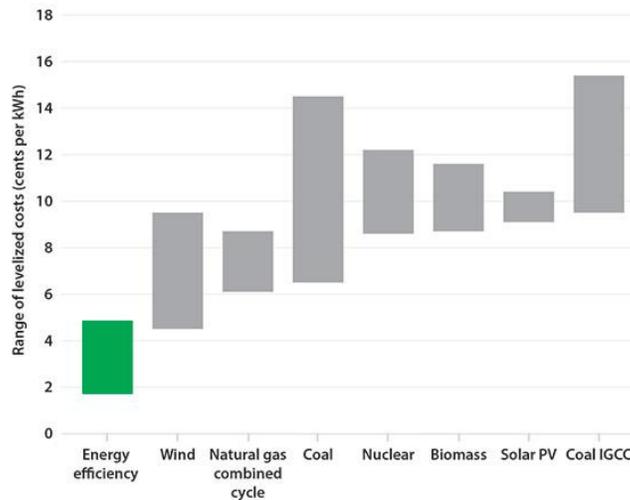
Summary of Estimated Costs & Benefits of the Smart Grid

The following is a real business case that was developed for the State of West Virginia. West Virginia monetized the costs and benefits of specific Smart Grid technologies such as Advanced Metering Infrastructure, Demand Response, Distribution Management System, Distributed Energy, over a 20-year period. The cumulative benefits were found to be almost 6 times the cost of investment, once again confirming that the Smart Grid can deliver some very significant benefits.

Example: State of West Virginia Smart Grid Business Case-PV 20-year Costs & Benefits (\$M)		
Smart Grid Technology	Costs	Benefits
AMI	\$399	\$1,649
IT	\$170	\$1,308
DR	\$22	\$1,091
DMS	\$454	\$3,288
DER	\$832	\$5,289
Total	\$1,878	\$12,625

Energy Efficiency

According to a new report released in 2014 by *American Council for an Energy-Efficient Economy* energy efficiency is the cheapest method of providing electricity. Energy efficiency programs aimed at reducing energy waste cost utilities only about three cents per kilowatt hour, while generating the same amount of electricity from sources such as fossil fuels can cost two to three times more. The report looks at the cost of running efficiency programs in 20 states from 2009 to 2012 and finds an average cost of 2.8 cents per kWh---about one-half to one-third the cost of alternative new electricity resource options, as illustrated by the following graph from the report:



Source: *The Best Value for America's Energy Dollar: A National Review of the Cost of Utility Energy Efficiency Programs*, 2014

Each dollar invested in electric energy efficiency measures yields \$1.24 to \$4.00 in total benefits for all customers, which include avoided energy and capacity costs, lower energy costs during peak demand periods like heat waves, avoided costs from building new power lines, and reduced pollution.³

Renewable Energy

The price of wind and solar power continues to go down. They are now the same or cheaper than grid electricity in many areas of the world. Solar, the newest major source of energy in the mix, makes up less than 1 percent of the electricity market today but could be the world's biggest single source by 2050, according to the International Energy Agency.⁴ And according to new analysis from research firm Bloomberg New Energy Finance (BNEF), unsubsidized renewable energy is now cheaper than electricity from new-build coal- and gas-fired power stations in Australia. The study shows that electricity in Australia can be supplied from a new wind farm at a cost of (US\$ 83), compared to 143 AU\$/MWh from a new coal plant or 116 AU\$/MWh from a new baseload gas plant, including the cost of emissions under t's carbon pricing scheme. However, even without a carbon price (the most efficient way to reduce economy-wide emissions) wind energy is 14 % cheaper than new coal and 18 % cheaper than new gas.

"The perception that fossil fuels are cheap and renewables are expensive is now out of date", says Michael Liebreich, Chief Executive of BNEF. "The fact that wind power is now cheaper than coal and gas in a country with some of the world's best fossil fuel resources shows that clean energy is a game changer which promises to turn the economics of power systems on its head," he adds.

This is consistent with applications in the U.S. such as when utility Xcel Energy proposed adding 550 megawatts of wind capacity to its system last year -- not due to environmental motivations or state

³ <http://aceee.org/press/2014/03/new-report-finds-energy-efficiency-a>

⁴ <http://www.bloomberg.com/news/articles/2015-04-14/fossil-fuels-just-lost-the-race-against-renewables>

renewable-energy mandates, but because new wind power was the cheapest supply option from a list that included gas combined-cycle. Solar and wind similarly beat new gas plants in California electricity auctions. Further confirming this, the near-future forecasts of the most respected industry analysts, including Bloomberg New Energy Finance, predict that unsubsidized solar power will beat retail prices more or less globally by 2025 (as they already do in favorable places, even though renewables receive smaller, temporary subsidies while fossil fuels enjoy well-documented larger, permanent ones).

Additionally, DER's value is positive when the energy generated displaces the need to produce energy from another resource at a net savings. There are two primary reasons. The cost and amount of energy that would have otherwise been generated to meet customer needs, largely driven by the variable costs of the marginal resource that is displaced. The compounded value of the additional energy generated by central plants that would otherwise be lost due to inherent inefficiencies (electrical resistance) in delivering energy to the customer via the transmission and distribution system.

2.2 India Experience

India's Smart Grid Sector

India is at the threshold of dynamic growth in the deployment of smart grid and integration of renewable energy projects. Utilities are looking for solutions to provide secure electricity supply in the face of a significant power generation gap, reduce transmission and distribution losses, reduce negative impact of fossil power generation, and accommodate a growing middle class with an appetite for a reliable power supply to run their modern conveniences. The country has addressed some of the major barriers to modernization of the sector, including laws that address electricity theft and the unbundling and privatization of many of the utilities. These utilities now strive to implement smart grid technologies, develop renewable energy projects, integrate renewable energy projects within their systems to increase stability and reliability of their grids, decrease non-technical losses, grow generation capacity without having negative impact on the environment, and increase revenue. Energy efficiency is an important component of a functioning smart grid, especially as buildings and businesses are able to respond to price and other signals as part of a utility's demand-side management strategy.

The electricity grid systems in India are antiquated, inefficient, unreliable, incompatible with intermittent renewable energy sources, and vulnerable to cyber-attacks. According to Indian government, the country's transmission and distribution losses average about 26 percent (among the highest in the world); losses in some states are as high as 62 percent. Modernizing the grid can reduce power outages by anticipating equipment failures. It can also help improve the entire system (generation, transmission, distribution) in terms of reliability, security, efficiency and integration of renewables. As of now, Indian utilities in many cases lack the basic hardware or software that would be required to deploy a smart grid. With a few exceptions, most utilities have yet to adopt on a large scale what are considered basic enterprise IT systems, such as geographic information systems (GIS), Outage Management System (OMS), supervisory control and data acquisition (SCADA), Distribution Automation, or Management Information System (MIS).

The Government of India has introduced and continues to introduce sector reforms to encourage foreign investments to improve the conditions of the grid. Despite these attempts, few smart grid

projects have actually been implemented. Tata Power Delhi Distribution Limited (Tatapower DDL), formerly North Delhi Power Limited (NDPL), has been at the forefront of implementing smart distribution system solutions in the capital city. Since privatization of the utility, aggregate technical and commercial losses in the Tatapower service area have declined from 53 percent to less than 14 percent. Reliance Infrastructure – Mumbai Distribution is also implementing a grid modernization program that includes smart grid components such as a state of the art SCADA system, a distribution automation system and a fully integrated GIS/OMS (outage management system). They have brought total losses down to an impressive 9%, among of the lowest in India. Other utilities such as BSES (Delhi), CESC (Kolkata) and BESCO (Bangalore) have been actively working to develop their own smart grid systems.

Recognizing the significant gains to be captured in this area, India's Ministry of Power initiated the Restructured Accelerated Power Development and Reforms Program (R-APDRP) in 2008, a successor to the APDRP, which began in 2003. The government's efforts have resulted in creation of independent evaluating agencies in all states to verify the initial baseline transmission and distribution losses. The government expects that on successful completion of the program, transmission and distribution losses will be reduced by at least 30 percent. Under this program, government has also earmarked more than \$2.7 billion for implementation of information and operational technologies, including SCADA and smart grid in 775 of the 1,100 eligible towns in the country. By early 2011, the government had disbursed about \$1.3 billion to eligible projects in the form of loans and grants, leaving about \$1.4 billion for future projects.

The challenges faced in India to implement smart grid solutions include:

- Integration of existing control and data systems along with new applications in a common, cyber secure interoperable control platform.
- Demonstration of seamless integration of renewable energy resources and smart grid technologies, such as electric car charging stations, distributed generation, building management systems, and home area networks into utilities' distribution control center systems.
- Demonstration of the potential to improve the reliability of the electric system as well as the participation of various sources of distributed generation.

The key drivers for smart grid solutions in India are to:

- Reduce utility operating costs
- Improve grid reliability
- Increase energy efficiency
 - Overall demand reduction
 - Reduce end-to-end system losses
 - Peak-demand shifting
- Integrate renewable generation
 - Intermittent, bulk generation
 - Distributed renewable generation
- Support electric transportation transition
 - Commercial and personal vehicles

India Solar PV Market

India is all set to become the fourth largest solar market globally in 2016 behind only China, US and Japan with 5.4 GW of expected capacity addition in the year. Growth of 140% is expected in India's utility-scale solar PV segment, with 4.8 GW set to be commissioned in the calendar year 2016, 80% of which will be seen in the states of Tamil Nadu, Andhra Pradesh, Telangana and Karnataka.⁵ The Indian government aims to install 4.8 GW of rooftop solar in 2016-17 and has increased its budget for rooftop solar PV deployment, from INR 6 billion (around \$90.2 million) to INR 50 billion (around \$751.8 million) up until 2019-20, aiming to install 4.2 GW.⁶

Currently, there are 25 GW of projects under different stages of development, 35 new tenders with a cumulative capacity of 15.5 GW have been announced in the last year, and an additional 5 GW of new tenders are awaiting release in the coming months, according to Bridge to India, a Delhi based consultancy firm.⁷ State-wide details of total current commissioned capacity of solar energy in the country is given below⁸:

Sr. No.	State/UT	Total Commissioned Capacity (MW) as on 07/03/2016
1.	Andhra Pradesh	475.74
2.	Arunachal Pradesh	0.265
3.	Bihar	5
4.	Chhattisgarh	73.18
5.	Gujarat	1024.15
6.	Haryana	12.8
7.	Jharkhand	16
8.	Karnataka	104.22
9.	Kerala	12.025
10.	Madhya Pradesh	678.58
11.	Maharashtra	378.7
12.	Odisha	66.92
13.	Punjab	342.32
14.	Rajasthan	1264.35
15.	Tamil Nadu	635.87
16.	Telangana	392.39
17.	Tripura	5
18.	Uttar Pradesh	140
19.	Uttarakhand	5
20.	West Bengal	7.21
21.	Andaman & Nicobar Islands	5.1
22.	Delhi	6.712

⁵ PV Magazine Online, India: 7.2 GW of utility-scale solar 'plausible' in FY 2016-17 www.pv-magazine.com/news/details/beitrag/india--72-gw-of-utility-scale-solar-plausible-in-fy-2016-17_100022729/#ixzz472jUX0bi

⁶ Ibid.

⁷ Ibid.

⁸ Ministry of New and Renewable Energy Website, Pres Release on Capacity of Solar Energy: <http://pib.nic.in/newsite/pmreleases.aspx?mincode=28>

23.	Lakshadweep	0.75
24.	Puducherry	0.025
25.	Chandigarh	5.041
26.	Daman & Diu	4
27.	Others/Rooftop	114.223
TOTAL		5775.571

India has installed 740 MW of rooftop solar capacity as of March 31, 2016.

The Asian Development Bank (ADB) has signed a memorandum of understanding (MoU) with the U.S. Agency for International Development (USAID) to help fund India's growing solar PV market. The MoU sets out the terms of an \$848 million investment between the two, with ADB putting forward \$500 million and USAID stumping up \$348 million.⁹

2.2.1 Technology Trends

Power

Modernization of distribution sub-stations and conversion of sub-stations in all urban areas (starting with metro cities) to Gas Insulated Substations.

Integration of renewables, storage options, virtual power plants (VPP), solar photovoltaic to grid (PV2G), and building to grid (B2G) technologies in order to manage peak demand, optimally use installed capacity and eliminate load shedding and black-outs.

Development of microgrids in villages/industrial parks/commercial hubs, which can island from the main grid during peak hours or grid disturbances.

Mandatory Demand Response programs for select categories of consumers.

Energy Efficiency Programs for lighting and HVAC in Metros and state capitals; initiation of Dynamic (smart) Energy Efficiency Programs.

EV and Storage: Development of EV and EV charging stations in urban areas and along select highways and introduction of Battery Parks and other Energy Storage Systems on trial basis.

2.2.2 Case Studies/Examples

Following are a few case studies and examples demonstrating India's activities in promoting a smarter grid that will accommodate renewable energy and energy efficiency mechanisms.

Government of India: MNRE Solar Cities Program

⁹ PV Magazine Online, USAID and ADB sign \$848m MOU for Indian solar PV development, March 3016, www.pv-magazine.com/news/details/beitrag/usaaid-and-adb-sign-848m-mou-for-indian-solar-pv-development_100023936/#ixzz472daExtZ

Solar Cities is a program initiated by Govt. of India under the Ministry of New and Renewable Energy (MNRE) to meet urban energy needs. Solar City aims at minimum 10% reduction in projected demand of conventional energy at the end of five years, through a combination of enhancing supply from renewable energy sources in the city and energy efficiency measures. A total of 60 cities/towns are proposed to be supported for development as Solar Cities. At least one city in each State to a maximum of five cities in a State may be supported by the Ministry.

Tata Power Delhi - Accelerates Smart Grid Deployment in India

Tata Power Delhi Distribution formed a joint venture with IBM to better manage energy output and further reduce outages in the northern and north-western part of Delhi.

IBM helped Tata Power Delhi to conceptualize, design and deliver an Advanced Smart Grid solution that collects and analyses real-time information from smart meters and data from the management infrastructure.

The project helps to add a layer of digital intelligence to the grid and ensure reliability when the demand rises exponentially and the supply falls due to heavy consumption, managing demand and boosting operational efficiency.

Vizag: Energy Initiatives

Push for solar power-Vizag port first in the country to run operations on solar energy. Vizag Port Trust (VPT), recently commissioned 2MW solar power plants with investment of ₹60 crore; will be adding another 8 MW capacity. Proposed Vizag Solar Tree at Kailasagiri to have live labs to monitor air quality in the city and conduct research on renewable energy. Converted all street lights to energy efficient LEDs with significant savings in energy and costs-to serve as model for 100 cities in India.

Nagpur: Energy management practices to reduce energy consumption

A 2005 water audit by the Nagpur Municipal Corporation recorded water losses at 62%. Energy costs in 2004-05 were 21.1 crore rupees, accounting for nearly 50% of the city's water operation and maintenance. The city had to improve its energy management, both to save resources and to help prolong the life of the city's water supply equipment.

After the audit, the Nagpur Municipal Corporation's initiated a study of its water situation that found that pumping system efficiency was low and there was significant potential to both increase energy efficiency and decrease operational costs. The audit recommended setting up an automated water management system. Based on the recommendation, the Nagpur Municipal Corporation rationalized water distribution and pumping systems to reduce static and friction. It replaced old, inefficient pumps with energy efficient pumps; improved pump machinery; and installed remote monitoring systems to operate the pumps at prescribed efficiency levels.

The city's strategy led to a 106.96 Kwh/MLD reduction in energy consumption. It also helped the city to recover 7 MLD of backwash water and save more than 10 crore rupees in operation and management costs. Pumping efficiency rose from 40% to 75%. The Nagpur Municipal Corporation's experience shows that a structured approach, specific investment funding, and timely implementation can help to achieve tangible savings.

Jaipur: Smart City

Jaipur smart city focuses on smart governance, energy, environment, mobility, and water. In terms of energy, its focus is on clean and green power, reliable and 24/7 power supply, smart grids and meters, use of renewable energy, efficient grievance redressal mechanisms. Its goals are assured electricity supply with 10% of the areas' energy requirement coming from solar. Smart street lighting and monuments lighting using energy efficient sensors. Underground cabling of overhead cables.

Mumbai: Metropolitan Region to develop 5 Smart Cities

The MMRDA is considering developing five growth centers — Vasai-Virar, Bhiwandi, Greater Kalyan, Greater Panvel and Pen-Alibaug – in the Mumbai Metropolitan Region along the proposed 126-km Virar-Alibaug Multi Modal Corridor. It is also planning to transform Wadala and Oshiwara as business hubs. In smart cities, data collected through sensors enable real time monitoring by authorities and is used to enhance efficiency in utilities and citizens' services such as electricity, water, drainage, gas, traffic, parking etc.

Under the plan, MMRDA will first cover 175-hectare area with a public Wi-Fi network having a high internet speed of 5 Mbps. Ninety surveillance cameras will be set up in some areas with direct co-ordination between security agencies. A smart parking facility will be introduced for vehicles to know the nearest available parking slots. Citizen-centric mobile applications will be launched for emergency services and to provide details of nearest restaurants.

2.2.3 Regulatory & Policy Issues

On the regulatory side, India has been very active. Here are a subset of the initiatives on the regulatory and policy front in the energy sector:

- Development of **state/utility specific strategic roadmap(s)** for implementation of smart grid technologies across the state/utility. Required business process reengineering, change management and capacity building programs to be initiated.
- Development of **frameworks for cyber security** assessment, audit and certification of power utilities.
- **Policies for grid-interconnection** of captive/consumer generation facilities (including renewables) where ever technically feasible; policies for roof-top solar, net-metering/feed-in tariff; and policies for peaking power stations.
- **Policies supporting improved tariffs** such as dynamic tariffs, variable tariffs, etc., including mandatory demand response (DR) programs, starting with bulk consumers, and extending to all 3-phase (or otherwise defined consumers) by 2017.
- **Policies for energy efficiency** in public infrastructure including EV charging facilities and for demand response ready appliances.
- **Development of Skill Development Centers** for smart grid development in line with the National Skill Development Policy 2009 for Power Sector. This also includes the boot-camps that are being conducted by ISGF which have been very popular.
- **National Solar Mission** is the Indian government's key policy changes to support the solar sector. In March 2016, the Government of India revised the target of Grid Connected Solar Power projects from 20,000 MW by 2022 to 1,00,000 MW by 2022. A total investment of around Rs. 6,00,000 crore has been estimated to achieve the target

of 100 GW. Banks and financial institutions have given green commitments to finance up to 78,850 MW.¹⁰

- **Rooftop Solar Incentives** are being offered by the Indian Government to support the rooftop solar market, through: capital subsidy: 30% subsidy for residential and institutional consumers (M50 billion); Accelerated depreciation: 80% depreciation; a tax holiday: 10 year tax holiday (MAT payable); and, low cost funding: \$1.5 billion funding from World Bank, ADB and KFW.

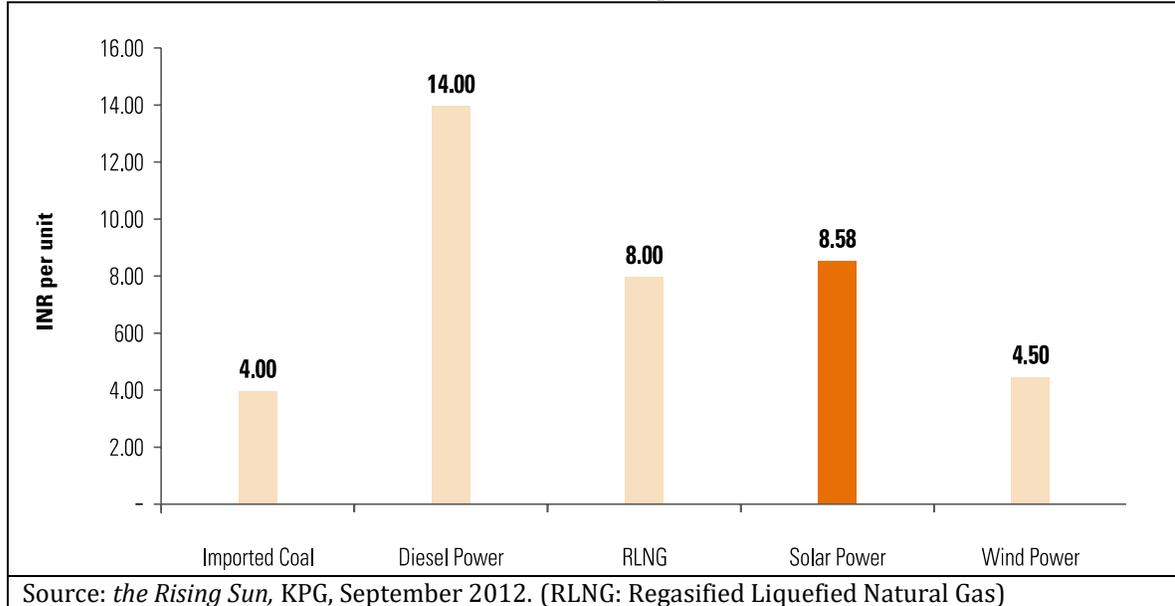
2.2.4 Cost Benefit

In 2010, the Government of India formed the India Smart Grid Task Force (ISGTF) as an inter-ministerial group to serve as the government's focal point. It is a body composed of officials from different government departments and is primarily meant for understanding and advocating policies in smart grid technologies. The Government of India also formulated the India Smart Grid Forum (ISGF) in 2010 as a non-profit, voluntary consortium of public and private stakeholders with the prime objective of accelerating development of smart grid technologies in the Indian power sector. The ISGF has roles and responsibilities complementary to the ISGTF.

The goal of the Forum is to help the Indian power sector to deploy Smart Grid technologies in an efficient, cost-effective, innovative and scalable manner by bringing together all the key stakeholders and enabling technologies. ISGF is in the process of performing a cost-benefit analysis of smart grid projects with inputs from the pilots and assessment of direct/indirect impacts on all societal stakeholders. ISGTF has shortlisted 14 Smart Grid pilot projects for Power Distribution segment and the number of projects have been increased to expand the scope of these pilots to reflect diversity in project profiles. The projects will receive funding under the R-APDRP and a matching financial support from the states. Actual funding information was not available.

The driving force for implementing solar projects in India has been the cost parity with grid power and/or diesel gensets, especially in the commercial and industrial sectors. Grid power and diesel prices continue to rise as demand for power increases and the power supply deficit widens. The cost of solar power has also fallen by more than 50% over the past few years. The residential market is more driven by the need for power and a desire to have energy independence than it is by the cost or commercial benefits of solar energy. The cost driver for solar PV may have shifted with the falling price of diesel over the past year but there is still a strong case for solar PV.

¹⁰ Ministry of New and Renewable Energy Website, Pres Release on Capacity of Solar Energy: <http://pib.nic.in/newsite/pmreleases.aspx?mincode=28>

Solar Power Is Economical as Compared With Diesel Power

3 City/State Situational Analysis

3.1 City/State Situational Analysis

Ajmer Vidyut Vitran Nigam Ltd, (AVVNL or Ajmer Discom) is the electricity distribution company serving Ajmer. According to its website, it has been established under the Companies Act, 1956 by the Government of Rajasthan to supply electricity in 11 districts of Rajasthan, namely Ajmer, Bhilwara, Nagaur, Sikar, Jhunjhunu, Udaipur, Banswara, Chittorgarh, Rajsamand, Doongarpur and Pratapgarh. The area of operation of Ajmer Discom is 87256 sq. km. The power supply in the Ajmer Discom is managed by 12 distribution circles i.e. Ajmer City, Ajmer District, Bhilwara, Nagaur, Sikar, Jhunjhunu, Udaipur, Banswara, Chittorgarh, Rajsamand, Doongarpur and Pratapgarh.

The USTDA Smart Cities Technical Advisory Team during the team's trip to Ajmer in May 2106 had two three meetings with the Ajmer Discom and other city officials. This situational analysis was developed based on research and these meetings.

Key Facts:

- Ajmer Discom serves approximately 220,000 customers. 160,000 of the customers are in the city and of those only 128,000 are active. Most of its customers are residential.
- The area has 105 MW peak load and 200 MW installed capacity. 200+ MVA = for the entire district

- Estimated aggregate technical and commercial (AT&C) losses are estimated at 13% with 7 to 8% technical and 6% commercial although estimates from the franchisee¹¹ tender (Dec. 2015) show losses of about 17% for 2014-15. This is a reduction from 30% based on different sources. These reductions were realized through meter upgrades and quality improvements to minimize tampering as well as the threat of punishment for theft.
- Electricity is available 24/7 for residential users, however, only 10-12 hours per day for agricultural customers.

Key Activities under Progress:

Outages

- Outages are identified as follows: All substations are manned 24 hours.
- Process - Individual phones the utility – call the substation –where either the SDO or JE picks up the phone and takes the trouble-call information. All tracking is paper and manual. No Outage Management System (OMS) implemented. The analysis for overhead faults is visual and for underground a machine is used to track the location of the fault.
- 11 kV transformer – automatic information – manned 24 hrs. Under IPDS – some may still be manned. No fault indicator (FLISR) implemented. Was in IPDS but taken out of scope.

Metering and billing

Ajmer Discom has rolled out 100% meters in its service area. Secure meters, an Indian meter vendor, is the supplier which has delivered 50% analog and 50% digital meters. Ajmer Discom has tried manual remote reading, but the company that offered the service could not integrate into the back-end system. The Discom is using HCL for its meter data management software (MDMS) – all modules are prepared, but not yet integrated. So far net metering has been found to be too expensive but the discom is willing to try in a small area to see value.

Ajmer is also perceiving a need for smart meter solution as a service (SaaS). The tender for this is being prepared. Ajmer Discom is willing to pay for meter reading. Includes pre-paid, post-paid. Customers may pay their bills online, in the office, via PayTM and/or via direct bank payment.

Aggregate and Technical and Commercial Losses

The Discom informed the team that aggregate technical and commercial losses were minimized from 30% to 13% over a 5-year period.¹² These improvements were achieved by:

- Replacing old meters with new, higher quality meters.
- Creating tamper proof digital meters with CT (Current Transformers) in all wires.
- Threat of penalty and criminal charges for tampering.
- Moved from 7 to 21 distribution substations with more of the stations closer to the load centers. Currently 12 more substations are sanctioned and under construction financed under Power Finance Corporation with different schemes. This reduces technical losses.
- Prepaid meters are available for government buildings and currently approximately 200 of 540 government building meters are in place now.

¹¹ <http://energy.rajasthan.gov.in/content/dam/raj/energy/avvnl/pdf/Tender/Project/TN-01/Final%20RFP%20Ajmer%20TN-01%20dt-01-12-2015.pdf>

¹² The franchisee documentation shows losses have not been reduced in 5 years but the accounting is not clear as collections of past due accounts may be attributed to losses, e.g. 105% collection means 5% less AT&C losses.

USAID Smart Meter Pilot

- USAID is funding a smart meter pilot in Ajmer. The implementation is being performed by the U.S. consulting firm Nexant. The pilot is being deployed on one feeder with about 500 customers (Satguru feeder). The meter has just passed inspection testing in the lab.

Renewable Energy

All present efforts are focused on implementing the solar policy 2013 Government of India Ministry of New and Renewable sources. However, Ajmer has taken several steps to demonstrate its ability and intent to be in the forefront of the solar PV effort.

This is being done by:

- Installing solar PV rooftop (30 kW) on the rooftop of one of the Nagar Nigam buildings.
- Installing solar PV (80 kW) on top of the ADA (Ajmer Development Authority) building. This installation is still in progress.



Ajmer Nagar Nigam Solar 30 kW PV Project

Ajmer is also offering a bold plan of making it the first city to be fully powered by renewable sources. The district collector has offered to set aside enough land to meet all the present electricity needs of Ajmer. While the location of this land is slightly outside the city due to the large amount of land needed to deliver the amount of power needed through solar PV – it is expected to feed the solar output into the distribution grid and make up for the capacity requirements of the electric grid of Ajmer city.

Back-office Systems Implementation

Under the aegis of the Restructured Accelerated Power Development and Reforms Program (R-APDRP) scheme, Ajmer Discom (along with Jaipur and Jodhpur Discoms) have purchased an IT CIS system from HCL with a total of 17 modules. They are:

- Metering, billing and collections - functional
- CIS – is functional
- Billing is functional
- WSS – Online portal is functional
- New connections – partly functional
- Disconnects – partly functional
- Rest of the modules such as Asset Management and others are not functional

SCADA and Automation

Ajmer Discom along with Jaipur and Jodhpur have taken the lead in increasing the levels of automation in their distribution systems. Dong Feng, a Chinese company, is implementing the SCADA system. As a part of this effort the following activities have been implemented or are in progress:



Ajmer Discom SCADA

- There is SCADA in every substation.
- 21 substations in the city are SCADA-enabled which means that data acquisition is happening.
- In 13 other substations, hardware is in place and currently undergoing testing.
- The SCADA automated substations are still manned mainly because specific equipment such as motorized GO (Gang-Operated) switches were not ordered thereby still requiring manual intervention at the substation to perform specific activities.
- By 2017, it is expected that the following will be completed:
 - DMS Distribution management system,
 - GIS - GIS – 33KV substations are in the GIS. 132 KV and up are also in GIS,
 - Feeder work
 - Underground cabling
 - FRTU – Field RTU
 - RMU – Remote Monitoring Units.

Franchising Model

Ajmer Discom has extended tenders for franchising more than six times and has received no offers.. Much of this is attributed to low AT&C losses which leaves very little opportunity for a franchisee to make money.

Biggest Challenges for the Utility

1. The present Discom model: Discom model is inefficient with too much centralized bureaucracy. Decisions are made at too high of level and it is difficult for the local bodies to provide input and value.
2. Locations where it is difficult to read the meters: There are locations where meter readers are afraid to go, mainly by the Dargah area. To solve this, AMI/Smart meters with full automation all the way to the home with some specific features should be installed. These meters would be tamper proof with automation all the way to the home so the consumption can be read remotely.

Potential Areas of Transformation

1. Put all solutions in one single area

Identify one specific area within the retrofit area (Area Development Plan) and bring all aspects of this grid to international standards – outages, load-generation balance and so on. The focus in this area would be on:

- Fault locators and a focus on reduction of number of outages and extent of outages (number of customers affected and time of outages).
- Installation of distribution automation supported by circuit breakers and re-closers to provide for greater flexibility in feeder reconfigurations.
- Implementation of SCADA and the ability to perform remote control operations thereby improving efficiency of operations.

2. Operational excellence –coordinating all city-based services

- Combine city-based services to provide better service to citizens.
- Start with a common Customer Service Center – provide for a single location of all customer interactions to provide services such as – outages, complaints, single source of customer information, crew management and dispatching and others. Lessons can be learned from the effort implemented in Rio de Janeiro across all services.
- Migrate to a common GIS – that models all city-based utilities and other services (such as land records). This directly leads to improved coordination between different entities that routinely perform work that impacts each other.
- Migrate to a common SCADA – allowing for the use of a common set of operational tools to operate all the services from a common location.

3. Modifying the business model of the utilities at the city-level

Investigating the option of converting all the utility-based services (water, wastewater, electricity, and solid waste disposal) at the city-level into a single multi-services utility somewhat akin to either the municipality or co-op model prevalent in the United States and several other countries in the world. This could be done by first performing the steps identified above and then moving to bring them all under a single company under the overall control of the city government and its citizens – take advantage of the synergies among the services being provided.

4 High Level Analysis and Recommendations for Potential Smart City Projects

- **Reliability and Quality of Electric Supply:** Invest in distribution system technologies such as fault location and identification, feeder load balancing, conservation voltage reduction, which lead to greater system reliability and improved quality of power. The focus in this area would be on:
 - Fault locators and a focus on reduction of number of outages and extent of outages (number of customers affected and time of outages).
 - Installation of distribution automation supported by circuit breakers and reclosers to provide for greater flexibility in feeder reconfigurations.

Implementation of full remote-controlled based SCADA and the ability to perform remote control operations thereby improving efficiency of operations.

Put all solutions in one single area: Take one specific area within the retrofit area and bring all aspects of this grid to international standards – outages, load-gen balance and so on.

- **Renewable Energy Integration:** Ajmer has a tremendous potential for solar and potentially wind. These renewable energy resources can be part of a net zero carbon emissions strategy whereby future energy demand growth is absorbed through energy efficiency and renewable energy deployment. It should begin using these resources by:
 - Start with a focus on rooftop solar. Municipal, public and also private sector buildings have a lot of space to drive solar PV installations which can take advantage of the long uninterrupted sunny days that tend to deliver good and high quality electricity over extended periods of time. These buildings are already (for the most part) equipped with net metering to allow them to use much of their energy within the building but also send some back to the grid when internal consumption is less.
 - Rajasthan has over 3000 MW of wind power generation currently. Perform a study of the potential for wind energy installations which could be viable given the mountainous terrain which could provide good opportunities for wind-based electricity generation.
 - Extend solar PV to other public areas such as water treatment plants or sewerage treatment plants where there tends to be open areas suitable to installation of solar PV.
 - Take advantage of other open areas outside the city where a solar PV farm can be installed and the output connected to the grid or tied into a green industrial park.
- **Maximize synergies and minimize costs:** Decisions related to energy can have an impact on other aspects of smart grid such as water and waste water management, transportation, communications, etc. Use of distributed generation technologies such as rooftop PV, and small wind turbines can defer or eliminate the need for large centralized fossil-fuel based power plants, and transmission lines.
- **Operational Excellence – Coordinating All City-Based Services:** Combine city-based services to provide better service to citizens.
 - Start with a common Customer Service Center which provides a single location for all customer interactions to handle outages, complaints, single source of customer information, crew management and dispatching and others. Lessons can be learned from the effort implemented in Rio de Janeiro across all services.
 - Migrate to a common GIS that models all city-based utilities and other services (such as land records). This directly leads to improved coordination between different entities that routinely perform work that impacts each other.
 - Migrate to a common SCADA that allows for the use of a common set of operational tools to operate all the services from a common location.
- **Demand Response and Energy Efficiency:** Demand response and energy efficiency are both considered low hanging fruit for smart grid efforts and deliver immediate value. This can be done in the following ways:
 - Time of Delivery/Use rates for all commercial and industrial customers. One can also include specific remote controls for air-conditioners so that during periods of peak power or critical peak power consumption, specific actions can be taken to ensure reduction in power consumption.

- Retrofit all municipal and commercial buildings to make them more energy efficient with changes such as energy efficient doors and windows, lighting, and sealing up the buildings better to reduce leakage from air-conditioning.
- **Microgrid Deployment:** Leapfrog developed nations by deploying microgrids where usage is self-contained such as industrial parks, college campuses and other commercial parks. Invest in backup power: Continuous supply of power is critical to thriving IT communities. Development of microgrids on university campuses, industrial parks, commercial buildings, etc. will make the entities energy independent as well as act as a backup source of supply to the grid in the case of inadequate or non-existent supply.
- **EVs and EV Charging Equipment:** Investing in EV technology and later in V2G technology can reduce reliance on carbon-based fuels as well as build a portfolio of backup power to the grid. EV technology does not need to be implemented in cars such as in the US but can be focused on rickshaws (eRickshaws), eCycles and so on. Providing them with the ability to charge at central areas such as work locations and so on would be valuable. The pricing model can be adjusted based on the city and this would be an excellent option for a PPP model.
- **Invest in Data Analytics:** Electric utilities and associated service providers (water, wastewater, solid waste and others) are collecting vast quantities of data from their system and this is expected to increase as more automation is implemented. The data collected from IEDs and sensors is only as good as the intelligence it provides. Extract this intelligence and put it into action either to provide better services to the customers or to improve operational efficiencies.

5 U.S. Companies and Technologies

Several major U.S. companies provide the technologies required to support some of the above recommendations. Following are descriptions of several of these:

GE is a major solutions provider and thought leader in the effort to modernize and optimize the electric grid. It is one of the world's leading suppliers of power generation and energy delivery technologies. GE's play in the Smart Grid arena is in meter manufacturing, software, and grid optimization. GE launched a distributed generation business venture that combines three product lines—Aeroderivative Gas Turbines, Jenbacher Gas Engines and Waukesha Gas Engines. GE will invest \$1.4 billion over the next four years to help meet the world's growing demand for on-site power systems that are easier to finance, faster to install and more efficient and reliable for customers. On top of all of the above, GE also makes systems and hardware associated with providing support in various areas such as (1) distribution automation (2) SCADA, EMS, DMS and associated systems (3) PV and associated distributed renewables (4) microgrids and grid integration and (5) others.

Cooper Power Systems, which is now part of Eaton, is a manufacturer of power system equipment, and a provider of energy management solutions. It is a long-standing player in the industry with nearly hundred years of experience. Specific to the Indian market, its products are at the top of the list for distribution automation and also for integration of DERs into the grid.

Protonex (a Ballard Power company) is a leading provider of advanced fuel cell power solutions for portable, remote and mobile applications in the 100 to 1,000-watt range. Based on patented proton

exchange membrane (PEM) and solid oxide fuel cell (SOFC) technologies, these power systems are among the industry's smallest, lightest and highest performing fuel cell systems for portable applications.

Eos produces cost effective energy storage solutions that are not only less expensive than other battery technologies, but less expensive than the most economical alternative used today to provide the same services—gas turbines for peak power generation and transmission and distribution assets for delivery capacity. It has developed a low-cost zinc-air energy battery projected to cost \$1,000 per kilowatt, or \$160 per kilowatt-hour (DC-to-DC), assuming large-volume purchases.

Seeo was founded in 2007 with the goal of creating a new class of high-energy rechargeable lithium-ion batteries based on a nanostructured polymer electrolyte initially developed at the Lawrence Berkeley National Laboratory under funding from the Department of Energy's Batteries for Advanced Transportation Technology (BATT) program. Seeo has been engaged in demonstration activities with SunEdison to test its batteries for use in solar PV applications.

Honeywell Smart Grid Solutions (SGS) for 30 years has helped more than 60 utilities worldwide meet energy efficiency and demand response goals, and manage the grid while improving overall customer engagement and satisfaction. Nearly 50% of Honeywell's product portfolio delivers energy efficiency benefits across the world, with technologies currently being delivered to more than 150 million homes, 10 million buildings and thousands of industrial sites around the world. It provides expertise in design and implementation of energy efficiency programs that results in increased participation, and measurable energy savings.

Silver Spring Networks helps global utilities and cities connect, optimize, and manage smart energy and smart city infrastructure. Since 2002, Silver Spring has been innovating networking technologies to securely connect consumers and utility providers. Its proven smart grid networks easily expand as needs evolve and enable utilities to gain operational efficiencies, improve grid reliability, and empower consumers to monitor and manage energy and water consumption. Its pioneering IPv6 networking platform, with more than 22 million Silver Spring enabled devices delivered, is connecting utilities to homes and businesses throughout the world.

IBM offers best-of-breed analytics technologies and solutions for the smart grid, specifically in the areas of smart metering, grid operations, asset and workforce management, intelligent electric vehicle enablement, smart buildings, communications networks, etc. IBM Insights Foundation for Energy, an extensible and scalable foundation that delivers a single view of analytics across your enterprise, to help energy and utility companies drive operational excellence. IBM's smarter buildings solution capabilities give facilities managers and real estate executives the tools to better manage facility energy and space utilization, reduce operating costs, and prepare for new lease accounting standards that will have a major impact on most organizations. IBM offers a practical approach to managing and optimizing energy beyond the data center, to include building infrastructure and other network connected property and assets.

OPower offers smart grid products in the areas of energy efficiency, demand response, digital engagement, etc. OPower's demand side management (DSM) platform helps customers achieve energy savings through personalized insights. It helps utilities motivate customers to save energy during peak demand, boost dynamic pricing participation, increase customer satisfaction, and market DSM programs.

Space-Time Insight offers situational-intelligence applications for utilities that provide unprecedented 360-degree operational insight by correlating, analyzing and visualizing IT, OT and external (XT) data sources spatially, over time and across network nodes. These applications deliver greater operational efficiency, safety, and reliability in a matter of months. Space-Time Insight's software powers mission-critical systems at some of the largest utilities around the world, helping them reduce costs, uncover revenue opportunities and deliver more reliable services to their customers.

6 Appendices

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Report No 6: Solid Waste Management

1 Executive Summary

Municipal solid waste management is one of the biggest burdens for any city and the City of Ajmer is not alone in its struggles to properly manage a growing solid waste management challenge. Best practice globally and in India includes: use of private contractors and concessionaires; creating incentives to reduce, reuse, recycle, and utilize waste (e.g. electric power, compost) throughout the waste cycle; new clean waste to energy technologies such as refuse derived fuel and pyrolysis; proper emission controls for all waste to energy plants; biomedical waste treatment; landfill gas to power; and controlled landfills that include fencing and controlled access; compaction, grading and capping; landfill gas management and flaring or use for electric power production; and leachate management and treatment.

Based on site visits, interviews and review of reports and research on Ajmer's municipal solid waste treatment sector, the USTDA technical team has found that: the City of Ajmer currently has inadequate solid waste collection, with some door to door collection and some bin collection mostly done by private contractors; no organized segregation of waste at source or at the landfill; an uncontrolled landfill with no compaction or grading, no fencing, no gas collection system, no leachate control, uncontrolled burning, an active picker community, and freely roaming animals.

The city has a privately operated biomedical waste facility which handles most of the biomedical waste for the city although it is likely that some biomedical waste from smaller and informal healthcare facilities goes to the landfill. There was an unsuccessful privately built/operated composting facility. There is no organized industrial waste treatment – industry is responsible for its own waste treatment and it is unclear what oversight takes place from the city. The city has no fee collection system for residential or commercial customers although it has tried several times unsuccessfully.

The city has recently tendered for a contractor/concessionaire to manage the municipal solid waste system for Ajmer under the Swachh Bharat Mission. The RFP includes door to door collection, IT enabled tracking of vehicles and a requirement that no more than 25% of waste be landfilled in a controlled landfill according to Government of India regulations. The RFP is technology neutral regarding the requirement to manage the other 75% of the waste and could include segregation, recycling, waste to energy, composting and other uses for the waste. Bids were opened in May 2016 and are under evaluation. Preliminary feedback is that the responses may not meet the requirements of the City.

Some concerns regarding the tender include: no user fee system which would encourage long term financial sustainability of the system; no detailed FS was performed, including waste characterization study, which increases risk for bidders and possibly increases cost for the city; there is no analysis on opportunities for using the existing composting facility; there is no analysis or requirement for GIS based customer information management and user fee collection system which could be developed in collaboration with other city services.

The USTDA technical team recommends that these studies are performed and incorporated in future tenders. The city should also find ways to promote “reduce and reuse” strategies in the city, for example by having collection fees based on size/weight of waste collected (volume based garbage collection fees or VGCF); and putting in place a waste reduction program for government offices. It may be advisable to begin with a new tender for just the Area Based Development under the Smart City Mission project. Additional smart technologies should be considered such as: real time collection systems using technology such as bin sensors and data feed from the 24 hour help line and using SMS and smart phone apps; near field communication devices for collection; IT based user fee payment systems; IT enabled workforce management solutions for municipal oversight staff and contractor/concessionaire staff; and integrating solid waste management into any planned integrated command and control operations center for the city that would oversee citywide services, traffic, security etc.

2 Sector and Technology Background (1 to 2 pages)

2.1 Global Experience

The amount of municipal solid waste (MSW), one of the most important by-products of an urban lifestyle, is growing even faster than the rate of urbanization. According to the World Bank¹, ten years ago there were 2.9 billion urban residents who generated about 0.64 kg of MSW per person per day (0.68 billion tonnes per year). These amounts have increased to about 3 billion residents generating 1.2 kg per person per day (1.3 billion tonnes per year). By 2025 this will likely increase to 4.3 billion urban residents generating about 1.42 kg/capita/day of municipal solid waste (2.2 billion tonnes per year). Municipal solid waste management is the most important service a city provides; in low-income countries as well as many middle-income countries, MSW is the largest single budget item for cities and one of the largest employers. Solid waste is usually the one service that falls completely within the local government’s purview. A city that cannot effectively manage its waste is rarely able to manage more complex services such as health, education, or transportation.

Poorly managed waste has an enormous impact on health, local and global environment, and economy; improperly managed waste usually results in down-stream costs higher than what it would have cost to manage the waste properly in the first place. The global nature of MSW includes its contribution to GHG emissions, e.g. the methane from the organic fraction of the waste stream, and the increasingly global linkages of products, urban practices, and the recycling industry.

Waste composition is influenced by factors such as culture, economic development, climate, and energy sources; composition impacts how often waste is collected and how it is disposed.

- Low-income countries have the highest proportion of organic waste
- Paper, plastics, and other inorganic materials make up the highest proportion of MSW in high income countries.

Although waste composition is usually provided by weight, as a country’s affluence increases, waste volumes tend to be more important, especially with regard to collection: organics and inerts

¹

<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTURBANDEVELOPMENT/0,,contentMDK:23172887~pagePK:210058~piPK:210062~theSitePK:337178,00.html>

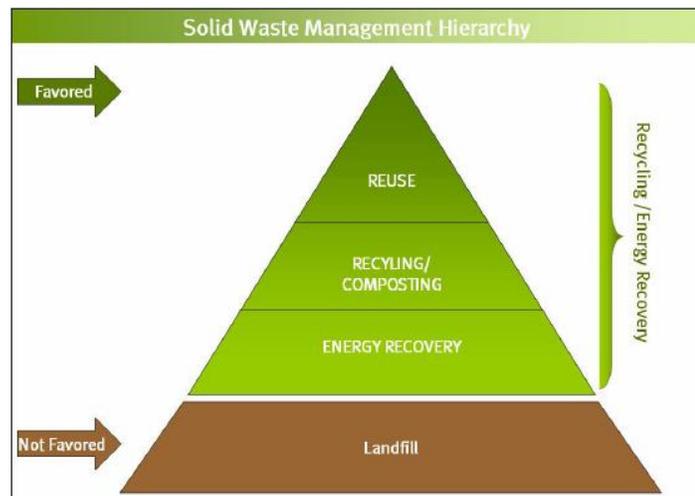
generally decrease in relative terms, while increasing paper and plastic increases overall waste volumes.

Below is a table describing the continuum of MSW practices across the economic development spectrum which demonstrates the path for developing countries.

TABLE 1Comparison of Solid Waste Management Practices by Income Level (adapted from *What a Waste 1999*)

Activity	Low Income	Middle Income	High Income
Source Reduction	No organized programs, but reuse and low per capita waste generation rates are common.	Some discussion of source reduction, but rarely incorporated into an organized program.	Organized education programs emphasize the three 'R's' – reduce, reuse, and recycle. More producer responsibility & focus on product design.
Collection	Sporadic and inefficient. Service is limited to high visibility areas, the wealthy, and businesses willing to pay. High fraction of inerts and compostables impact collection—overall collection below 50%.	Improved service and increased collection from residential areas. Larger vehicle fleet and more mechanization. Collection rate varies between 50 to 80%. Transfer stations are slowly incorporated into the SWM system.	Collection rate greater than 90%. Compactor trucks and highly mechanized vehicles and transfer stations are common. Waste volume a key consideration. Aging collection workers often a consideration in system design.
Recycling	Although most recycling is through the informal sector and waste picking, recycling rates tend to be high both for local markets and for international markets and imports of materials for recycling, including hazardous goods such as e-waste and ship-breaking. Recycling markets are unregulated and include a number of 'middlemen'. Large price fluctuations.	Informal sector still involved; some high technology sorting and processing facilities. Recycling rates are still relatively high. Materials are often imported for recycling. Recycling markets are somewhat more regulated. Material prices fluctuate considerably.	Recyclable material collection services and high technology sorting and processing facilities are common and regulated. Increasing attention towards long-term markets. Overall recycling rates higher than low and middle income. Informal recycling still exists (e.g. aluminum can collection.) Extended product responsibility common.
Composting	Rarely undertaken formally even though the waste stream has a high percentage of organic material. Markets for, and awareness of, compost lacking.	Large composting plants are often unsuccessful due to contamination and operating costs (little waste separation); some small-scale composting projects at the community/ neighborhood level are more sustainable. Composting eligible for CDM projects but is not widespread. Increasing use of anaerobic digestion.	Becoming more popular at both backyard and large-scale facilities. Waste stream has a smaller portion of compostables than low- and middle-income countries. More source segregation makes composting easier. Anaerobic digestion increasing in popularity. Odor control critical.
Incineration	Not common, and generally not successful because of high capital, technical, and operation costs, high moisture content in the waste, and high percentage of inerts.	Some incinerators are used, but experiencing financial and operational difficulties. Air pollution control equipment is not advanced and often by-passed. Little or no stack emissions monitoring. Governments include incineration as a possible waste disposal option but costs prohibitive. Facilities often driven by subsidies from OECD countries on behalf of equipment suppliers.	Prevalent in areas with high land costs and low availability of land (e.g., islands). Most incinerators have some form of environmental controls and some type of energy recovery system. Governments regulate and monitor emissions. About three (or more) times the cost of landfilling per tonne.
Landfilling/ Dumping	Low-technology sites usually open dumping of wastes. High polluting to nearby aquifers, water bodies, settlements. Often receive medical waste. Waste regularly burned. Significant health impacts on local residents and workers.	Some controlled and sanitary landfills with some environmental controls. Open dumping is still common. CDM projects for landfill gas are more common.	Sanitary landfills with a combination of liners, leak detection, leachate collection systems, and gas collection and treatment systems. Often problematic to open new landfills due to concerns of neighboring residents. Post closure use of sites increasingly important, e.g. golf courses and parks.
Costs (see Annex E)	Collection costs represent 80 to 90% of the municipal solid waste management budget. Waste fees are regulated by some local governments, but the fee collection system is inefficient. Only a small proportion of budget is allocated toward disposal.	Collection costs represent 50% to 80% of the municipal solid waste management budget. Waste fees are regulated by some local and national governments, more innovation in fee collection, e.g. included in electricity or water bills. Expenditures on more mechanized collection fleets and disposal are higher than in low-income countries.	Collection costs can represent less than 10% of the budget. Large budget allocations to intermediate waste treatment facilities. Up front community participation reduces costs and increases options available to waste planners (e.g., recycling and composting).

Solid waste management can include a variety of practices from open dumping to landfilling, to waste to energy to recycling/composting to reuse. While there is debate on the cost and benefits of waste to energy projects the EPA recommends the hierarchy seen in this graphic representation, with landfilling being the least favorable and reuse being the most favorable. Clearly waste reduction is the ideal practice.



Source: EPA, <http://www.epa.gov/garbage/faq.htm#1>

Figure 1-1. EPA solid waste management hierarchy.

Overview of Waste to Energy in the United States

The first incinerator in the United States was built in 1885 on Governors Island in New York, NY. By the mid-20th Century hundreds of incinerators were in operation in the United States, but little was known about the environmental impacts of the water discharges and air emissions from these incinerators until the 1960s. When the Clean Air Act (CAA) came into effect in 1970, existing incineration facilities faced new standards that banned the uncontrolled burning of MSW and placed restrictions on particulate emissions. The facilities that did not install the technology needed to meet the CAA requirements closed.

Currently there are more than 86 commercial facilities in the United States for combustion of municipal solid waste (MSW) with energy recovery and a few under construction or various planning stages for converting MSW to ethanol. The combustion facilities have the capacity to produce 2,720 MW of power per year by processing 28 to 29 million tons of waste. After energy recovery the volume of MSW is reduced by about 80% leaving 20% of MSW as ash behind.

MSW can be directly combusted in waste-to-energy facilities as a fuel with minimal processing, known as mass burn; it can undergo moderate to extensive processing before being directly combusted as refuse-derived fuel; or it can be gasified using pyrolysis or thermal gasification techniques. Gases generated due microbial reaction in a landfill can also be collected, cleaned and combusted in an engine or turbine to generate electricity. Landfill gas recovery permits electricity production from existing landfills via the natural degradation of MSW by anaerobic fermentation (digestion) into landfill gas. Anaerobic digestion can also be used on municipal sewage sludge.

Mass Burning

Mass burning technology, the most common MSW-to-electricity technology, involves the combustion of unprocessed or minimally processed waste. The major components of a mass burn facility include:

- Refuse receiving, handling, and storage systems
- The combustion and steam generation system (a boiler)
- A flue gas cleaning system
- The power generation equipment (steam turbine and generator)

- A condenser cooling water system
- A residue hauling and storage system

At a mass burning facility, MSW trucks deposit the refuse into pits, where cranes then mix the refuse and remove any bulky or large non-combustible items (such as large appliances). The refuse storage area is maintained under vacuum in order to prevent odors from escaping. The cranes transfer the waste to the combustor hopper from which the waste is fed the boiler. Heat from the combustion process is used to turn water into steam, with the steam then routed to a steam turbine-generator for power generation. The steam is then condensed via traditional methods (such as wet cooling towers or once-through cooling) and routed back to the boiler. Residues produced include bottom ash (which falls to the bottom of the combustion chamber) and fly ash (which exits the combustion chamber with the flue gas and is separated from the flue gas in a downstream cleaning system). The combined ash ranges from 20 to 25 percent by weight of the incoming waste. This ash residue may or may not be considered a hazardous material, depending on the makeup of the municipal waste.

It is possible to avoid the production of hazardous ash by preventing the sources which create hazardous waste from entering the system. It is also possible to treat the ash. Both of these methods avoid the costs of disposal at a limited number of landfills classified as able to handle hazardous materials. Non-hazardous ash can be mixed with soils for use as landfill cover or sold as pavement aggregate.

Refuse-Derived Fuel Combustion

Refuse-derived fuel (RDF) typically consists of pelletized or fluff MSW that is the by-product of a resource recovery operation. Processing removes ferrous materials, glass, grit, and other materials that are not combustible. The remaining material is then sold as RDF. Usually, both the RDF processing facility and the RDF combustion facility are located near each other, if not on the same site. The RDF can then be used in one of several configurations:

- Dedicated RDF boilers designed with traveling grate spreader-stokers
- Co-firing of RDF with coal or oil in a multi-fuel boiler
- Dedicated RDF fluidized-bed boiler

More processing and refinement is prudent when using RDF as a supplemental fuel than when using it in a dedicated boiler, which can be designed to withstand a lower quality fuel. Another benefit of a higher level of RDF preparation is that more non-combustible materials can be separated from the MSW. About 13 RDF to energy facilities were operating in the U.S. as of late 2010.

Pyrolysis/Thermal Gasification

Pyrolysis and thermal gasification are related technologies. Pyrolysis is the thermal decomposition of organic material at elevated temperatures in the absence of air or oxygen. The process, which requires heat, produces a mixture of combustible gases (primarily methane, complex hydrocarbons, hydrogen and carbon monoxide) liquids and solid residues.

Thermal gasification of MSW is different from pyrolysis in that the thermal decomposition takes place in the presence of a limited amount of oxygen or air. The produced gas which is generated can then be used in either boilers or cleaned up and used in combustion turbine/generators or catalytically converted to liquid fuels such as ethanol or gasoline. The primary area of research for this technology is the scrubbing of the product gas of contaminants such as tars and particulates at high temperatures

in order to protect combustion equipment downstream of the gasifier and still maintain high thermal efficiency or prevent poisoning of the catalysts in fuel manufacturing operations.

Both of these technologies are in the development stage with a limited number of units in operation. The Hyperion Energy Recovery System operated by the City of Los Angeles had a system designed to fire dried sewage sludge in a staged fluidized bed combustor. The resulting gas was then combusted in stages, and the heat was used to turn water into steam, driving a 10 MW steam turbine-generator.

Landfill Gas

Landfill gas production results from chemical and microbial reactions within the MSW landfill causing the breakdown of organic matter. The rate of production is affected by waste composition and landfill geometry, which in turn influence the bacterial populations within it, chemical make-up, heat of reactions, and biological ecosystems co-existing simultaneously within the landfill. This heterogeneity, together with the frequently unclear nature of the contents, makes landfill gas production more difficult to predict.

Due to the constant production of landfill gas, the pressure within the landfill (together with differential diffusion) increases causing the gas to escape into the atmosphere. Landfill gas is about 40-60% methane, with the remainder being mostly carbon dioxide (CO₂). Landfill gas also contains varying amounts of nitrogen, oxygen, water vapor, sulfur and a hundreds of other contaminants -- most of which are known as "non-methane organic compounds" or NMOCs. Inorganic contaminants like mercury are also known to be present in landfill gas. Sometimes, even radioactive contaminants such as tritium (radioactive hydrogen) have been found in landfill gas.

Emission of landfill gas leads to production of greenhouse gas (GHG) and other environmental and health problems. Landfill gas could also cause explosions properly not monitored, collected and released (flared or utilized). In 1986, migrating landfill gas which was allowed to build up caused an explosion in Loscoe, England which partially destroyed the property. An accident causing two deaths occurred from an explosion in a house adjacent to Skellingsted landfill in Denmark in 1991. Due to the risk presented by landfill gas there is a clear need to monitor gas produced by landfills. In addition to the risk of fire and explosion, gas migration in the subsurface can result in contact of landfill gas with groundwater causing water contamination.

General options for managing landfill gas are: flaring or utilize it in a boiler (to make steam/ heat), internal combustion engine, gas turbine, or fuel cell (to make electricity), convert the methane to other products such as methyl alcohol or clean it enough to pipe it to other industries or into natural gas pipelines.

The number of landfill gas projects, which convert the methane gas that is emitted from decomposing garbage into power, increased from 399 in 2005, to 594 in 2012. These projects are popular because they control energy costs and reduce GHG emissions. These projects collect the methane gas, which is released with twenty times the global warming potential of carbon dioxide, and treat it, so it can be used for electricity or upgraded to pipeline-grade gas.

Table 1-1. Biomass Conversion Technologies Summary

Technology	Description	Mode of Operation	Commercially Available for WTE
Combustion	Thermal conversion of a feedstock utilizing excess air or oxygen as oxidant to generate heat.	-Grate -Bubbling fluidized bed -Circulating fluidized bed	87 installations in the United States
Pyrolysis	Thermal conversion of a feedstock in the absence of air or oxygen as oxidant to generate a synthesis gas or fuel and pyrolysis oil. (Plasma arch capabilities of operating in excess of 20,000°F.)	-Horizontal -Vertical (updraft/downdraft) -Plasma arch	Two installations in the United States
Gasification	Thermal conversion of feedstock in a limited atmosphere of air or oxygen as oxidant to generate a synthesis gas or fuel.	-Horizontal stationary -Horizontal rotating -Vertical (updraft/downdraft) -Stationary grate -Bubbling fluidized bed	0 installations in the United States
Anaerobic Digestion	Biochemical conversion of a feedstock in the absence of oxygen to generate biogas.	-Mesophilic (77°F–100°F) -Thermophilic (122°F–135°F)	Multiple installations in the United States (total quantity unknown)

2.1.1 Case Studies/Examples

Fulcrum BioEnergy Nevada WTE Plant

Fulcrum BioEnergy Inc., headquartered in Pleasanton, Calif., is constructing a plant in Nevada to convert 147,000 tons of municipal solid waste into 10 million gallons of ethanol annually. It will be the first such biofuel facility in the region. Fulcrum is reported to have 20-year contracts with Waste Management and Waste Connections Inc. to provide the garbage that will be sorted to remove other recyclables such as plastics, cans, bottles and paper. The plant will also use walnut shells from a processing facility in the same industrial park. The RDF is gasified and product gas, after cleaning, is catalytically converted to ethanol. The ethanol will be sold to Tenaska BioFuels LLC, which will market it to blenders in the Nevada and Northern California region as a gasoline additive. Other plants are reported to be at various stages of planning and financing by other project developers in Fairfax, VA and lake County, Indiana.

Helsinki, Finland (Source: Smart Cities Council Readiness Guide)

Located 50 kilometers east of Helsinki, the Finnish capital, is Porvoo, an old medieval town situated in the picturesque scenery of the Finnish archipelago. In the summer of 2011, the scenery at the local recycling stations was less picturesque; overflowing waste containers and angry customers. The local waste management authority, Itä-Uudenmaan Jätehuolto, was having considerable challenges handling the increasing amount of waste that the many guests were generating during the summer season. Overfilling at the local recycling stations was becoming more common, causing increased

littering and cleaning costs. Customers were demanding increased collection intervals, while the service was getting too expensive to maintain. To tackle the problem the authority decided to pursue a smart city solution, installing wireless fill-level sensors at recycling. The sensor system provided by Finland-based logistics solution company Enevo, a Council member, measures and forecasts when waste containers will be full. By combining the forecasts with traffic and vehicle information, Enevo's system can generate millions of different route options and suggest the most cost-efficient to the user. By utilizing Enevo's smart sensor service ONE, Itä-Uudenmaan Jätehuolto was able to: reduce the amount of collections by 51%; reduce unnecessary driving and emissions; reduce the overfilling problem at recycling stations; and achieve a net savings rate of 47%

2.1.2 Cost Benefit

The cost benefit analysis for MSW options will vary greatly depending on the regulatory environment (e.g. is NMOC capture required), waste composition, and markets for recycled products, compost, and/or energy.

- Generally speaking it is best to do landfill gas capture during landfill construction as the capture is more efficient and less costly than drilling and installing the piping to capture the gas after the fact. In many cases landfill gas capture is not financially viable unless there is a requirement to capture NMOCs as in the U.S.
- The cost benefit analysis for recycling has generated great debate and some cities, such as New York City, terminated recycling for glass and plastic in 2002 (until costs for solid waste landfilling rose even higher). There are many factors that go into assessing the full lifecycle costs and benefits, including the cost of land, haulage, sorting, and the market for recycled materials. Another factor is that recycling sometimes takes valuable product out of the waste stream, e.g. high calorific content such as paper; or plastics, which are ideal for refuse derived fuel plants. Best practice is to promote "reduce and reuse" strategy vs. recycling.
- Waste to energy plants can be financially viable depending on the waste content and the offtake price for electricity. Depending on the technology, proper environmental controls for emissions can be costly and will have an impact on financial viability.
- Composting facilities can be financially viable but the market is often not readily available. For example the city of Washington DC recently started a composting facility from a wastewater treatment facility and has had to begin offering the compost free of charge to prospective customers in order to generate knowledge of the produce and thus a market/demand for the product.

2.2 India Experience

Every year, about 55 million tons of municipal solid waste are generated in the urban areas of India. In addition, large quantities of solid and liquid wastes are generated by industries.² Waste generation in India is expected to increase rapidly in the future. As more people migrate to urban areas and as incomes increase, consumption levels are likely to rise, as are rates of waste generation. This has significant impacts on the amount of land that is and will be needed for disposal, economic costs of collecting and transporting waste, and the environmental consequences of increased MSW generation levels.

² Emmanuel, William. "[Energy Alternatives India](#)". *Energy Alternatives India*. EAI. Retrieved 5 March 2012.

According to the India Smart Grid Forum, urban local bodies spend about Rs.500 to Rs.1500 per ton on solid waste collection, transportation, treatment and disposal. The Indian government has taken up a number of initiatives to expand the waste management infrastructure. As a result of these initiatives, many Indian cities have taken steps towards implementing good solid waste management practices. There are also fiscal incentives offered by the government - companies that handle waste management can get 100% tax deductions on gains and profits, electricity taxes and excise duty with exemptions and concessions - which makes this sector attractive for international investors.

Waste to Energy in India

According to the Ministry of New and Renewable Energy (MNRE), there exists a potential of about 1700 MW from urban waste (1500 from MSW and 225 MW from sewage) and about 1300 MW from industrial waste. The ministry is also actively promoting the generation of energy from waste, by providing subsidies and incentives for the projects. Indian Renewable Energy Development Agency (IREDA) estimates indicate that India has so far realized only about 2% of its waste-to-energy potential.

The Indian Government has recognized waste to energy as a renewable technology and supports it through various subsidies and incentives. The Ministry of New and Renewable Energy is actively promoting all the technology options available for energy recovery from urban and industrial wastes. MNRE is also promoting research on waste to energy by providing financial support for R&D projects on cost sharing basis in accordance with the R&D Policy of the MNRE. In addition to that, MNRE also provides financial support for projects involving applied R&D and studies on resource assessment, technology up-gradation and performance evaluation.

The central government's recently revised tariff policy that mandates power distributors to buy all the electricity from waste-to-energy plants in a state and the remunerative tariff set for it by the Central Electricity Regulatory Commission (CERC) has helped raise investor interest in this segment. CERC in October 2015 fixed a tariff of Rs.7.9 per kilowatt hour of electricity sold by waste-to-energy plants, compared to about Rs.2.5 applicable for many thermal power plants.

The Government of India has set a target of generating 700 MW energy from waste by 2019. For this, many concrete steps have been taken by the government including:

- Purchase of power by the Distribution Companies from any city generating power from waste is now mandatory.
- The Ministry of Fertilizers has made it mandatory for co-marketing of city compost by the fertilizer marketing companies and they would be entitled for an incentive of Rs.1500 per ton (\$22 per ton) of compost, the notification of which was made on 10 Feb 2016.

As many as 24 waste-to-energy projects to produce 233MW are currently in different stages of construction and five projects of 79MW have already been tendered, adding up to a total of 312 MW. As per estimates by the urban development ministry, about Rs.65000 crore of public and private investments will flow into city waste management, cleanliness and waste-to energy projects over the next three years. The central government is giving Rs.15000 crore to municipal corporations over the next three years under the Swachh Bharat Mission for cleanliness, waste-management and waste-to-energy projects. It has also requested these bodies to give priority to these projects while utilizing the cash transfers that they get from central government as mandated by the 14th Finance Commission.

New waste-to-energy capacity is coming up in places like Nalgonda district and Greater Hyderabad Municipal Corporation in Telangana, Bawana and Kidwai Nagar in Delhi, Jabalpur and Indore in Madhya Pradesh, Pune and Kolhapur in Maharashtra, Pallavaram in Chennai, Allahabad and Agra in Uttar Pradesh and Bathinda and Jalandhar in Punjab. Hyderabad, Pune, Indore and Rajkot have floated tenders for new projects which are to be completed early in 2018.

Twenty-six waste-to-energy plants, one for each assembly constituency in its jurisdiction, are being planned by the North Delhi Municipal Corporation in an attempt to tackle solid waste in a decentralized way. North Delhi Mayor Ravinder Gupta announced in late 2015 that 26 plants, which shall use 70 to 100 metric tonnes of trash per day, were in the pipeline. "We will be initiating work on the first of these plants as a pilot project by the first week of November. These plants will require about 1,000 to 1,500 square yards of space, which will be easier to obtain than the land needed for bigger facilities," said Mr. Gupta. He added that a company had been shortlisted to carry out the pilot.

Key Issues

Based on our experience and research to date, the following are key issues regarding MSW and WTE in India:

- Lack of uniformity of composition of MSW from region to region;
- High moisture content;
- High amount of soil content in delivered waste;
- Difficult to process and separate undesirable materials or recyclables;
- Desirable materials sometimes segregated privately prior to collection;
- Social issues, where recyclables are collected and sold by socially and economically disadvantaged groups (pickers);
- Lack of land close to urban populations;
- Increasing MSW generation as population increases and with increasing economic development; and
- Increasingly stringent regulations and permitting conditions for constructing new landfills.

2.2.1 Case Studies/Examples

Surat, India Case Study (source: Smart Cities Council India)

Once called the dirtiest city in India, Surat achieved a remarkable transformation in less than two years after the outbreak of bubonic and pneumonic plague in December 1994, owing to improved municipal management and strong leadership. Following the outbreak of the plague in the outskirts of the city, the Surat Municipal Corporation (SMC) launched a seven-point action plan that involved the government, NGOs, civil society, and private sector. Surat Municipal Corporation (SMC) worked to implement an integrated system through retraining of existing sanitary staff, asset utilization and new technologies. SMC implemented part of the system through JNNURM funds and part with a public-private partnership (PPP). The SWM project aimed to reinforce primary and secondary collection, transportation, and development of transfer stations and a sanitary landfill site. SMC pioneered 'time place movement' wherein collection vehicles move in accordance with the time schedule with areas of coverage and number of units allotted.

The collection efficiency of Surat has improved from 40 per cent in 1995 to 97 per cent at present, while house-to-house collection coverage has improved to 92 percent. SMC generates close to 1,400

TPD of waste of which 400 TPD is currently treated in its waste treatment plant developed and managed in partnership with a private agency. In the planning stages are a 600 TPD waste-to-energy plant and a 400 TPD integrated waste treatment plant through PPP mode. Today, Surat is hailed as the second cleanest city in India, prompting urban local bodies (ULBs) across India to emulate its example.

Hari Bhari Waste to Energy Concession in Allahabad (<http://haribhari.co.in>)

The Municipal Corporation of Allahabad (MCA) entered into a concession agreement with Hari Bhari Recyclable Private Ltd. for a period of 20 years on a build, own, operate and maintain basis for integrated waste management including door to door collection of waste and setting up of 150 MT Per day refuse derived fuel (RDF) to energy plant. Hari Bhari started the roll out of door to door collection operations from September 2015 using a GIS based routing software and near field communication devices and will cover the entire population under municipal limits over a phased deployment. Allahabad Municipal Corporation is divided in 5 Municipal Zones and total 80 election wards. There are total 200,000 households and about 85,000 commercial customers.

East Delhi's Ghazipur Waster to Power Plant (12 MW)

East Delhi's Ghazipur landfill will be put to use when the waste-to-energy plant there is commissioned. The plant will produce 12 MW of power by using 1,300 tons per day (TPD) of municipal solid waste. According to a spokesperson of Infrastructure Leasing & Financial Services (IL&FS), which is running the plant, the facility will be commissioned in 2016. The Ghazipur landfill, spanning 70 acres, gets over 2,500 metric tons of garbage every day.

2.2.2 Cost Benefit

As seen in the Cost Benefit section above, there are many factors that are city and project specific in order to establish the cost benefit analysis for a project in India. However, it is without doubt that there are a great number of MSW recycling, composting, and WTE options in India which have a strong benefit cost ratio, especially when driven by policy and regulatory requirements as demonstrated by the case studies above.

3 City/State Situational Analysis

Following is an overview of the Ajmer municipal solid waste management situation based on site visits, research and interviews by the team.

Overview

- Ajmer Municipal Corporation is involved in managing the solid waste generated in the city
- The City generates 216.93 MT of garbage based on an estimated @400 gm per capita per day.
- Waste generated in the city is collected with the help of safai karamcharis in different wards.
- There are three zones for the whole city – one contractor for each zone with one year contract.
- Collection is not covering certain areas of the city.
- Waste collection, loading and unloading operations have been done manually. The sanitary workers have not been provided with any protective equipment.
- Door to door collection is done by sweepers with hand rickshaws under contract
- There is inadequate waste collection equipment, waste storage bins and waste transportation vehicles.

- According to City officials (varying reports) current equipment includes: 30 tractor trolleys; 10 dumpers; 4 backloaders and one auto rickshaw container to transport the solid waste.
- There are common bins but people don't use them properly.
- Backloaders are used to clean the nalas prior to the monsoon season every year.
- There is no waste processing facility in the city.
- There is no segregation of waste.
- A composting facility was built in the city by a private contractor but it failed shortly after completion. The abandoned facility is located near the biomedical waste facility.

Fees

- There are no collection fees for either residential or commercial users
- A 30 rupees monthly fee was instituted for residential customers at one point but there was a complete failure to pay.
- The city tried to institute a 70 rupees for commercial customers but it was unsuccessful (the contractor responsible for collection terminated the contract)
- Industry manages its own waste but no details were available on the oversight or process by which this occurs.

Oversight

- The city organizes into 60 wards with one supervisor per ward. For every seven wards there is a sanitary inspector - nine in total.
- Visual inspection occurs every morning 6-10AM and a report is made. From 3-6PM a second round is made and any complaints addressed.
- There is a 24/7 helpline with a 24 hour response time.

Industrial waste

- There is no industrial/ hazardous waste management facility in the city.
- According to the Nagar Nigam all industrial waste is managed and treated on site.
- It is not clear what oversight the city has over this but it is likely that there is illegal dumping and/or this waste finds its way to the municipal landfill.

Commercial Waste

- Commercial waste is collected by the city and no fee is levied.

Biomedical Waste

- Biomedical waste in the city is being processed by a private operator, who has established one processing plant at Sendhri.
- Total biomedical waste collected per day is 950 kg.
- The treatment plant has a capacity for treating 100 kg waste/ hour.
- Five vehicles are involved for collection and transportation of waste to the treatment plant
- It is likely that biomedical waste from smaller hospitals and nursing homes find their way into MSW.
- Incineration with emissions control and autoclave operations appear to be functioning properly.
- Management of waste at facility is unsafe (see photo below).



Biomedical Waste Incineration Facility

Solid Waste Landfill

- Completely uncontrolled landfill.
- No fencing
- Weighstation is in place and appears to be functioning
- No compaction, grading or capping is taking place at the landfill
- Estimated 206 MT per day of waste is delivered to the landfill
- Though data on ground water quality is not available, it is likely that the leachate generated from the dumping site contaminates the ground water in the area.
- The team witnessed open burning, roaming animals, and pickers (est. 150) at the landfill.



Roadside Solid Waste Collection Bin



Cattle Freely Roaming at Landfill



Backloader Cleaning Nalas



Pickers at Landfill



Delivering Waste at Uncontrolled Landfill



Children Pickers at Landfill

Municipal Solid Waste (MSW) Concession

Recently AMC has floated tenders (for the financial year 2016-17) inviting bids for design, construction, operation and maintenance of processing and engineered sanitary landfill site for Ajmer as per the guidelines of Swachh Bharat Mission, GoI for implementation of Municipal Solid Waste (Management & Handling) Rules 2000. The bids for this purpose have been received and opened on 5th May 2016.

Under the guidelines of the Swachh Bharat Mission (Urban), the City of Ajmer in December 2015 issued an RFP for design, construction, operation and maintenance of a processing plant & engineered sanitary landfill site of solid waste. The RFP calls for the following:

- Design and construction of a MSW processing and disposal facility within 18 months on land available with the authority using any suitable technology adhering to Municipal Solid Waste Handling Rules 2000 (MSW Rules 2000 as amended)
- The facility should have adequate capacity to process generated MSW and contractor should operate and maintain the facility to process the domestic, commercial, institutional etc. MSW collected from door to door and market.
- The contract period is for 30 years with an option to further extend.
- The Contractor shall at his own cost and expense install a Vehicle Tracking and Monitoring System in all the vehicles used by the Contractor for collection and Transportation of MSW including the vehicles purchased from the Authority. The vehicle tracking and monitoring system should be able to provide the real time data related to the time, position and route taken by the vehicles and generate reports in the manner desired by the Authority.
- The Contractor shall adopt such technology, processes and methods as it considers necessary or expedient for processing of MSW and landfilling at the project facilities, subject to meeting the norms, construction requirements and O&M requirements
- The Contractor shall endeavor to obtain carbon credits under Clean Development Mechanism (CDM) of the Kyoto Protocol for the Project by adopting the greenhouse gas mitigation measures.
- Contractor shall endeavor to improve the ancillary conditions and infrastructure related to the Project, including assistance to informal recycling workers;
- Contractor shall endeavor to sell or otherwise dispose of all recyclables in a manner which is not detrimental to the environment
- The MSW Processing Facility shall have an integrated facility to treat organic matter as well as other burnable matter adopting suitable technology to ensure that at least 75% of the waste is reduced on account of segregation and processing of waste and a maximum of 25% waste is left for disposal in landfill.
- The city has taken a technology/solution neutral approach to the bidding process, simply stating that only 25% of waste can be landfilled. This technology neutral approach is generally considered best practice in order to let companies and the market, not bureaucrats, drive the technology decision process.
- The compost, energy/RDF/Power or any other product or byproduct generated/derived from MSW shall be the property of the Contractor and he shall be free to sell the same in the open market as he deems appropriate.

- The Authority shall provide necessary land not exceeding 2 hectares per 100 MT of waste processed in the facility per day, to the Contractor on a lease rent fee of Rs.1/- per sq. mtr per year or a license fee for the Contract Period.
- The Contactor shall ensure that the leachate shall be treated scientifically and no nuisance of odour, flies or birds shall be allowed.

Based on discussions with city officials, the RFP has not been successful in attracting suitable Contractors. Based on a review of the tender, some issues that may need to be addressed include:

- There is not a detailed description or analysis of the existing solid waste management facilities, equipment, or collection schemes in place within the city.
- There does not appear to have been a waste characterization study performed by the city in advance of the RFP. This is critical to assessing the potential for composting, waste to energy, recycling and other uses for the collected waste. A waste characterization study would significantly reduce the risk for bidding contractors and ensure better and more financially attractive bids from Contractors/Concessionaires.
- There does not appear to be any analysis or description of the existing landfill site or prospective alternative sites for landfilling, waste to energy, or composting. The team learned that there was an unsuccessful composting facility built near the biomedical waste facility. It is not clear who owns the defunct facility or if it would be available to the contractor/concessionaire.
- As per above, detailed assessments and analysis upfront will enhance the quality and decrease the cost to the city (e.g. lower tipping fee).

4 High Level Analysis and Recommendations for Potential Smart City Projects

The City of Ajmer has begun the process of soliciting for a contractor/concessionaire for solid waste management with recycling, reuse and/or waste to energy. Based on our analysis the way forward should include the following steps:

- Perform a detailed feasibility study/DPR including:
 - a waste characterization study for the project which considers:
 - a variety of productive uses for the waste, including waste to energy
 - prospective offtakers of products
 - financial analysis, including user fees
 - a detailed assessment of the current waste management system including collection and delivery of the waste to the landfill.
 - a detailed assessment of the existing landfill and new prospective landfill sites for consideration for the concession.
 - consideration of PPP opportunities whereby the city takes on certain roles in the development of the project as a partner/equity shareholder (e.g. offtake or facilitate market development for certain products such as compost; shared responsibility for user fee collection using GIS based mapping and collection).

- Ensure that waste to energy is prioritized or required by the contractor/concessionaire in order to promote clean energy initiatives of the city.
- There is currently no user fee collection system after several failed attempts. This is critical to the success of any sustainable MSW project, especially for commercial users. A GIS based customer information management system should be developed within the Area Based Development of the Smart City project to begin with to pilot this approach.
- The city should also find ways to promote “reduce and reuse” strategies in the city, for example by having collection fees based on size/weight of waste collected (volume based garbage collection fees or VGCF); and putting in place a waste reduction program for government offices. Even a nominal fee will redefine the value of door to door (vs. central bin) service and lay the foundation for new collection systems and technologies.
- It is not clear how the city is addressing industrial waste but it is imperative to keep close oversight and possibly to develop collaborative approaches to manage industrial waste. If not given a financially and technically viable solution, the consequence may be (continued?) illegal dumping.
- If the current landfill is to be abandoned then the city must consider options for capping the existing landfill, putting in place leachate management and controlling access to the site.
- If the current landfill is to be used for future use under the concession then a detailed assessment must be done regarding the management of the existing landfill and conversion to a controlled landfill including management of uncontrolled burning, animal control, finding suitable and sanitary employment opportunities for community of pickers. If not then a study must be done for properly closing the current landfill taking into consideration gas and leachate management.
- Additional smart technologies should be considered such as: real time collection systems using technology such as bin sensors and data feed from the 24 hour help line and using SMS and smart phone apps; near field communication devices for collection; IT based user fee payment systems; IT enabled workforce management solutions for municipal oversight staff and contractor/concessionaire staff; and integrating solid waste management into any planned integrated command and control operations center for the city that would oversee citywide services, traffic, security etc.

5 U.S. Companies and Technologies

Below are several major U.S. companies that provide the technologies and services required to support some of the above recommendations:

Waste Management is a leading provider of comprehensive environmental solutions services. With the largest network of recycling facilities, transfer stations and landfills in the industry, our entire business can adapt to meet the needs of every distinct customer segment, including municipalities, construction sites, healthcare facilities, commercial buildings and many others.

Covanta Energy Corporation's major focus is on Energy-from-Waste (EfW). It has a number of EfW programs and is a big proponent of sustainability. Through its Clean World Initiative, Covanta is working with local governments and communities to better utilize waste management techniques.

Gershman, Brickner & Bratton, Inc. is an international solid waste management consulting firm that helps public- and private-sector organizations craft practical, customized and technically sound solutions for complex solid waste management challenges. During the past 30 years, as the solid waste industry has grown and EPA's solid waste management hierarchy has increasingly made informed waste management decisions, we have been a trusted resource at the forefront of the industry, creating success stories that integrate smart planning with effective management of solid waste services.

Wheelabrator Technologies is an industry leader in the safe and environmentally sound conversion of everyday residential and business waste - and other renewable waste fuels - into clean energy. Wheelabrator pioneered the energy-from-waste industry in the U.S. when it designed, built and operated the first commercially successful facility in 1975.

Malcolm Pirnie offers a comprehensive array of services in drinking water, air and water pollution control, solid and hazardous waste management, and environmental management and restoration. They have more than 1,000 engineers, architects, scientists, planners, designers, technicians, and support personnel with in-depth experience in all areas of environmental problem-solving.

SCS Engineers is an environmental consulting and contracting firm serving public and private clients across the nation and around the world. The company's core capabilities are in solid and hazardous waste management, energy, remediation and environmental compliance. The company focuses on work to prevent, mitigate and remediate environmental events, and use our environmental regulatory systems knowledge to help shorten project timelines and stay on budget. SCS Engineers specializes in the assessment, design, permitting, construction, operation and maintenance, and monitoring of sustainable environmental solutions and facilities.

6 Appendices

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4.10. State Policies supporting implementation of Smart Solutions proposed under SCP

**RAJASTHAN
E-GOVERNANCE
IT & ITES
POLICY 2015**





Government of Rajasthan
Department of Information Technology &
Communication

RAJASTHAN E-GOVERNANCE IT & ITES POLICY 2015

October, 2015

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Definitions

1. "IT Sector" means manufacturing of hardware and software for Information Technology other than ESDM, and shall include development of IT software, IT services, IT enabled services, IT infrastructure, IT training institutions and robotics centre.
2. "IT Industries" include IT hardware & software industries. IT software industries include IT software, IT services, IT enabled services, IT infrastructure and IT training institutions. The "IT Industry" shall cover development, production and services related to IT products. Here IT includes IT & Telecommunications.
 - a. "IT Software" is defined as any representation of instructions, data, sound or image, including source code and object code recorded in a machine readable form, and capable of being manipulated for providing interconnectivity to a user, by means of an automatic data processing machine falling under heading "IT Products", but does not include "non-IT products".
 - b. "IT Products" are defined as computer, digital-data communication and digital-data broadcasting products as notified by the Ministry of Finance, Government of India or Central Board of Excise & Customs.
 - c. "IT Service" is defined as any IT-based service which results from the use of any IT system for realizing value addition.
 - d. "IT Enabled Service" is defined as any product or service that is provided or delivered using the resources of Information and Communication Technology.
 - e. "IT Training Institution" means an institution imparting training in the field of IT, IT Enabled Service and IT Services and having an accreditation / affiliation from NIELIT (GOI) or any University established by Law in India or any Institution which has a Deemed University status as per the UGC Act.
 - f. "IT Infrastructure" means the physical infrastructure built by a firm or a builder and sold / leased or transferred on lease-cum-sale to an IT industry for its use or the infrastructure built by an IT industry for its own use.
 - g. "Telecommunications" means telecommunications companies including Basic Telecom Service Providers, VSAT, Cellular (Mobile) companies, Telecom



- Infrastructure Companies, LAN, ISPs and any other value added services licensed by Ministry of Communications & IT, Government of India.
3. "Electronic System Design Manufacturing (ESDM)" means electronic hardware design and manufacturing (which shall include embedded software) for information technology, telecommunications, defense, medical, industrial automotive, robotics, consumer product, applications and components, part and accessories required for the aforesaid product and applications;
 - a. "Robotics Enterprise" means an industrial undertaking or a business concern or any other establishment, by whatever name called, engaged in manufacturing, in any manner, or engaged in providing or rendering of service or services pertaining to robots, i.e. an automatically controlled, reprogrammable, multipurpose manipulator programmable in three or more axes;
 4. "Backward Area" means an area as the Government may so notify by an order;
 5. "CST" means tax payable under the Central Sales Tax Act, 1956 to the Government of Rajasthan;
 6. "Commencement of Commercial Production/Operation" means:
 - a. For a new enterprise, the date on which the enterprise issues:
 - the first sale bill of the goods manufactured related to the investment made under this Policy; or
 - the first bill of commercial transaction related to the investment made under this Policy; or
 - the first receipt of deposit of fee/charges etc. for providing any service with respect to facilities set up related to investment under this Policy; or

Provided that investment made in development of an industrial park, it shall mean the date of handing over of possession to the first unit in the park.
 - b. For an existing enterprise making investment for expansion, the date on which the enterprise issues:
 - the first sale bill of the goods manufactured after completion of expansion; or
 - the first bill of commercial transaction after completion of expansion; or
 - the first receipt of deposit of fee/charges etc. for providing any service with respect to facilities set up after completion of expansion:

Provided that investment made in development of an industrial park, it shall mean



- the date of handing over of possession to the first unit in the park.
- c. For revival of sick industrial enterprise, the date on which the enterprise issues the first sale bill of the goods manufactured after its revival;
 7. "Conversion Charges" means the conversion charges payable to Government for change in land use and shall include any part of such charges payable to local bodies;
 8. "Electricity Duty" means the duty payable under the Rajasthan Electricity (Duty) Act, 1962;
 9. "Eligible Units": New units will be eligible for availing of incentives under this Policy. Existing units carrying out expansion/ diversification during the operative period of this Policy will be eligible for one-time incentives.
 10. "Employment by an enterprise" means to employ any person, other than the directors, promoters, owners and partners, for wages or salary to do any manual, unskilled, skilled, technical or operational work, in or in connection with the work of an enterprise and who works either in the premises of the enterprise or engaged in Rajasthan outside the premises of enterprise and gets his/her wages or salary either directly from the enterprise or whose wages or salary is reimbursed by the enterprise;
 11. "Enterprise" means an industrial undertaking or a business concern or any other establishment, by whatever name called, engaged in manufacture of goods, in any manner, or engaged in providing or rendering of service or services, as may be specified by an order by the State Government;
 12. "Existing Enterprise" means a manufacturing or service enterprise that is engaged in commercial production or operation during the operative period of the Scheme;
 13. "Existing Unit" means a manufacturing/service unit which is active with minimum 20 direct employees at the time of implementing expansion.
 14. "Expansion" means creation of additional capacity for production of goods or operational capacity for service in same line of production/operation or through a new product line or new line of services by an existing enterprise provided that in case of expansion at existing site, additional investment is more than 25% of its existing investment on the date of initiating expansion at that site;
 15. "Investment" or "Eligible Fixed Capital Investment (EFCI)" means investment made by an enterprise in fixed assets, in the following, up to the date of commencement of commercial production:
 - a. For a new enterprise, the date on which the enterprise issues:
 - the first sale bill of the goods manufactured related to the investment made under this Policy; or
 - the first bill of commercial transaction related to the investment made under this Policy; or
 - the first receipt of deposit of fee/charges etc. for providing any service with respect to facilities set up related to investment under this Policy; or

Provided that investment made in development of an industrial park, it shall mean the date of handing over of possession to the first unit in the park.
 - b. For an existing enterprise making investment for expansion, the date on which the enterprise issues:
 - the first sale bill of the goods manufactured after completion of expansion; or
 - the first bill of commercial transaction after completion of expansion; or
 - the first receipt of deposit of fee/charges etc. for providing any service with respect to facilities set up after completion of expansion:

Provided that investment made in development of an industrial park, it shall mean



- a. price paid for the land;
 - b. cost of new factory sheds and other new industrial buildings;
 - c. price paid for new plant and machinery or equipment;
 - d. other investment made in new fixed assets essential for production of the unit as approved by the Screening Committee; and
 - e. technical know-how fees or drawing fee paid in lump-sum to foreign collaborators or foreign suppliers or paid to laboratories recognized by the State Government or the Government of India;
 - f. However investment made in land in excess of 30% of the total investment/EFCl made and expenditure in purchase of existing factory sheds, industrial buildings and old plant and machinery by the Enterprise shall not be included in investment/EFCl;
16. "Land Tax" means the tax payable under chapter VII of the Rajasthan Finance Act, 2006;
 17. "Large Enterprise" means a manufacturing enterprise other than Micro, Small and Medium Enterprises;
 18. "Manufacturing Enterprise" means an enterprise employing plant and machinery in processing of goods which brings into existence a commercially different and distinct commodity and shall include an enterprise in the production of Commercial off-the-shelf software, but shall not include such processing as may be specified by the State Government by an order;
 19. "Micro, Small or Medium Enterprise (MSME)" means a manufacturing enterprise notified as such under the Micro, Small and Medium Enterprises Development Act, 2006;
 20. "Most Backward Area" means a block, which is more backward than backward area and is notified as such by the Government in the Finance Department, by an order;
 21. "New Unit" means a new manufacturing or service enterprise set up by making investment within the meaning of clause 14 and includes a new unit set up by an existing enterprise at a site other than the existing site for manufacturing products or providing services which are different from those being manufactured or provided by it in the State, by making investment within the meaning of clause 14 and having separately identifiable books of accounts and depositing the taxes and duties leviable



- a. price paid for the land;
 - b. cost of new factory sheds and other new industrial buildings;
 - c. price paid for new plant and machinery or equipment;
 - d. other investment made in new fixed assets essential for production of the unit as approved by the Screening Committee; and
 - e. technical know-how fees or drawing fee paid in lump-sum to foreign collaborators or foreign suppliers or paid to laboratories recognized by the State Government or the Government of India;
 - f. However investment made in land in excess of 30% of the total investment/EFCl made and expenditure in purchase of existing factory sheds, industrial buildings and old plant and machinery by the Enterprise shall not be included in investment/EFCl;
22. "Person with disability (PwD)" means a person suffering from not less than forty per cent of any of the following disabilities:
 - a. blindness;
 - b. low vision;
 - c. leprosy-cured;
 - d. hearing impairment;
 - e. locomotor disability;
 - f. mental retardation;
 - g. mental illness
 as certified by a Medical Authority i.e. any hospital or institution specified for this purpose by the Government of Rajasthan under the Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995;
 23. "Revival of a Sick Industrial Enterprise" means, in case the sick industrial enterprise was lying closed due to sickness, re-commencement of commercial production, and in case of a running sick industrial enterprise, enhancement of production level due to infusion of fresh funds for change in production process/technology/product line, subject to condition that the enterprise provides employment to the extent of 50% in the first two years and 100% within five years from the date of commencement of commercial production of the maximum employment attained in any month of the 3 preceding years from the date of its declaration as a sick industrial enterprise;
 24. "Service Enterprise" means an enterprise engaged in providing or rendering of services including custom made software development and related services, as the Government in the Finance Department may notify by an order;
 25. "Sick Industrial Enterprise" means:
 - a. A manufacturing enterprise which has been declared sick before the commencement or during the operative period of this Policy by the competent authority under the provisions the Sick Industrial Companies (Special Provision) Act, 1985; or
 - b. A manufacturing enterprise, which has been taken over before the commencement or during the operative period of this Policy and sold during the operative period of the Scheme to a new management by RIICO/RFC/Central

- Financial Institutions/Banks;
26. "Sick Industrial Enterprise" means:
 - a. A manufacturing enterprise which has been declared sick before the commencement or during the operative period of this Policy by the competent authority under the provisions the Sick Industrial Companies (Special Provision) Act, 1985; or
 - b. A manufacturing enterprise, which has been taken over before the commencement or during the operative period of this Policy and sold during the operative period of the Policy to a new management by RIICO/RFC/Central Financial Institutions/Banks;
 27. "Stamp Duty" means the duty defined as stamp duty payable under the Rajasthan Stamp Act, 1998;
 28. "State Empowered Committee (SEC)" means the State Empowered Committee constituted under Section 3 of the Rajasthan Enterprises Single Window Enabling and Clearance Act, 2011;
 29. "Women/Schedule Caste (SC)/Schedule Tribe (ST)/Person with disability (PwD) enterprise" means an enterprise other than a Company constituted under the Companies Act, 1956 and other association of persons by whatsoever name it may be called, having:
 - a. Women/Schedule Caste (SC)/Schedule Tribe (ST)/Person with disability (PwD) as proprietor, in case of proprietorship enterprise; or
 - b. majority of partners who are Women/Schedule Caste (SC)/Schedule Tribe (ST)/Person with disability (PwD) and such partners are working partner(s) having more than 50% investment in the capital of the enterprise, in case of partnership including limited liability partnerships;
 30. "VAT" means the tax payable under the Rajasthan Value Added Tax Act, 2003;
 31. "Year" means financial year (From 1st April to 31st March) and quarter means the period of three months ending on 30th June, 30th September, 31st December and 31st March;

SECTION 1

Stratum of Digital Rajasthan

1.1 Preamble

e-Governance in Rajasthan has steadily evolved from computerization of Government departments to fragmented initiatives aimed at speeding up e-Governance implementation across the various arms of the Government at the State and local levels. These fragmented initiatives are being unified into a common vision and strategy under the Rajasthan e-Governance Framework leveraging the Rajasthan e-Governance Architecture. Rajasthan takes a holistic view of e-Governance initiatives across the State and departments, integrating them into a collective vision and a shared cause. Around this idea, a magnanimous State-wide infrastructure reaching down to the remotest of villages is evolving, and large-scale e-Governance initiatives are taking place to enable easy, reliable access of people to the Government the e-Way.

Over the last few decades, evolutions in the Information Technology & Electronics (ITE) arena have emerged as the most significant enablers for improving efficiency & effectiveness of the Government & non-government organisations. Rajasthan recognizes the enormous potential of Electronics and Information technology and has made significant efforts to ensure that the benefits of these sectors percolate to its citizens.

Rajasthan's multicultural population of 6.86 crore lives and works on a land area of 342239 square kilometres, and has learned to combine skills and diligence with education and technology to sustain the momentum of economic growth. There is a recognition that information technology is needed to leverage Rajasthan's intellectual capital for the State to be the leader and benchmark for e-Governance. A concerted effort to harness computer power began in the early 1980s, and in a manner that has become a state formula, the Government has taken the leadership reins of the race.

e-Governance is seen as a key element of the Rajasthan's governance and administrative reform agenda. The Rajasthan e-Governance Framework and Architecture has the potential to enable huge savings in costs through the sharing of core and support



infrastructure, enabling interoperability through standards, and of presenting a seamless view of Government to citizens. The ultimate objective is to bring public services closer to citizens.

Rajasthan emphasises that creating digital opportunities in the 21st century is not something that happens after addressing “core” development challenges, but it is rather a key component of addressing those challenges. There are three key challenges in stepping up e-Governance: investments in and access to ICTs, capacity building to utilize e-Governance services, and promoting people’s participation in e-democracy. It is hoped that improved access to information and services will provide economic and social development opportunities, facilitate participation and communication in policy and decision-making processes, and promote the empowerment of the marginalised groups. In its continuing endeavour of development, the Rajasthan e-Governance, IT & ITES Policy 2015 envisages promoting citizen access to ICTs for encouraging their participation in e-Governance. The Policy is for the people, by the people. Though the 33 districts of Rajasthan are at various stages of development, the Policy attempts to highlight the possibilities for other districts that are similar to capital in levels of development. To promote the IT / ITES Industry in the city, this Policy attempts to develop a more modern and vibrant ecosystem for Electronics and IT industry to support electronic governance initiatives of the Government of India and attract investment and talent to such industries in Rajasthan. Key focus areas of the policy include pioneering e-Governance initiatives, research & development in Electronic System Design and manufacturing, support of the Micro Small & Medium Enterprises and promotion of entrepreneurship that harnesses the huge talent pool of the people of Rajasthan, and ensuring inclusive growth – for one and for all.

1.2 Rajasthan e-Governance & IT Mandate

A. Vision

To achieve good governance and facilitate inclusive growth, harnessing ICT and evolving e-Governance with improvement in delivery of services, bridging the digital divide and evolving Digital Rajasthan.

B. Mission

- a) Establishing complete participatory & transparent open Governance and Citizen



- Centric IT and e-Governance for the residents of Rajasthan
- b) Branding Rajasthan on the IT Landscape
 - i. Establishing 7 Smart Cities in Rajasthan by 2020
 - ii. Positioning Rajasthan as Best IT Investment Destination
 - iii. Positioning and Branding Jaipur as IT, ITeS and R&D Hub in North and West India
- c) Improvement in the environment for IT Industry in Rajasthan.

C. Objectives

- a) Till 2025:
 - i. Achievement of up to 500,000 direct employable professionals in the ICT sector vide implementation of ICT/ESDM initiatives in Rajasthan with establishment of Rajasthan Skills Registry.
 - ii. Development of at least 2,000 technology startups in the State and prioritization of IT/ITeS/ESDM sector under Rajasthan Venture Capital Fund with specific capital for development of IT/ITeS/ESDM startups in Rajasthan.
 - iii. Increase in the current investment in IT/ITeS sector by 10 times.
 - iv. Increase in the IT turnover to INR 50,000 crore.
 - v. Increase in IT exports from the State to INR 5000 crore.
 - vi. Making two individuals (at least one female) in every household e-literate so as to bridge the digital divide.
- b) Improvement in delivery of public services by leveraging e-Governance and m-Governance to achieve Efficiency, Effectiveness, Economy, Transparency, Accountability and Reliability in service delivery across all departments and functions and Re-engineer the

Objectives

Till 2025:

- Make two individuals (at least one female) in every household e-literate
- Achieve up to 5,00,000 direct employable professionals in the ICT sector
- Develop at least 2,000 technology startups
- Prioritize IT/ITeS/ESDM sector
- Increase in the current investment in IT/ITeS sector, Increase IT turnover to INR 50,000 crore. and Increase in IT exports from the State to INR 5000 crore.

- Government business practices and rules to ensure hassle-free service delivery.
- c) Ensuring requisite connectivity to all Government offices up to Panchayat level by 2016.
 - d) Creating centralized, integrated and unified state datasets to ensure uniformity, de-duplication and updating.
 - e) Providing secure e-Space for personal/official storage with facility for authentication and workflow to residents and organizations, private or public, in Rajasthan.
 - f) Rise in awareness among the school and college children and society as a whole regarding environmentally sound e-Waste management and take steps for its proper disposal.
 - g) Implementation of a uniform website policy for Rajasthan Government with emphasis on user-friendliness of the interface for all inclusive percolation of the benefits of IT.
 - h) Promotion of Robotics and Open Source Technology for IT initiatives in Rajasthan.

Objectives

- **Establishing Smart Cities**
- **Automated Service Delivery with automated one-time verification of Government documents**
- **Connectivity up to Panchayat level by 2016**
- **Centralized, integrated and unified State Datasets**
- **Promotion of Robotics**
- **Promotion of Open Source Technology**

SECTION 2 e-Governance for All

2.1 Service Delivery – e-Governance and m-Governance

- A. Enabling actions shall be taken for implementation of existing and future e-Governance and m-Governance projects in the State with emphasis on Service Delivery, Right to Information and Grievance Redressal.
- B. e-Enablement of all public services shall be carried out, which would include e-Submission of forms, electronic workflows, e-Payments, Use of DSC, online/SMS-based status tracking and final delivery of services through e-means. It would also include (wherever required) cross-sharing of data amongst various departments/Govt. agencies, and e-Authentication.
- C. Uniform and Unified Datasets, collated centrally as a Hub shall be developed to take care of issues like duplication, isolation and obsolescence. In complete adherence to the State e-Governance Framework, such Datasets shall follow a common structure, shall be centrally located, controlled and managed, and shall provide complete flexibility of expansion and integration using state-of-the-art technologies.
- D. Affidavits and Notary Attestation shall be completely removed and Datasets shall be used instead of documents for service delivery.
- E. Individual, Family, Governmental and Organisational secure e-Space shall be provided to residents and organisations to enable them to secure their digital dialog and

- **Easy access and delivery of all Government services:**
 - **Automated Unified Service Delivery and benefits transfer using e-Mitra and Bhamashah**
 - **Unrestricted and seamless means of service delivery – Web Portals, Mobile, e-Mitra Kiosks**
 - **Automated electronic verifications and secure storage – Raj eVault**
- **Next Generation IT Infrastructure:**
 - **Connectivity till village level (RajNET)**
 - **Complete readiness for mobile governance**



to allow safe document storage, sharing, e-Sign and approval protocol to avoid providing attestation of duplicate documents, enabling service delivery through all Government departments centrally in a paperless fashion.

- F. One Person One e-Identity shall be achieved with unique online profile for each citizen under a common framework.
- G. For delivering e-Services to citizens, Government will promote the use of upcoming technologies like NFC, cloud computing and social media. Further, multiple channels like mobile phones, tablets, call centres, TV, etc. will be used for such delivery.
- H. Efforts would be undertaken to provide all government services through mobile devices for 'on-the-move' service delivery. Endeavour will be to provide services 'Anywhere, Anytime, Any network, Any device'.
- I. Self-service kiosks shall be installed across the State.
- J. An integrated platform for reality check leveraging iFacts shall be used by the government to ensure end-to-end grievance redressal.
- K. An endeavour would be made to analyse the behaviour of the citizens in usage of Government portals so as to constantly improve these portals and make them more user friendly.
- L. Knowledge resources / Digital Library will be set-up that will maintain a repository of documents for use by general public and Govt. authorities. This would include official gazette notifications, acts, rules, regulations, circulars, policies and scheme documents for electronic access in a time-bound manner.

2.2 Office Automation

- A. Government shall notify the acceptance of correspondence through emails received from the public. Further, use of official email ID would be mandated by Government for all official communications, which, inter alia, includes (i) responding to such correspondence of citizens, and (ii) for intra- and inter-departmental communication within Government and communication with Govt. of India to make citizen-government interface more efficient and effective.
- B. Complete office automation in an integrated fashion shall be carried out, with end-to-end automated office processes and workflow automation, and shall ensure all government departments integrated on a common platform.



- C. Common Gateway for all citizen services with corresponding required information available to public leveraging eMitra Integrated Service Delivery Platform and Bhamashah.
- D. Integrated GIS-based Decision Support System shall be implemented and commissioned with GIS Mapping and Layers for all respective departments, and Government shall mandate the use of only this GIS-based decision making system by all departments.

2.3 IT Infrastructure

- A. Creation of next generation IT Infrastructure and up-gradation of existing IT infrastructure shall be undertaken to bring it at par with the world class state-of-the-art infrastructure.
- B. Further, development of IT infrastructure shall be undertaken to support the increasing requirements of Rajasthan including the rural areas to ensure that high speed internet connectivity reaches every citizen.
- C. Extended State Data Centre to provide 'on-the-go' services through an integrated cloud-based mechanism to all the departments to minimize the overheads associated with managing the physical infrastructure and to ensure that all the components of IT infrastructure (Hardware, Software, Network, etc.) would be available as simple and configurable services.
- D. Government shall endeavour to provide every state resident with high speed internet access (wired and wireless) for creation of smart city infrastructure This will be achieved, inter alia, through (i) making 7 Wi Fi cities in Rajasthan (ii) creation of fibre-ready urban homes.

- **Automation of all Government offices**
 - **GIS-based Decision Support System with GIS Mapping (Rajdharaa)**
 - **Centralized Grievance Redressal (Rajasthan Sampark)**
 - **Centralized Monitoring and Accountability System (RAAS & iFacts)**
- **Unification of Government information — creation of Centralized Data Repository**
- **'Anywhere, Anytime, Any network, Any device' service delivery through mobile phones, tablets, call centres, TV, etc.**
- **One Person One e-Identity with unique online profile for each resident**
- **Creation of next generation IT Infrastructure**

- E. Government shall encourage Green IT initiatives. Departments shall be disposing off their unusable, redundant and irreparable IT infrastructure as per the guidelines of e-Waste management. For this, guidelines on the obsolescence of IT hardware will be formulated.
- F. Rajasthan Information Security Policy shall promote public trust in Government, with continual improvements to protect the State from cyber attacks and cyber-disruptions, thus enhancing preparedness, security and resilience.

SECTION 3

Bridging Human Capital Divide

3.1 Capacity and Skill Building

- A. Rajasthan e-Governance Centre of Excellence with a mandate of IT for Jobs and Employability Assurance, Rural ICT workforce development and IT Education Incubation Units shall be established, and shall become the central authority for Capacity and Skill Building in IT/ITeS/ESDM/R&D fields in Rajasthan. This CoE shall be:
- Strengthening of IT & Personality Development Program/soft skills curriculum with significant weightage in overall performance/grades and spreading of awareness about job opportunities in IT.
 - Standardized IT/ ITeS/ BPO/ KPO/ ESDM/ ITES-BPO certification for job aspirants for the industry. The certification shall be granted by relevant authorities in Government in association with the private sector thus adding credibility to the IT professional skills, reducing time and cost of hiring for recruiters.
 - Facilitating training and development of IT skills as well as personality development program for teachers and encouraging them to use IT to enhance the effectiveness of teaching.
 - Encouraging introduction of IT Clubs for students & faculty.
 - Facilitating partnership between educational institutes and industry to provide courses/ training on emerging IT technologies.
 - Facilitating setting up of e-Learning centres, in rural/ slum areas for promotion of IT education along with soft skills development and spreading awareness about job opportunities in IT.

- Making two individuals (at least one female) in every household e-Literate
- Facilitating partnership between educational institutes and industry
- Utilising Digital India and Digital Rajasthan campaign for mass literacy
- Creating Rajasthan Skills Repository with Data bank of youth who are IT literate



- g) Transforming non-IT human resource to IT specialities taking advantage of Digital India and Digital Rajasthan campaign.
 - h) Strive towards digital economy and knowledge based society drawing upon the strength of Digital Rajasthan.
- B. Possibility of introducing distance learning program/ vocational courses shall be explored in this respect. This would enable “anytime anywhere” learning.
- C. Spreading awareness about job opportunities in IT and facilitating short-term job oriented certificate courses in various IT skills and Personality Development Program for unemployed educated youth shall be done.
- D. Rajasthan Skills Repository with Data bank of students who are IT literate and suitable for deployment in the IT industry would be established, maintained and shared with the industry. This would enable the industry to have easy access to skilled manpower.



SECTION 4

Inclusive Industry Promotion

4.1 IT/ITeS Industry Development

A. Benefits to Manufacturing Enterprises

- a) Investment up to Rs.5 crore
 - i. Investment subsidy of 30% of VAT and CST which have become due and have been deposited by the enterprise for seven years.
 - ii. Employment Generation Subsidy up to 20% of VAT and CST which have become due and have been deposited by the enterprise, for seven years.
- b) Investment more than Rs.5 crore and up to Rs.25 crore
 - i. Investment subsidy of 60% of VAT and CST which have become due and have been deposited by the enterprise, for seven years.
 - ii. Employment Generation Subsidy up to 10% of VAT and CST which have become due and have been deposited by the enterprise, for seven years.
- c) Investment more than Rs.25 crore
 - i. Investment subsidy of 70% of VAT and CST which have become due and have been deposited by the enterprise, for seven years.
 - ii. Employment Generation Subsidy up to 10% of VAT and CST which have become due and have been deposited by the enterprise, for seven years.

The total amount of subsidy as mentioned above shall not exceed 100% of EFCI.

- **VAT/CST Incentive – Investment & Employment Generation Subsidy**
 - Up to 80% for Manufacturing
 - Up to 90% for Women, SC, ST, Persons with Disability
 - Up to 100% for Backward and Most Backward Areas
 - Up to 80% of VAT Reimbursement for Services Industry
 - Up to 50% exemption on Land Tax, Electricity Duty, Entry Tax
 - Up to 100% exemption on Stamp Duty

- d) Exemption from payment of 50% of Electricity Duty for seven years.
- e) Exemption from payment of 50% of Land Tax for seven years.

B. Benefits to Service Enterprises

- a) Reimbursement of 50% of amount of VAT paid on purchase of plant and machinery or equipment for a period up to seven years from date of issuance of the entitlement certificate, provided that for enterprises engaged in providing entertainment, the reimbursement shall be restricted to 25% of such amount of VAT paid;
- b) Exemption from payment of 50% of Electricity Duty for seven years
- c) Exemption from payment of 50% of Land Tax for seven years.

C. Special Provisions for Women, Scheduled Castes, Scheduled Tribes and Persons with Disability Enterprise

Eligible Women/Schedule Caste (SC)/Schedule Tribe (ST)/Person with disability (PwD) enterprises shall in addition to the benefits specified in other clauses, be eligible to avail the following additional benefits:

- a) A manufacturing enterprise shall get additional Investment Subsidy to the extent of 10% of VAT and CST which have become due and have been deposited by the enterprise.
- b) A service enterprise shall get additional 10% reimbursement of VAT paid on the plant and machinery or equipment for a period up to seven years from date of issuance of the entitlement certificate for this purpose.

D. Benefits to Enterprises in Backward and Most Backward Areas

- a) An eligible enterprise, making investment in a backward area or a most backward area shall be granted the same benefits as would have been applicable if the enterprise was located elsewhere in the State but the period of benefit, except for interest subsidy, shall be extended to ten years.

Provided that the State Government may, on the recommendation of the State Empowered Committee (SEC), grant to a manufacturing enterprise and a service

enterprise making an investment in a backward area, such benefits as mentioned in below mentioned clauses b and c respectively, which are applicable for investments in most backward areas, with a view to attract investment in the backward area.

- b) A manufacturing enterprise, making investment in a most backward area shall, in addition to benefits under clause a above, get additional investment subsidy of 20% of the VAT and CST which have become due and have been deposited by the enterprise, for a period of seven years.
- c) A service enterprise making investment in a backward area shall, in addition to benefits mentioned in other clauses of the Scheme, get additional 10% reimbursement of VAT paid and a service enterprise making investment in a most backward area shall, in addition to benefits mentioned in other clauses, get additional 20% reimbursement of VAT paid on the plant and machinery or equipment for a period up to seven years from the date of issuance of the entitlement certificate for this purpose.

Special Customized Packages as per RIPS 2014 and subsequent amendments/addendums

E. Power to Grant Customized Package

- a) Notwithstanding anything contained in the Scheme, the State Government, on the recommendation of State Empowered Committee (SEC), may grant a customized package under section 11 of the Rajasthan Enterprises Single Window Enabling and Clearance Act, 2011, to the manufacturing enterprises investing more than Rs.200 crore or providing employment to more than 400 persons.
- b) Notwithstanding anything contained in the Scheme, the State Government may grant a customized package to the service enterprises investing more than Rs.200 crore or providing employment to more than 500 persons.

F. MSME Sector

Manufacturing enterprises in the MSME sector shall, in addition to benefits mentioned above, if applicable, be granted the following benefits:

- a) For micro and small enterprises in rural areas, 75% exemption from payment of electricity duty in place of 50% exemption from payment of electricity duty, as provided in notification number F.12(99)FD/Tax/07-56 of 15.10.2009, as amended from time to time.
- b) Reduced CST of 1%, against C Form, on sale of goods for a period of ten years, for micro and small enterprises as provided in notification number F.12(99)FD/Tax/07-66 of 14.02.2008 as amended from time to time;
- c) 50% exemption from payment of Entry Tax on raw and processing materials and packaging materials excluding fuel as provided in notification number F.12(99)FD/Tax/07-65 of 14.02.2008 as amended from time to time; and
- d) Reduced Stamp Duty of Rs.100 per document in case of loan agreements and deposit of title deed and lease contract and Rs.500 per document in case of simple mortgage with or without transfer of possession of property executed for taking loan for setting up of micro, small or medium enterprises or enhancing credit facilities or transfer of loan account from one bank to another by MSME as provided in notification number F.2 (97)FD/Tax/2010- 11 of 25.04.2011.

G. ESDM Sector

Enterprises making a minimum investment of Rs.25 lakh rupees in the ESDM sector shall, be granted the following benefits:

- a) Investment Subsidy of 75% for first four years, 60% for next three years and 50% for the last three years, of VAT and CST which have become due and have been deposited by the enterprise, for ten years;
- b) Employment Generation Subsidy up to 10% of VAT and CST which have become due and have been deposited by the enterprise, for ten years; and
- c) 50% exemption from payment of Entry Tax on capital goods, for setting up of plant for new unit or for expansion of existing enterprise or for revival of sick industrial enterprise, brought into the local areas before the date of commencement of commercial production/operation.

H. Robotics Centre

The State shall promote establishment of Robotics Centres acting for the future of

robotics by casting the vision, and supporting the technology of robotics through Robotics enterprise promotion in Rajasthan. On investments of Rs.50 crore or more for establishment of such centres, Interest Subsidy of 5% on term loan taken from State Financial Institution/Finance Institution/banks recognized by RBI subject to a maximum of Rs.10 lakh per year for a period up to 5 years or up to the period of repayment of loan, whichever is earlier, from the date of commencement of the centre shall be provided.

**Interest
subvention on
investment upto
Rs.50 crore for
Robotics**

I. Benefits for Internet Connectivity

- Subsidy on Bandwidth for Connectivity (for BPOs/KPOs)
25% subsidy on Bandwidth for connectivity paid to Internet Service Provider (ISP), subject to maximum of Rs.5 lakh per annum, shall be available for a period of two years from the date of starting commercial production/operation. The subsidy amount will be determined on the basic benchmark prices to be declared by Government separately.
- Gateway and High Bandwidth Backbone
The State Government shall encourage private sector to become ISPs in the districts and set up international gateways in the State. The State Government shall facilitate and promote the establishment of broadband digital network (both wired and wireless) in the State.

J. Rajasthan Venture Capital Fund/SME Tech Fund RVCF II

25% of Rajasthan Venture Capital Fund shall be en-marked for IT/ITeS Sector. SME Tech Fund RVCF II with a committed corpus of over Rs.155 crore, raised by RVCF shall support enterprises in the high tech/emerging sectors that are of value to the Indian Economy,

- 25% subsidy on Internet Bandwidth
- Venture Capital
 - 25% of Rajasthan Venture Capital Fund en-marked for IT/ITeS Sector
 - RVCF SME Tech Fund II for IT/ITeS Sector
- Exemption from Zoning Regulations and Land Conversion to IT Parks/IT Campuses, IT Industry

commercially viable in terms of profitability and exhibit substantial future growth potential.

IT/ITeS enterprises shall be eligible for support from this fund.

K. Exemption from Zoning Regulations and Land Conversion

IT Parks/IT Campuses notified by the Department of Industries/Department of IT&C and IT industry, i.e., IT/ITES Units/Companies shall be exempted from the Zoning Regulations and payment of conversion charges, subject to the provisions of State Acts and the following:

- a maximum area limit (to be notified separately)
- ensuring environmental safeguards

L. Stamp Duty and Registration Fee Exemption

- a) Enterprises with investment up to Rs.5 crore shall be provided 50% exemption from payment of stamp duty on purchase or lease of land and construction or improvement on such land.
- b) Enterprises with investment of Rs.5 crore and more shall be provided 100% exemption from payment of Stamp Duty on purchase or lease of land and construction or improvement on such land.

M. Interest Subsidy

Service Enterprises making investment more than Rs.25 lakh shall be provided 5% Interest subsidy on Term Loan taken from State Financial Institutions/ Financial Institutions/ Bank recognized by Reserve Bank of India for purchase of equipment required for rendering services related to IT/ITeS Sector, subject to a maximum of Rs.5 lakh per year for a period of 5 years or up to the period of repayment of loan, whichever is earlier, from the date of commencement of commercial operation.

The enterprises which are engaged in manufacturing and rendering of services

- **Upto 5% Interest Subsidy on term loans**
- **Reimbursement of Patent Filing Costs upto Rs.3 lakh per patent awarded per year**
- **30% Reimbursement of Quality Certification Costs upto Rs.5 lakh**

both, in IT/ITeS Sector, shall have an option to opt for:

- a. Investment Subsidy and Employment Generation Subsidy, or
- b. Interest Subsidy

N. Patent Filing Costs

The Government of Rajasthan is keen to encourage the filing of patents by companies located within the State. The Government will, therefore, reimburse the cost of filing patents to companies having their headquarters in Rajasthan for successfully receiving patents. Reimbursement of such cost will be limited to a maximum of Rs.3 lakh per patent awarded per year.

O. Networking and Business Growth Support

- Business Networking
Government shall promote and encourage participation in international events by the ICT industry in form of joint delegation.

P. Quality Certifications

The Government of Rajasthan will reimburse 30% of expenditure incurred for obtaining quality certifications for CMM Level 2 upwards. Reimbursement will be limited to a maximum of Rs.5 lakh. Similar reimbursement will be made to BS7799 for security and also for ITES Companies for achieving COPC and eSCM certifications. The IT/ITES units/companies/firms can claim this incentive only once. A company/firm can claim incentive for BS7799 or any one of CMM Level 2 upwards/COPC/ eSCM.

Q. Protection of IPR

There will be a legal mechanism to control piracy of information technology products. Intellectual Property Right (IPR) protection support will be given to all entrepreneurs developing software and animation. All online transactions would be secured by a fool-proof mechanism of digital signature and biometric-like

Outstanding Performance Awards in 4 categories with a grant of Rs 1.5 lakh for each award

fingerprint and its recognition.

R. Outstanding Performance Awards

Registered IT/ITES units in the State will be considered for 'Outstanding Contribution Award' in form of grant each year in each category on the basis of objective criteria published by the Government.

Awards shall be given to the following categories:

- New Ventures – Most Promising Venture
- IT Enterprises – Best performing IT Company
- Innovation Leader – Enterprise that has displayed the maximum innovation in its products and services
- Startup Ventures

A total of 3 awards shall be given in each category, with a Grant of Rs.1.5 lakh for each award.

S. Incubation Units

The state shall be promoting sectorial incubation units for development of concerned sector, in partnership with industry and academia. IT/ITeS/ESDM/R&D Incubation Units in Sitapura EPIP Zone shall be promoted by the State.

T. Manpower Development Subsidy

Subsidy on Manpower development shall be provided in respect of Training/Technical up-gradation/Skill up gradation of local persons in a registered training organization/institution subject to a ceiling

Investment in fixed capital	Total Ceiling
Up to Rs.25 lakh	Rs.1.5 lakh
Rs.25 lakh to 50 lakh	Rs.3 lakh
Rs.50 lakh and above	Rs.5 lakh

**Reimbursement
on fixed capital
up to Rs.5 lakh
for Manpower
Development**

U. Auxiliary Support for Investors

All IT companies would be notified as 'Public Utility Service' providers under the Industrial Disputes Act, 1947.

All IT units, given the nature of their operations, will be granted permission to work on a 24x7 model.

4.2 General Incentives

General incentives available to the ICT industry, automatically are:

- a) IT/ITES units are exempt from the purview of the Pollution Control Act, except in respect of power generation sets.
- b) IT/ITES units/companies are exempt from the purview of statutory power cuts.
- c) The regulatory regime of labour laws shall be simplified to suit the needs of IT & ITES companies. General permission shall be granted to all IT & ITES companies to have 24x7 operations/to run in three shifts.
- d) Barriers pertaining to employment of women at night shall be removed, the companies will be instructed to offer employment to women with adequate security to them for working at night.
- e) The IT & ITeS companies will be permitted to self-certify that they are maintaining the registers and forms as contemplated and prescribed under the following Acts:
 - i. The Payment of Wages Act, 1936
 - ii. The Minimum Wages Act, 1948
 - iii. The Workmen's Compensation Act, 1923
 - iv. The Contract Labour (Regulations and Abolition) Act, 1970
 - v. Employees State Insurance (Amendment) Act, 2010
 - vi. Bombay Shops and Establishment Act
 - vii. The Payment of Gratuity Act, 1972
 - viii. The Maternity Benefit Act, 1961
 - ix. Equal Remuneration Act, 1976
 - x. Water (Prevention and Control of Pollution) Act, 1974
 - xi. Employment Exchange Act, 1959
 - xii. The Factories Act, 1948
 - xiii. Employees' Provident Fund & Miscellaneous Provisions Act, 1952
- f) IT/ITES units/companies and non-hazardous hardware manufacturing industry are declared as essential service.

SECTION 5

Green IT

5.1 Condemnation and Disposal of IT Equipment

A. Applicability

- a) All Departments/Companies/Corporations/Institutions/Organizations/Bodies on whom this Policy is applicable must ensure that there are proper procedures in place for the condemnation and disposal of IT equipment that is unserviceable or is no longer required. This Policy shall be applicable to the following departments and bodies:
 - i. All Government Departments under the aegis of Government of Rajasthan
 - ii. All Companies/Corporations/Autonomous Bodies/Local Bodies under the aegis of Government of Rajasthan
 - iii. All PSUs under the aegis of Government of Rajasthan

B. Definition of IT Equipment

- a) Hardware
By its own nature IT equipment is constantly evolving and this can therefore become a very broad category making it impossible to list every single item or group of items within this policy document; however a non-exhaustive list of IT and related equipment to be considered for this purpose is associated.
- b) Software
Software can be summarized as follows:
 - i. Desktop Software: all applications and related data loaded onto a desktop or laptop computer.
 - ii. Server Software: all applications and related data loaded onto a local or networked server.
 - iii. Hosted Solution: all applications and related data (owned by GoR) hosted on/off site.

C. Useful life of various items and replacement

Depending upon the nature, usage, maintenance cost, obsolescence in terms of technology, up-gradation of technology, etc., the related items are classified in following categories for the purpose of disposal of these items. The detailed non-exhaustive list of category-wise items is available in section 5.2:

Category	Nature	Suggestive Items	Useful/Productive Life
I	Immediate obsolescence / use-and-throw products	Printing Consumables (Non-refillable Ink Toners), CDs, DVDs, Digital Audio Tapes (DAT), UPS Batteries	As per usage. No residual value determined. However, proper inventories of purchase, issue and final use/disposal, etc. would be maintained in order to keep an accounting system.
II	Low life/ Fast obsolescence products	Mobile Phones	Two years
		Laptops, Pen Drive, External Hard Disk Drive (HDD), etc.	Three years in case of Laptops, Pen Drive, HDD, etc. for replacement. Residual values determined separately.
III	Medium obsolescence / Medium life products	Desktops, Printers, Multi-functional Devices (MFDs), Scanners, Multi-media Projectors, UPS Systems,	Five years for replacement.
IV	Slow obsolescence/ long life products	Fax, EPABX, Electronic items such as cameras, TVs, DVD Players, Public Address Systems, Electronic Calorie Meter, etc.	Seven years
V	Software	Software like MS Office, Oracle, MS-SQL, MS-Windows, Antivirus, etc.	Please refer to the explanation given below.

Note: The above mentioned items can be used beyond the mentioned/specified life till such time these items continue to serve the purpose.

- a) Use-and-throw products: These products have no fixed life and can be used till these are consumed or are under replacement warranty (like SMF batteries are covered under 1 year replacement warranty from the manufacturer). However, the user departments must maintain proper inventory of purchase, issue and disposal thereof so as to ensure prudent official use of these items.
- b) Low life products: The general useful/productive life in the case of products/items in this category would be two years in the case of a Mobile Phone Instrument and three years in the case of laptops and other items mentioned therein for replacement purposes. However, one may use the same for longer period so long as the item/equipment serves the purpose.
- c) Medium life products: The useful/productive life of products in this category is fixed at 5 years even though the products can be continued to be used for longer period in an organisation/department, being a multiple level of usage in terms of level of works to be done like Software development/testing, Data Processing, Information searching, Word processing, etc. Accordingly, the life of these products is fixed as five years for replacement purposes. However, one can use the equipment for longer period so long as it fulfills the user requirements.
- d) Long life products: It has been observed that these products can be used for more than 5 years due to comparative stability in specifications/services. Accordingly, the replacement life of these products is fixed as 7 years. However, one can use the same for longer periods so long as these products serve the user requirements.
- e) Software: Purchase of software can be booked as a one-time office expenditure. The old software can be upgraded into latest version by taking the benefit of old purchase in case scheme is available from the developer/principal company. In the alternative, latest software can be purchased and in that case the residual value of the old software can be treated as NIL. The old software can be donated to the State/Central recognised Service/Education Organisations.

D. Grounds for condemnation

For all condemnation cases, the concerned department shall form a committee comprising minimum 3 members, one of which shall be from the finance/accounts department and one member shall be a representative of DoIT&C in the department. If

in case there is no member of DoIT&C in the concerned office, the matter shall first be escalated to the HO of the concerned department and if not resolved, then to the DoIT&C.

The ICT Products/Equipment can be condemned on following grounds:

- a) Technically obsolete
 - i. Completed the life span as mentioned in Clause 4 and 5 and currently not in working condition.
 - ii. Technology outdated affecting performance and output that is expected out of it.
 - iii. Package Software can only be condemned by declaring it as technically obsolete when no more updates or support are available from OEM.
- b) Beyond Economical Repairs
ICT Products/Equipment can be declared BER when these Products/Equipment cannot be upgraded or maintained economically/warrant extensive repairs and replacement of sub-assemblies/accessories and the combined cost of which exceeds certain percentage (50%) of the current cost of an equivalent system. The same can be ascertained from the vendor who is giving AMC support.
- c) Non-repairable
ICT Products/Equipment can be condemned due to non-availability of spare-parts.
- d) Physically damaged
ICT Products/Equipment that have been damaged beyond repair due to fire or any other reason beyond human control can be condemned as Physically Damaged.

E. Disposal/alternate Use

- a) The primary mechanism of alternate use, which must be considered in cases where the said item(s) are still in usable condition, should be to transfer the item(s) to Government School(s) of the districts in which the said office is located.
- b) For this purpose, if the said item(s) are found usable by the DoIT&C representative in the department, a committee with DEO/BEO should be constituted to decide where the items can be sent for optimum usage.
- c) Only if the possibility of usage by Government schools is found negligible, should the process of disposal be initiated by the department/office.

- d) The mode of Condemnation may be done either by Buyback or Disposal, as decided by the committee formed for condemnation by the concerned department.
- e) Buyback
If the committee decides to choose Buyback mode of Condemnation, the proposal for purchasing new ICT Products/Equipment under buyback mode will be sent by the concerned Department to DoIT&C for obtaining NOC. The Buyback rates for specific hardware as finalized in the ongoing Rate Contract shall be applicable. If the Buyback rates are not specified in the Rate Contract then the committee will decide the Buyback rates based on their assessment, after comparing similar Rate Contract in the past and in consultation with the Vendor.
- f) Disposal
If the committee decides to choose disposal mode of Condemnation, the concerned Department can dispose it through Tender, Auction or Scrap depending on assessed residual value of the ICT Products/Equipment and as per the procedure laid down in this Policy document.
 - i. For the Products/Equipment with residual value above Rs.2 Lakh, the Department can dispose it through Advertised Tender or Public Auction.
 - ii. For Products/Equipment with residual value less than Rs.2 Lakh, the mode of disposal will be determined by Department's Competent Authority, keeping in view the necessity to avoid accumulation of such Products/Equipment and consequential blockage of space and also the deterioration in value of Products/Equipment to be disposed of.

F. Process of Disposal through Advertised Tender

The broad steps to be adopted for this purpose are as follows:

- a) Preparation of bidding documents
- b) Invitation of tender for the condemned ICT Products/Equipment to be sold
- c) Opening of bids
- d) Analysis and evaluation of bids received
- e) Selection of highest responsive bidder
- f) Collection of sale value from the selected bidder

- g) Issue of sale release order to the selected bidder
 - h) Release of the condemned ICT Products/Equipment that were sold to the selected bidder
 - i) Return of bid security to the unsuccessful bidders
- The important aspects to be kept in view while disposing the condemned ICT Products/Equipment through advertised tender are as under:
- a) The basic principle for sale of condemned ICT Products/Equipment through advertised tender is ensuring transparency, competition, fairness and elimination of discretion. Wide publicity should be ensured of the sale plan and the Condemned ICT Products/Equipment to be sold. All the required terms and conditions of sale are to be incorporated in the bidding document comprehensively in plain and simple language. Applicability of taxes, as relevant, should be clearly stated in the document.
 - b) The bidding document should also indicate the location and present condition of the condemned ICT Products/Equipment to be sold so that the bidders can inspect the condemned ICT Products/Equipment before bidding.
 - c) The bidders should be asked to furnish bid security along with their bids. The amount of bid security should ordinarily be ten per cent of the assessed or reserved price of the condemned ICT Products/Equipment. The exact bid security amount should be indicated in the bidding document.
 - d) The bid of the highest acceptable responsive bidder should normally be accepted. There should normally be no post tender negotiations. If at all negotiations are warranted under exceptional circumstances, then it can be with HT (Highest Tenderer) if required.
 - e) In case the total quantity to be disposed of cannot be taken up by the highest acceptable bidder, the remaining quantity may be offered to the next higher bidder(s) at the price offered by the highest acceptable bidder.
 - f) Full payment, i.e. the residual amount after adjusting the bid security should be obtained from the successful bidder before releasing the condemned ICT Products/Equipment.
 - g) In case the selected bidder does not show interest in lifting the sold condemned ICT Products/Equipment, the bid security should be forfeited and

other actions initiated including re-sale of the condemned ICT Products/Equipment in question at the risk and cost of the defaulter, after obtaining legal advice.

G. Process of Disposal through Auction

- a) The Department may undertake auction of condemned ICT Products/Equipment to be disposed of either directly or through approved auctioneers.
- b) The basic principles to be followed here are similar to those applicable for disposal through advertised tender so as to ensure transparency, competition, fairness and elimination of discretion. The auction plan including details of the condemned ICT Products/Equipment to be auctioned and their location, applicable terms and conditions of the sale, etc. should be given wide publicity.
- c) While starting the auction process, the condition and location of the condemned ICT Products/Equipment to be auctioned, applicable terms and conditions of sale etc., should be announced again for the benefit of the assembled bidders.
- d) During the auction process, acceptance or rejection of a bid should be announced immediately. If a bid is accepted, earnest money (not less than twenty-five percent of the bid value) should immediately be taken on the spot from the successful bidder either in cash or in the form of Deposit-at-Call-Receipt (DACR), drawn in favour of the Department selling the condemned ICT Products/Equipment.
- e) The condemned ICT Products/Equipment should be handed over to the successful bidder only after receiving the balance payment.
- f) The composition of the auction team will be decided by the competent authority. The team should however include an Officer of the Internal Finance Wing of the Department.
- g) A sale account should be prepared for goods disposed of, duly signed by the officials who supervised the sale or auction.

H. Process of Disposal at Scrap Value or by Other Modes

- a) If the Department is unable to sell condemned ICT Products/Equipment in spite of its attempts through auction and advertised tender, it may dispose-off the same at its scrap value with the approval of the competent authority in consultation with

Finance division.

- b) In case the Department is unable to sell condemned ICT Products/Equipment even at its scrap value, it may adopt any other mode of disposal including destruction of the Products/Equipment in an eco-friendly manner so as to avoid any health hazard and/or environmental pollution and also the possibility of misuse of such Products/Equipment.
- c) All rules, regulations and norms of e-Waste Management, Energy Efficiency and bio-friendly disposal of all electronic waste containing substances like Lead, Cadmium, Mercury, PVC that have the potential to cause harm to human health and environment must be followed by the departments.

I. Responsibility of Department

- a) Each unit of department will prepare equipment condemnation note which should be individually numbered having equipment description, including the make, model, serial number, asset register number, purchase date, purchase price, reason for condemnation and additional information, if any.
- b) Department will constitute a condemnation committee which will review all condemnation notes and decide about the condemnation of equipment as per guidelines given above. The committee should have at least one member from accounts/finance background and also the representative of DoIT&C in the department as a member.
- c) All procedure and rules made under relevant Rules of the Government on maintenance of records for condemnation of non-consumables items will be made in these cases.
- d) The condemnation report so prepared by the department based on these guidelines will be sent to the headquarters of concerned department for approval by the nodal officer. The condemnation will be done only after approval is obtained from the headquarters of the said department. To avoid piece-meal approach, all cases of a department may be processed once a year in May-June.



5.2 LIST OF ICT EQUIPMENT

Category I

- CD ROM/DVD/Compact Disk
- Floppy Disk
- Tapes DAT/DLT
- Ribbons
- Toners – non refillable
- Ink jet cartridges
- Inks for output devices
- Any type of Cell/Batteries beyond repair

Category II

- Laptop Computers
- Note book Computers
- Palm top Computers/PDA
- iOS/Android/ Windows based mobile & smartphones, iPad/ Tablets
- Hard Disk Drives / Hard Drives
- RAID Devices & their Controllers
- Floppy Disk Drives
- CD ROM drives
- Tape Drives – DLT Drives / DAT
- Optical Disk Drives
- Other Digital Storage Devices, Pen Drive, Memory Card
- Key Board
- Monitor
- Mouse
- Multi-Media Kits
- Access Card
- Electronics Purse
- Electronics Wallet
- Universal Pre-payment card
- Smart card etc.



Category III

- Desktop
- Personal Computer
- Servers
- Work-station
- Nods
- Terminals
- Network PC
- Network interface card (NIC)
- Adaptor-ethernet/PCI/EISA/combo/PCMCIA
- SIMMs-Memory
- DIMMs-Memory
- Central Processing Unit (CPU)
- Controller-SCSI/Array
- Processors-Processor/Processor Power Module/Upgrade
- Dot-matrix printers
- Laser jet printers
- Ink jet printers
- Desk jet printers
- LED printers
- Line printers
- Plotters
- Pass book Printers
- Hubs
- Routers
- Switches
- Concentrators
- Trans-receivers
- Switch Mode Power Supplies
- Uninterrupted Power Supplies

Category IV

- Telephones
- Videophones
- Facsimile Machines/Fax cards
- Tele-Printers/Telex machines
- PABX/EPABX/RAX/MAX –Telephone exchange
- Multi plexers/Muxes
- Modems
- Telephone Answering Machines
- Tele-Communication Switching Apparatus
- Antenna & Mast
- Wireless Datacom Equipment
- VSATs
- Video Conferencing Equipment
- Including Set Top Boxes for both Video and Digital Signalling
- Fibre Cable
- Copper Cable
- Cables
- Connectors, Terminal Blocks
- Jack Panels, Patch Cord
- Mounting Cord, Patch Panels
- Back Boards, Wiring Blocks
- Surface Mount Boxes
- Printed circuit Board Assembly/populated PCB
- Printed Circuit Board/PCB
- Transistors
- Integrated Circuits/ICS
- Diodes/Thyristor/LED
- Registers
- Capacitors
- Switches (On/Off, Push- button, Rocker, etc.)
- Plugs/Sockets/Relays

- Magnetic Heads, Print Heads
- Connectors
- Microphones/Speakers

Category V

- Application Software
- Operating System

SECTION 6

Digitally Secure Rajasthan

6.1 Information Security Policy

A. Foundation of Information Security

The State of Rajasthan recognises its dependence on information systems for effective operations of its e-Governance Initiatives. It is, therefore, essential that this information infrastructure is secure from destruction, corruption, unauthorized access, and breach of confidentiality, however accidental or deliberate.

Information Security requirements are of utmost importance for the State. Successful internal co-operation requires that a common security concept prevails in the GoR.

The objective is to define standards to ensure that information is secure at all times, in turn creating a foundation upon which sound internal controls within the computerized environment can be exercised. This is applicable to all officers and officials associated with Rajasthan Government/Boards/Corporation/PSUs/Third Parties.

It is vital that we continue our efforts with security and risk management so as to equip ourselves to meet the challenges of service running catering to the citizens of the State and give each User Department the means to fulfil its mandate for delivering Citizen Services.

B. Need for Information Security

State requires an information security policy for the following reasons.

- a) **Maintaining Confidentiality:** Confidentiality of information is mandated by IT laws (IT Amendment Act 2008) followed by GoR. Different classes of information warrant different degrees of confidentiality. The hardware and software components that constitute the IT assets represent a sizable monetary investment that must be protected. The same is true for the information stored in its IT systems, some of which may have taken huge resources to generate, and some of

which can never be reproduced.

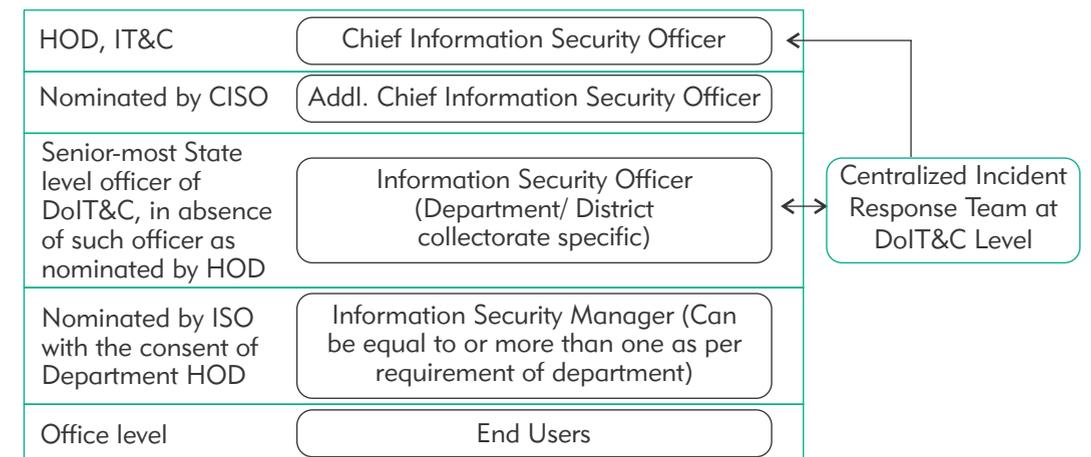
- b) **Integrity & Availability:** The integrity and availability of information, whether acquired, provided or created must be ensured at all times.
- c) **Safeguarding Critical Information:** Critical information like audit reports, budgets, sensitive and confidential information is protected from unauthorized access, use, disclosure, modification and disposal, whether intentional or unintentional.
- d) **Awareness among officers and officials:** officers and officials, third party users are made aware of the information security policy.

C. Review & Evaluation

The State shall be responsible for review and approval of Information Security Policy at the time of any major change(s) in the existing environment or once every year, whichever is earlier. Review shall take place in response to significant changes including but not limited to changes in risk assessment, security incidents, new vulnerability, change in technology or network infrastructure. The changes suggested in the Policy shall be approved from the appropriate authority and institutionalized within State with intimation to all concerned.

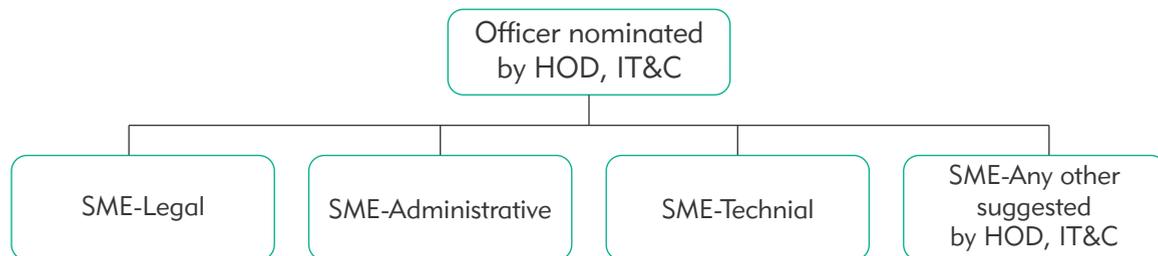
D. Information Security Organization Structure

Figure 1



- a) Chief Information Security Officer (CISO)
The Chief Information Security Officer shall provide the direction and support for all information security initiatives. The CISO is responsible for providing direction and leadership through:
 - i. Reviewing and Approval of the Information Security Policy.
 - ii. Approval of the resource requirements (human, IT Assets and financial) for information security.
 - iii. Driving information security initiatives across GoR.
 - iv. Conducting status review(s) of security implementation at Government Departments.
- b) Additional Chief Information Security Officer (Addl. CISO)
 - i. Review the Information Security Policy periodically.
 - ii. Propose the resource requirements (human, IT Assets and financial) for information security.
 - iii. Prepare roadmap to drive information security initiatives across the State.
 - iv. Monitor security implementation at Government Departments.
 - v. Organize a refresher course for Information Security Officer with regards to Information Security.
 - vi. Prepare the classification of Information assets.
 - vii. Understanding and Circulation of all the IT laws and amendments to Concerned ISOs.
- c) Incident Response Team (IRT)
Incident Response Team will be an independent body headed by officer nominated by HOD, IT&C. Members of IRT shall include Subject Matter Experts from all domains viz. legal, administrative, technical, etc.

Figure 2



- The IRT will check the authenticity of security incident and shall forward the request to CERT-In for resolution and coordinate with them till the closer of incident.
An Incident Reporting Team shall be made responsible for root cause analysis of security incidents and to preserve the logs and details for legal actions collected during analysis and recommend the preventive and corrective action to ISO. This team will be established by DoIT&C.
- d) Information Security Officer (ISO)
The ISO assumes overall responsibility for ensuring the implementation, monitoring, training and enforcement of the information security policy and standards within the department/ district collectorate office
 - i. ISO will be responsible for the implementation of the Information Security Policy and monitor the compliance by departmental officials.
 - ii. Recommending, coordinating and implementation of information security policies, standards, processes, training and awareness programs; to ensure appropriate safeguards are implemented.
 - iii. ISOs are responsible for ensuring that appropriate controls are in place on the IT Assets to preserve the security properties of confidentiality, integrity, availability and privacy of departmental information
- e) Information Security Manager (ISM)
Information Security Manager of respective departments is responsible for:
 - i. Administering security tools, reviewing security practices, identifying and analyzing security threats and solutions and responding appropriately to security violations.
 - ii. Administration of all user-ids and passwords and the associated processes for reviewing, logging, implementing access rights, emergency privileges and reporting requirements.
- f) End User
End User is responsible for following:
 - i. It is the responsibility of each end user to report any incident which is observed /suspected to ISM.
 - ii. Users shall not test any existence of vulnerability in the information systems.

- iii. Understand the IT laws and amendments.
- iv. Avoid breaches of any law, statutory, regulatory and/ or contractual obligations as well as security requirements.

6.2 Asset Management

A. Introduction

For information systems to be used effectively, efficiently and legally the assets that make up those systems must be properly controlled. This is referred to as asset management.

Asset management is not limited to stock of information (electronic data) but also covers physical computer equipment's/Softwares used to access them. This Policy shall emphasize on the importance of identification /classification of IT assets to ensure adequate accountability and responsibility of the ISO/ISM. The Policy also ensures that information systems needs to be suitably protected based on the confidentiality, integrity and availability of the information systems.

B. Responsibility

ISM shall be made responsible for following:

- a) A computer-based Asset Register shall be prepared and maintained for recording all Information Assets with their appropriate classification.
- b) Providing Asset Management reports to user department as and when required on approval from ISO.

C. Ownership

ISO shall ensure that Information assets belonging to department has been identified and documented. The ISO shall be responsible for following:

- a) Ensuring that all the Information assets are recorded in asset register
- b) Establishing the classification scheme of the Information assets.
- c) Implement appropriate security controls to safeguard the Information assets as per Information Security Policy.
- d) Review and update the asset register to reflect any changes to the access rights

and or the classification scheme of the IT asset.

D. Information Classification

All information assets will have different degrees of sensitivity and accessibility to the organization. Information shall be classified appropriately as applicable for each department into the following categories:

- a) **Secret:** This is applied to information unauthorized disclosure of which could be expected to cause serious damage to the National/State security or National/State interest. This classification should be used for highly important information and is the highest classification normally used. E.g. Visits of VIPs, security arrangements during VIP visits and international events, information related to critical infrastructure such as configuration details of servers in data centres, etc.
- b) **Restricted:** This shall be applied to information, unauthorized disclosure of which could be expected to cause damage to the security of the department or could be prejudicial to the interest of the department or could affect the department in its functioning. The information that is used as official information for departmental level only (Restricted Circulation), etc.
- c) **Public:** Information available in public domain like Government websites etc. It is the responsibility of the ISO to appropriately classify their assets. The classification process shall be completed for existing assets and shall be undertaken for any new project at the time of deploying a new asset or generation of information.

6.3 Data and Information Security

A. Introduction

The Data and Information Security ensures that the officers and officials, contractors, consultants and vendors who have access to GoR information and associated Information assets understand their security responsibilities that are required to maintain the protection of critical information and the controls that are required to protect the information assets from human error, theft, fraud and/ or their misuse are implemented.



B. Objective

All officers and officials, contractors, consultants and vendors who have access to GoR information and associated IT assets are required to understand and practice their responsibilities for the comprehensive protection of the information assets. Failure to adhere to information security responsibilities may entail appropriate disciplinary action as per Rajasthan Service Rules, Government of Rajasthan.

The objectives of this Policy are to:

- a) Ensure that the officers and officials, contractors, consultants and vendors understand their roles and responsibilities regarding information security.
- b) Reduce the risks of human error, theft, fraud or misuse of the information assets.
- c) Ensure that employees are aware of information security threats and concerns.
- d) Minimize the damage from the security incidents and malfunctions and learn from such incidents.

C. During Employment

ISO has the following responsibilities during employment of officer/official:

- a) The employees are made aware of their security responsibilities to maintain the information security.
- b) An adequate level of awareness, education and training on the information security is provided to all employees.

D. Information Security Awareness and Training

The ISO in consultation with CISO shall ensure that:

- a) Officers and Officials receive appropriate training on information security requirements.
- b) Officers and Officials are made aware of disciplinary process, which can be initiated against them in case of any violations of this Policy.
- c) Posters and hand-outs are used for creating security awareness among Officers and Officials
- d) Quiz, tests, questionnaire are circulated to measure the awareness of Officers and Officials relating to information security on periodic basis.



E. Reporting Information Security Incidents

- a) Officers/Officials who become aware of any loss, compromise of information or any other incident, which has information security implications, shall immediately report to the ISM.
- b) Suitable feedback processes shall be implemented by Incident Response Team to ensure that the person reporting the incident is informed about the results after the incident has been investigated and closed in consultation with concerned ISO and ISM.
- c) Security incidents shall be documented and used in user awareness training as learning from incidents.
- d) End Users shall be informed that they should not, in any circumstances, attempt to prove a suspected weakness. Any action in testing the weakness would be interpreted as a potential misuse of the system.

F. Disciplinary Action

The certain categories of activities, which have potential to harm, or actually harm the information assets are defined as security violations and are strictly prohibited. The security violations may entail a disciplinary action. Appropriate disciplinary action can be taken against security violations as per Rajasthan Service Rules, Government of Rajasthan.

G. Termination or Change of Employment

- a) ISM shall ensure that officers and officials are communicated about their information security responsibilities even after termination of employment/ contract regarding the return of all issued software, documents, equipment, mobile computing devices, and access cards, manual and/ or any other asset that is a property of GoR.
- b) The ISM is required to ensure that the access rights of the officers and officials for information assets are removed upon the termination of his employment, contract or agreement.
- c) The ISM is required to ensure that in case of change of responsibility, the access rights are revoked or modified as required and appropriate with proper approval from ISO.



6.4 Physical & Environmental Security

A. Introduction

The Physical and Environmental Security provides direction for the development and implementation of appropriate security controls that are required to maintain the protection of information systems and processing facilities from physical and environmental threats. Information systems should be physically protected against malicious or accidental damage or loss, overheating, loss of mains power, etc.

B. Objectives

Adequate protection shall be provided to information systems and facilities against the unauthorised physical access and environmental threats. Appropriate security controls shall be implemented to maintain the security and adequacy of the information systems and equipment.

C. Physical Security Parameter

ISM is required to define the physical security perimeter for concerned department and facilities where information systems of Government of Rajasthan are available. It is strongly recommended that the physical access restrictions proportionate with the criticality value of information system is implemented at perimeter of all such facilities where information assets are hosted.

D. Physical Entry Controls

- a) Access control system shall be installed at key/critical locations of Govt. departments.
- b) Access to Govt. department, facilities and secure areas (such as Data Centre, Development Centre) shall be provided to authorised personnel only. Access to secure areas shall be controlled and monitored.
- c) All premises and facilities, where information assets are hosted, shall be classified into zones with defined security controls.
- d) Zones should be designed and managed to protect against unauthorised access, detect attempted or actual unauthorised access and activate an effective



response.

- e) Some areas are open to general public, whereas some areas may be restricted to few officer and officials strictly on need basis like public, internal and restricted.

E. Public Access, Delivery and Loading Areas

- a) It shall be ensured that all areas, where loading and unloading of items is done, are monitored and equipped with the appropriate physical security controls during these activities.
- b) Access to these areas shall be confined only to the identified and authorised personnel.
- c) The movement of all incoming and outgoing items shall be documented and incoming items shall be inspected for the potential threats.
- d) It shall be ensured that all the outgoing items have a valid authorisation and gate pass.

F. Equipment Security

Information Security Manager (ISM) in consultation with ISO shall implement the equipment security controls to prevent loss, damage, theft or compromise of information systems.

Critical IT equipment, cabling, ect. should be protected against physical damage, fire, flood, theft, etc., both on- and off-site. Power supplies and cabling should be secured. IT equipment should be maintained properly and disposed of securely.

G. Equipment Location and Protection

All equipment shall be protected against environmental threats and unauthorised access. It shall be ensured that:

- a) The equipment are appropriately located and security controls are implemented to reduce the risk of potential threats (e.g. theft, fire, smoke, electrical supply interference) for their continued operations.
- b) The unattended equipment such as servers, network are placed in secure enclosures.
- c) The appropriate environmental protection controls are identified and implemented

for the safety of the equipment.

H. Power Supplies

All equipment shall be protected from the power failures and other disruptions caused by failures in supporting utilities. ISM & ISO shall jointly ensure that:

- a) All supporting utilities, such as electricity, water supply, sewage, heating/ventilation and air conditioning, are in appropriate condition for the information systems and/or processing facilities that they are supporting.
- b) The uninterruptible power supply (UPS) systems and generators are installed to support the continued functioning of equipment supporting critical business operations.
- c) UPS equipment shall be maintained in accordance with the manufacturer's recommendations.
- d) All department premises shall have proper earthing to prevent electric surges.
- e) An alarm system to highlight the malfunctions in the supporting utilities is installed.
- f) Voltage regulators shall be installed, wherever necessary, to guard against fluctuations in power. Circuit breakers of appropriate capacity shall be installed to protect the hardware against power fluctuations or short circuits.
- g) A preventive maintenance exercise is carried out at regular intervals for the utility equipment.

I. Cabling Security

It shall be the responsibility of ISM to ensure that cabling is done properly. Following controls shall be considered for cabling security:

- a) All cables, including power and telecommunication network cables, shall be protected from the damage or unauthorized interception.
- b) All network cables and their corresponding terminals shall be identified and marked.
- c) It is strongly recommended that the documents, including detailed physical network diagrams showing cable routings and terminations are maintained with ISM.

- d) It shall be ensured that the power cables are segregated from the communication cables.

J. Equipment Maintenance

ISO shall ensure the following controls for equipment maintenance:

- a) A preventive maintenance exercise for the utility equipments shall be conducted in scheduled intervals ensuring their continued availability and integrity.
- b) Preventive maintenance of hardware, UPS, AC and other equipment shall be covered under AMC.
- c) The ISM shall monitor SLA to ensure that preventive maintenance is carried out in efficient manner.
- d) ISM is required to apply the appropriate security controls to the off-site equipment considering various risks that may exist outside the premises.
- e) Every user is required to ensure that the equipment and information systems are disposed of after an approval from the ISO and following proper rules as per Government of Rajasthan Rules for disposing IT Assets.
- f) Any equipment, information system, storage device or software under the possession of or having information of State Government department shall not be taken outside the office premises without prior authorization of ISM and valid gate pass.

6.5 Communication & Operations Management

A. Introduction

The Communication and Operations Management establishes appropriate controls to prevent unauthorized access, misuse or failure of information systems and equipment and to ensure the confidentiality, integrity and availability of information that is processed by or stored in the information systems/equipment.

B. Responsibility

The ISM is responsible for the implementation of the controls defined in this Policy. However, ISO shall ensure compliance of Information Security Policy.



C. Objective

Government of Rajasthan shall ensure the effective and secure operation of its information systems and computing devices. The objectives are to:

- a) Develop documented operation procedures for information systems and computing devices.
- b) Ensure protection of information during its transmission through communication networks.
- c) Protect integrity of software and information against the malicious codes.
- d) Develop an appropriate backup strategy and monitoring plan for protecting integrity and availability of information processing facilities and communication services.
- e) Have appropriate controls over storage media to prevent its damage and/or theft.
- f) Maintain security during the information exchange with other State Governments.

D. Operations Procedures and Responsibilities

IT operating responsibilities and procedures should be documented. Changes to IT facilities and systems should be controlled. Duties should be segregated between different people where relevant (e.g. access to development and operational systems should be segregated).

E. Documented Operating Procedure

- a) Adequate documentations shall exist for maintenance of information systems. The documentations, procedures and checklists shall be created when a new systems or service is introduced and the activities to be carried out when a service failure occurs or when maintenance needs to be performed.
- b) Procedures shall be in place to ensure that activities performed in day-to-day operations are carried out in a secure manner.
- c) Standard Operating Procedure (SOP) shall be created to maintain the confidentiality, integrity and availability of that specific platform or application.



F. Change Management and Change Request Approval

For application software the documentation shall provide for a brief description of the changes requested, date on which the request was made, prioritizing of the request, tracking and controlling modifications and assigning a unique number to each request. All changes requested shall be approved/rejected by ISO of concerned department.

G. Hardware and Operating System Changes for Information Systems

- a) Any changes to hardware shall be done by raising a change request, approval by the ISO and documentation of the same.
- b) ISM shall update the asset register once the changes are done to the hardware.
- c) Any change to the operating system or application shall be strictly controlled. Any changes shall be done by raising a change request, approval by the ISO and documentation of the same.

H. Testing of Changes and Backup

- a) All critical and complex changes shall be tested before being carried out in the live/production environment.
- b) A quality assurance test of the changes to be implemented shall be performed in a test environment prior to implementation in the production environment.
- c) A backup of the system impacted by the change shall be made prior to its being updated.

I. Unscheduled/Emergency Changes

- a) Unscheduled/emergency changes shall be carried out only in case there are critical issues in current IT system/ environment, which require the change to be carried out with approval from ISO
- b) An audit trail of the emergency activity shall also be generated which logs all activity, including but not limited to:
 - i. The user-ID making the change
 - ii. Time and date
 - iii. The commands executed

- iv. The program and data files affected

J. Segregation of Duties

Segregation of duties is important in order to reduce opportunities for unauthorized modification or misuse of information, or services.

- a) ISM shall segregate the duties in such a manner so that no single user has the ability to subvert any security controls of the infrastructure thereby negatively impacting the business operations.
- b) An individual shall not be responsible for more than one of the following duties: data entry, computer operation, network management, system administration, systems development, change management, security administration, security audit, security monitoring.

Whenever segregation of duties is difficult to accomplish, other compensatory controls such as Monitoring of activities, Audit Trails and Management Supervision can be implemented.

K. System Planning and Acceptance

For maintaining adequate future storage and memory demands of IT Systems proper monitoring and requirement projection is performed for information assets. This will help in avoiding potential bottlenecks that might present a threat to system security or user services. ISM will identify the requirement and will send the requirement to ISO. ISO will review the same and will further send it to approving authority.

L. Protection against Malicious and Mobile Code

ISM shall ensure to implement software and associated controls to prevent and detect the introduction of malicious and mobile codes like Computer Virus, Trojan Horse, etc. which can cause serious damage to networks, workstations and critical Government data.

Mobile code is any program, application, or content capable of movement while embedded in an email, document or website. Mobile code uses network or storage media, such as a Universal Serial Bus (USB) flash drive, to execute local code execution from another computer system. The term is often used in a malicious

context; mobile code creates varying degrees of computer and system damage. Mobile code is usually downloaded via the body of an HTML email or email attachment. Therefore in the information systems where the use of mobile code is authorised, ISM shall ensure configuration in such a manner that only authorized mobile code operates according to a clearly defined set of rules.

M. Backup

For continuity of business operations in the event of failures and/ or disaster, it is essential to have the secondary copies of the data available. It is to be ensured that backups of all the identified highly critical information assets are taken and are tested for restoration and readable or regular intervals.

Information Security Manager is required to ensure following:

- a) Identification of critical information assets
- b) Selection of appropriate backup media on the criticality of data and retention period
- c) Backup logs shall be regularly maintained and kept up-to-date and can be in the form of hard or soft copies

N. Network Security Management

- a) Network Controls

The appropriate security controls shall be implemented by the ISM to protect the departmental network. The controls shall include, but not limited to, the following:

- i. Logical segregation of networks e.g. internal network zone, Demilitarized Zone (DMZ) and External zone
- ii. Protection through firewall
- iii. The Documentation related to the network diagram, IP Addressing and configuration of network devices, etc.

- b) Wireless Local Area Network (WLAN)

The wireless infrastructure system shall be managed appropriately in order to provide protection to its information and information systems. The following controls shall be implemented by ISM to ensure WLAN security:

- i. Secure configuration of wireless communication devices including the Access

- Points and wireless client devices such as Laptops/Workstations.
- ii. Implementation of a strong key management system for the authentication of clients connecting to the WLAN.
- iii. Implementation of appropriate physical and environmental security controls to protect wireless access points against theft and damage.
- iv. Register access points and cards. All wireless access points must be registered and approved by ISM. These access points are subject to periodic penetration tests and audits.
- c) Firewall
 - ISM shall establish following controls:
 - i. Firewalls shall restrict access to all applications and network resources and protect these from unauthorized users
 - ii. Access control policy shall be implemented on the Firewall and all activities shall be logged (successful, unsuccessful)
 - iii. Publicly accessible servers shall be kept behind the Firewall and access control policies shall be defined
 - iv. An updated, reviewed and approved network diagram with all connection to and from the firewall shall be maintained.
 - v. A documented list of services and ports shall be maintained.
 - vi. Approval process for new rules for firewall shall be established
- d) Security of Network Services
 - i. The ISM is required to identify the security features, service levels and management requirements of all network services included in any network services agreement, irrespective of the fact whether these services are being provided in-house or outsourced.
 - ii. The ISM shall prepare a checklist of the non-essential, default and vulnerable services for all the information systems owned by them. The non-essential services shall be disabled on all information systems and the default and vulnerable services required for business operations shall be fixed by implementing alternative mitigation controls on the information systems.

O. Exchange of Information

a) Information Exchange

Appropriate security controls shall be implemented to exchange the Govt. department information or software assets with third parties. The security controls shall include technical controls and contract/agreements signed with the third parties.

The relevant information asset owners/ISM/ISO shall be responsible for ensuring that such information assets are exchanged only after signing appropriate agreements.

P. Monitoring

- a) ISM needs to ensure that proper logs are maintained and stored for a specific time period for future investigation purposes.
- b) Audit logs shall be secured in such a manner that even the ISO/CISO is not allowed to erase or modify the logs of the activities performed by them on system.
- c) Access to Log shall only be provided on need basis and with approval from ISO.
- d) Time and date synchronization shall be maintained at all network devices and servers.

6.6 Access Control

A. Objective

User Access of the Information assets shall be based on their roles and responsibilities provided. All the User ids are provided with access permissions as per requirements, role and designation of officers and officials. The system shall deny all request other than permitted to protect the information from unauthorised access.

The objectives of the Access Control are to:

- a) Provide need-based access to information assets
- b) Prevention of unauthorised access to information systems, network services, operating systems, databases, information and applications



B. User Access Management

The allocation of access rights to users should be formally controlled through user registration and administration procedures (from initial user registration through to removal of access rights when no longer required), including special restrictions over the allocation of privileges and management of passwords, and regular access rights reviews where if roles and responsibilities change for officers and officials than his access rights shall be changed accordingly.

- a) Users shall be provided access as per their roles and responsibilities, e.g. DDO is provided access to disburse salaries of his concerned office but is not allowed to view or disburse salary for other offices.
- b) Unique User id shall be provided to each employee so that each person will be responsible for one's action which will help in tracking of security threats incidents, if any.
- c) User rights shall be provided by system administrator on written approval from ISM/ISO of Concerned department.

C. User Registration

- a) Documentation and implementation of procedures for registration and de-registration of User id.
- b) Naming Convention shall be followed for User id creation
- c) Identification of inactive accounts and disabling them
- d) Re-activation of the accounts on written request from ISM
- e) Guest accounts to be disabled on servers

D. Password Management

- a) It is made mandatory for users to change their passwords during the first time logon and after 20 days of each password change. Warnings to the users shall be flashed before 5 days of the password expiry and to be sent repeatedly everyday till the user changes password or password expires.
- b) The Password shall have a combination of alpha-numeric characters and minimum length of eight characters for strong security.
- c) System shall keep record of last five passwords and shall not allow user to reuse it at the time of changing one's passwords



- d) After maximum 5 unsuccessful login attempts, account shall be locked for security purposes.
- e) The passwords shall not be hard coded into the logon scripts, batch programs or any other executable files when user authentication or authorisation is required to complete a function.
- f) The password shall be encrypted while transmitting over network.
- g) For forgot passwords and account lockouts, proper support procedures shall be documented and implemented.
- h) User password reset is performed only when requested from user and after identifying and verifying the user through defined procedures.

E. User Responsibilities

All Users who will have access to information assets of Government of Rajasthan are required to understand their responsibilities for maintaining the effective Security Controls and safety of information assets.

F. "Clear Desk and Clear Screen" and "Security of Unattended Equipment"

- IT team needs to ensure that information system needs is auto locked if unattended for a specified duration
- a) Sensitive and critical information need to be locked (electronic media)
 - b) Desktops shall be logged off or protected with a screen when unattended for a specified duration.
 - c) Incoming and outgoing mail points should be protected.
 - d) Use of scanner and digital cameras shall be monitored so that unauthorised use for reproduction of critical information can be prevented.
 - e) Logout from the workstation, servers and/or network device when the session is finished.

G. Application and Information Access Control

The logical access to the application software shall be restricted to the authorised users only. The access rights shall be provided for relevant section of application, e.g. DDO is provided access to prepare salary bills for one's concerned office employees.

- a) User access matrix shall be updated quarterly and documented
- b) Information systems (Application system processing) containing critical information shall not be hosted on the shared server, and
- c) High level logging mechanism shall be established for critical systems.

H. Mobile Computing and Communication

- a) Employees shall be allowed to remotely access GoR network to access official information after proper identification and authentication.
- b) The employees shall take special care of the mobile computing resources such as, but not limited to, Laptops, mobile phones, PDA's, etc. to prevent the compromise and/or destruction of confidential information.
- c) Official laptops shall be configured as per policy with proper firewall and updated virus definitions to secure the information systems

6.7 Information Security Incident Management

A. Objective

All the security breaches, discovered weakness in the system and attempts to breach in the Information systems shall be reported and responded to promptly. Appropriate actions shall be taken to prevent the reoccurrence.

The objectives are to:

- a) Develop proactive measures so that the impact of any security incident on information systems can be minimized
- b) Create awareness among users so that they can report the identified incidents to ISM.
- c) Get learnings from the incidents and implementing appropriate controls to prevent the reoccurrence

B. Incident Identification

An incident is the act of violating the security policy defined for State. The following actions can be classified as incidents, but not limited to:

Category	Nature	Description
Cat 1	Unauthorised Access	Attempts to gain unauthorised access to a system or its data without having permission, e.g. spoofing as authorised users
Cat 2	Denial of Services	An attack that successfully prevents or impairs the normal authorized functionality of networks, systems or applications by exhausting resources.
Cat 3	Malicious Code	Successful installation of malicious software (virus, worm, Trojan horse, or other code-based malicious entity) that infects an operating system or application.
Cat 4	Changes to Information System	Changes to system hardware, firmware or software characteristics and data without the application owner's knowledge.
Cat 4	Changes to Information System	Changes to system hardware, firmware or software characteristics and data without the application owner's knowledge.
Cat 5	Unknown User Accounts	Existence of unknown user accounts
Cat 6	Others, if any	Any other incidents identified by users

C. Reporting Security Events and Weakness

- a) An incident management procedure shall be formalized and documented which includes incident identification, reporting, response, escalation and incident resolution.
- b) There should be a central point of contact (ISM), and all employees/users should be informed of their incident reporting responsibilities.
- c) Users shall not test existence of any vulnerability in the information systems

D. Learnings from Information Security Events

A knowledge base shall be established by IRT for the information gained from the evaluation and analysis of all information security incidents, that will be helpful to prevent reoccurrence of security incidents, to handle security incidents and for learning.

E. Collection of Evidence

- a) As per the legal requirements, ISO shall collect the evidences during the incident analysis, retained and presented for relevant jurisdiction. IRT will provide complete

help to ISO for collection of evidence. IRT has to preserve the proof for any legal proceedings to support ISO.

- b) Delayed reporting of information security events or incidents, and consequent delays in initiating investigations can result in loss of evidence. Therefore, timely investigation shall be performed by IRT.
- c) Evidence shall be collected in such a manner that it should not destroy its evidentiary proof and can be used for legal use in court, if required.

6.8 Compliance

A. Introduction

The Compliance provides the direction to design and implement appropriate controls to meet the legal, regulatory and contractual requirements as per Cyber law, IT Act 2000 and any other relevant act prevailing in India.

B. Responsibility

It is the responsibility of ISO to ensure implementation of the appropriate controls to meet the legal, regulatory and contractual requirements as circulated by ACISO. The details about the Cyber laws, but not limited to, is available at <http://deity.gov.in/content/cyber-laws>

C. Objective

All Government Departments shall understand the importance of Compliance to the legal requirements and thus enforce the appropriate controls to the officers and officials working under their department to embed a compliance culture.

The objectives are to:

- a) Promote a positive ethical and compliance culture among Government offices
- b) Creating awareness among users regarding the law compliance
- c) Avoiding breaches of any law, statutory, regulatory and/ or contractual obligations as well as security requirements
- d) Ensuring that officers and officials, third party users understand and adhere to the legal, statutory, regulatory and contractual requirements which may have an

impact on their daily activities

D. Compliance with Legal Requirement

a) Identification of Applicable Laws

It is the responsibility of ISO to maintain a list of all relevant statutory, regulatory and contractual requirements with the help of ISM in guidance of ACISO (Circulated by ACISO)

b) Intellectual Property Rights

- i. All Software and application used in Government offices shall be purchased and issued in accordance with the license agreements.
- ii. All employees shall abide by the Copyright laws detailed by the software vendor
- iii. Awareness campaigns shall be organized for employees regarding IPR
- iv. Software shall be used for official purpose only
- v. Officers and Officials shall not be allowed to carry Personal Information Processing equipment or CD writers, USB drives, etc. without obtaining prior approval from ISM.

c) Protection of Government Records

- i. Important records like accounting and financial records, payroll and other employee related records shall be protected from loss or destruction.
- ii. Retention period shall be defined for various types of records as per rules and regulations and shall be destroyed in a safe and secure manner on completion of their retention period.
- iii. Extra Protection shall be taken to store the records required to meet legal requirements.

d) Data Protection and Privacy of Personal Information

- i. Personal information of employees/users shall be kept safe and confidential.
- ii. Relevant Legal laws, Acts and regulations shall be followed for handling personal information.
- iii. Personal records shall be retained and stored as required by legislation.
- iv. The review period and review rights of personal records shall be defined by ISO.
- v. Backup of personal records shall be ensured.

- e) Prevention of misuse of Information Processing Facilities
 - i. Users shall be prevented from accessing information, information systems and/ or facilities for unauthorized purposes through implementing appropriate access controls.
 - ii. Any usage of information system other than for official purposes shall be considered as improper use of the facilities and may lead to disciplinary action against user.

E. Compliance with Information Security

- i. The ISOs shall ensure that the Policy is implemented in their respective departments, in turn ensuring the compliance.
- ii. It shall be communicated to all employees officially through a Government order that compliance to Information Security Policy is mandatory and if any non-compliance is found, necessary disciplinary action can be taken against the employee.
- iii. There shall be a regular review of compliance to the policies using Internal Audits. Any deviations shall be noted and communicated to the HODs as a part of the Internal Audit report.

F. Technical Compliance

- i. Technical compliance check shall be carried out to identify vulnerabilities in the system and to check effectiveness of controls to prevent unauthorized access to information systems.
- ii. Information systems shall be checked by ISM every six months for security and compliance with the security Policies.
- iii. A schedule shall be maintained to ensure that vulnerability assessment and penetration testing is carried out at regular frequency.
- iv. Technical compliance shall be carried out by experts.

6.9 Internet Security

A. Introduction

Internet security provides directions to the officers and officials to ensure that internet

usage in Government departments is legitimate and does not breach any security of information system, thus preventing the unauthorised use of internet.

B. Responsibility

ISM shall ensure compliance of the Policy. Controls shall be established by IT Team under guidance of ISM. Each employee/user shall take responsibility to follow Internet Security Policy.

C. Objective

Appropriate technological and user level controls need to be established for ensuring legitimate use of internet in Government departments to maintain the confidentiality, integrity and availability of the internet system.

Following are the objectives:

- a) Rules to be defined so that each employee in Government departments shall use internet for legitimate purpose
- b) To ensure that internet system shall not be misused.

D. Internet Usage

- a) Access to internet
 - i. Internet should be provided to users for official purpose.
 - ii. Internet access shall be provided after approval from ISM.
 - iii. Access to Internet shall be controlled by Proxy server and firewall.
- b) Authorised and unauthorised access to internet
 - i. Internet usage shall be restricted to serve employees for official/office related work and transactions.
 - ii. Unauthorised use of Internet shall include, but not limited to:
 1. Using for personal entertainment, personal business or profit, and publishing personal opinions.
 2. Attempting to gain or gaining unauthorized access to any computer system
 3. Sending/receiving/viewing racial or sexually threatening email messages
 4. Sending, transmitting or distributing proprietary information, data or other confidential information.

5. Using Internet for non-official purposes and wasting computer resources like uploading and downloading large files
 6. Introducing computer viruses, worms, or Trojan horses
 7. Downloading obscene written material or pornography
- c) Downloading and uploading of software
- i. Downloading and uploading of software is allowed only when permissions are granted from ISM.
 - ii. Trial versions shall be deleted after expiry of trial period.
 - iii. Periodic review of all desktop/laptops shall be done to ensure that no unauthorized software is installed.
 - iv. Browsers are configured at workstations in such a manner that they should accept applets only from trusted sources.
- d) Internet Security awareness
Users shall be kept aware through trainings regarding the acceptable and legitimate use of internet, e.g. downloading the content from internet, downloading of applets for browsers, etc.
- e) Website blocking
Internal users shall be blocked at the proxy level from accessing websites which are deemed inappropriate as per the directions from the State Government.
- f) Auditing, logging and monitoring
- i. Logging shall be maintained for all the attempts to access internet services
 - ii. ISM shall review log files of proxy server on periodic basis

6.10 E-mail Security

A. Introduction

E-mail Security provides directions and controls to be established for legitimate use of e-mail account provided to the users and to protect e-mail system from vulnerability and modifications. E-mails originating from registered domain of Government department/PSU/Boards/Corporation and other autonomous bodies only shall be considered for official purpose.

B. Responsibility

An e-mail server administrator for registered domains of Government departments/ PSU/Boards/Corporations and other autonomous bodies is responsible to ensure that appropriate controls are kept in place for one's email server. Each user is responsible for complying with the E-mail Security Policy. ISM shall ensure that access rights of e-mail id shall be managed, e.g. on transfer of officers and officials their e-mail id which is as per designation is given to other officer/official after changing the password.

C. Objective

- a) E-mail security is of prime importance and appropriate technological and user level controls shall be implemented to maintain confidentiality, integrity and availability of the e-mail system by respective e-mail server administrators.
- b) The objective of the e-mail policy is to Establish the rules for the official use of the e-mail system and to adequately protect the information transmitted through the e-mails.
- c) If any PSU/Boards/Corporations/Autonomous bodies are not able to follow e-mail Policy due to lack of appropriate infrastructure, it is suggested to open their employee's email-id on the domain (www.rajasthan.gov.in) by taking necessary approvals.

D. Authorized Use of e-mail

- a) All e-mail messages generated from registered e-mail System of Government department/PSU/Boards/Corporation and other Autonomous bodies shall be considered to be the property of Government of Rajasthan.
- b) Users shall not forward/redistribute any offensive or unsolicited material received from the external sources.

E. Prohibited use of e-mail

- a) Users shall not use e-mail for raising charitable funds campaign, political advocacy efforts, personal amusement and entertainment.
- b) Users shall not use e-mail for creation or distribution of any disruptive or offensive



messages, including offensive comments about race, language, gender, hair colour, disabilities, age, sexual orientation, pornography, culture, religious beliefs and practice, political beliefs or national origin.

- c) Users shall not use e-mail for forwarding or sending messages that have racial or sexual slur, political or religious solicitations or any other message that could damage the reputation.
- d) Users shall not use email for transmitting any data that potentially contains Viruses, Trojan horses, Worms, spywares or any other harmful or malicious program.
- e) Users shall not use e-mail in connection with surveys, contests, chain letters, junk e-mail, spamming, or any duplicative or unsolicited messages.

F. User Accountability

- a) Users shall not use any unauthorised Web-mail services for official purpose.
- b) Users shall not share their e-mail account passwords.
- c) Users shall choose strong passwords as per password policy.

G. User Identity

- a) Misrepresenting, Concealing, suppressing or replacing another user's identity on an electronic communications system is prohibited.
- b) The user name, email address and related information included with electronic messages shall reflect the actual originator of the messages.
- c) At a minimum, the users shall provide their name and mobile numbers in all e-mail communications.

H. E-mail Administrator Accountability

E-mail Administrator is responsible for following:

- a) All e-mails and content shall be scanned through authorized email scanning software
- b) Open relay is blocked at all e-mail servers to prevent spamming
- c) Content monitoring systems shall be installed at e-mail Servers
- d) Antivirus definitions shall be kept updated at the gateway/server levels



I. Electronic Mail Encryption

The objective of e-mail encryption is to prevent the email content from being read by unintended recipients.

All electronic communications through the e-mail systems are not encrypted by default. Therefore, if sensitive information needs to be sent by e-mail System, encryption or similar techniques provided by the e-mail system shall be employed for the protection of information being transmitted.

J. Attachment and Virus Protection

- a) E-mail Server administrator shall implement appropriate controls at e-mail gateway/server level to scan email attachments and delete malicious file extensions or viruses. E-mail administrator shall block documented malicious file extensions at gateway level.
- b) E-mail virus protection and content filtering software shall be implemented at e-mail gateway/server level.

K. Public Representations

- a) No e-mail messages related to State Government shall be used for advertisement purposes.
- b) If users are suffering from excessive spams in their mail box from a particular e-mail id than they shall raise a security incident to their respective ISM.

L. Archival, Storage and User Back up

All official e-mail messages containing approval, work delegation, authorisation or handing over of responsibilities or similar transactions shall be archived for future official use by end user.

Any e-mail message which can be helpful as an evidence for critical decisions shall be appropriately retained for future use by end user.

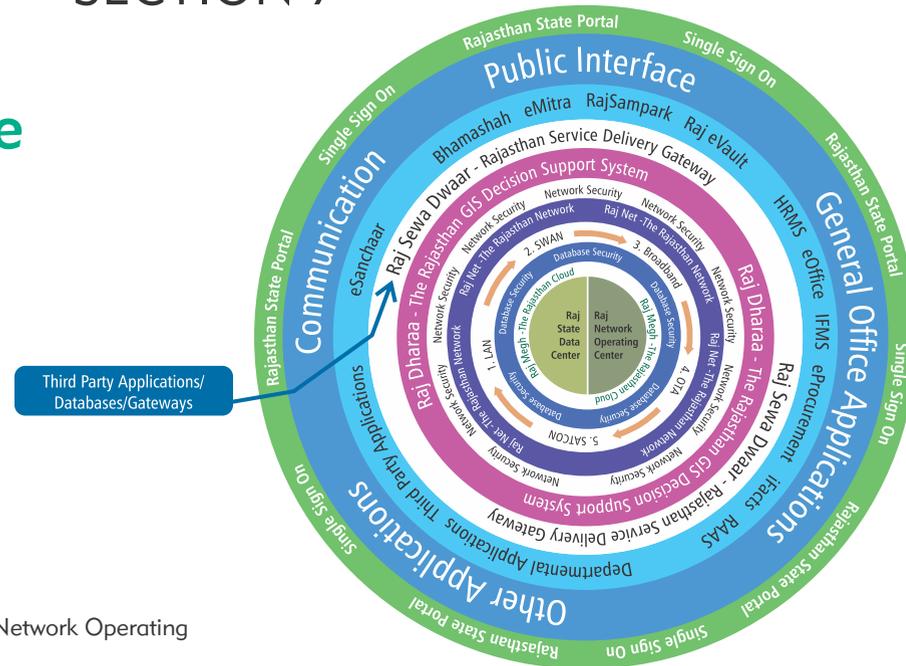
M. Disclaimer

A disclaimer approved by CISO shall be appended to all e-mail messages generating from State Government domains.



SECTION 7

Rajasthan e-Governance Architecture



1. Rajasthan State Data Centre & Network Operating Centre:
 - 100 mbps Dedicated Connectivity;
 - Hosting more than 500 Websites, Portals and Applications
2. Raj Megh - The Rajasthan Cloud:
 - End-to-end Cloud enablement on SaaS, PaaS basis for Rajasthan
3. Raj Net - The Rajasthan Network:
 - Seamless connectivity till Gram Panchayat Level through LAN/SWAN/Broadband/Over-The-Air/Satellite
4. Raj Dharaa - The Rajasthan GIS-DSS:
 - A seamless Geographic Information System for Rajasthan, shared by all Government Departments, Organizations and utilized for systematic decision support.
5. Raj Sewa Dwaar - The Rajasthan Service Delivery Gateway:
 - Providing unique door of connectivity, unification and integration for all State, National and Private Applications/Gateways – The true Intelligent Middleware

6. Public Interface:
 - 1 Fully automated & mobile ready Solutions for
 - Public Interface (Bhamashah/eMitra/RajSampark)
 - Government officials (HRMS/eOffice/IFMS/eProcurement/ifacts)
 - Communication (eSanchar)
 - 2 Raj eVault - Fully automated electronic verification, no need of hard copy documents/affedavits/notary attestation for service delivery
 - 3 RAAS (Rajasthan Accountability Assurance System) - End-to-End monitoring and accountability of government officials
 - 4 Mobile Apps for all Government portals & application on all plat forms
7. Rajasthan Single Sign On and State Portal:
 - One Person, One Identity – With all mapped datasets and documents for every state resident



सत्यमेव जयते

Government of Rajasthan
Department of Information Technology
and Communication



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RAJASTHAN SOLAR
ENERGY POLICY, 2014

RAJASTHAN SOLAR ENERGY POLICY, 2014



सत्यमेव जयते

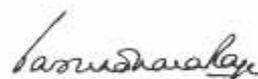
Energy Department
Government of Rajasthan



Rajasthan, by virtue of its geography, enjoys the highest number of cloud-free days and high insolation ideal for generation of Solar Power. The opportunities offered by this bounty of nature are immense and it is important that this inexhaustible energy source is used to our advantage.

In times when being responsible towards the requirements of climate and environment is the way forward, solar power as a source of electricity is a vital development input. At the same time, the ambitious plan of the State to make a major stride in Solar Power Generation – aiming at 25,000 MW of installed Solar Power Generation capacity – is reflective of the State's forward looking policies. In this backdrop, the new Solar Policy is designed to provide this sector with a major fillip.

I am confident that Rajasthan Solar Energy Policy 2014 shall usher in an environment that is congenial to investors and also be an engine to draw in the much-required investment in the State. The benefits that shall accrue will go a long way in furthering development in the State. At the same time, lesser dependence on fossil fuels shall assist in addressing environmental concerns and be an important step in mitigating the deleterious effects of climate change.



Vasundhara Raje
Chief Minister, Rajasthan



Rajasthan is the most preferred state in India for solar power generation, due to the highest level of solar radiations, abundant land availability at the cheapest rate and an "investor friendly" policy.

Therefore, the day is not far off when Rajasthan becomes the hub of solar energy.

In the budget speech for year 2014-15, Hon'ble Chief Minister has declared the intention of the State Government for installation of 25,000 MW solar capacity in the State through a lucrative new "Solar Policy". We take pride in announcing the New Solar Policy in such a short span of time.

The Rajasthan Solar Energy Policy 2014 has been brought out with the aim of creating a business friendly atmosphere so that the investors see Rajasthan as a land of opportunity in the solar sector which is currently in the threshold of a boom.

I am sure that the solar revolution will be triggered off with Rajasthan playing the role of pinch hitter and consequently, accelerate the development process of India.



Gajendra Singh
Minister of Energy
Government of Rajasthan

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Rajasthan Solar Energy Policy, 2014

1 Preamble

- 1.1 Energy Security is key to economic growth to any country and state. Fossil fuel such as coal, gas, oil, etc. for conventional power generation is fast depleting and will be exhausted in coming decades. The conventional generation is also the source of greenhouse gas emission attributing to global warming and has adverse impact on climate. Therefore, a global shift towards sustainable renewable energy generation is being witnessed.
- 1.2 India is blessed with abundant solar energy and if harnessed efficiently, the country is capable of producing trillion-kilowatts of electricity. Solar energy is extremely beneficial as it is non-polluting and its generation can be decentralized.
- 1.3 The State of Rajasthan receives maximum solar radiation intensity in India with very low average rainfall. It also has desert land available in abundance. Therefore, Rajasthan is likely to emerge as the global hub for solar power in the country.
- 1.4 Challenge of climate change and global warming continuously threaten the world community, and Rajasthan Government has also recognized the urgent need to tackle these challenges.
- 1.5 To tap the potential of the emerging revolution in solar energy and to leverage advantage from the Jawaharlal Nehru National Solar Mission launched by Government of India, the State Government has decided to review the existing Rajasthan Solar Energy Policy, 2011.

Solar Thermal Power Project at Nokh, Jaisalmer
2013

2 Vision

Our vision is to reduce the dependence on conventional sources of energy by promoting the development of non-conventional energy sources and most importantly, solar power thereby enabling the State in attaining self-sufficiency in its energy needs. Our aim is to create an enabling environment for installation of 25000 MW of solar power through State or Private enterprises or through Public Private Partnerships or through individual efforts.

3 Title and enforcement

- 3.1 This Policy will be known as Rajasthan Solar Energy Policy, 2014.
- 3.2 The Policy will come into operation with effect from 8.10.2014 and will remain in force until superseded or modified by another Policy.
- 3.3 State Government may amend / modify / undertake review of this Policy including statutory fees / deposits and contribution towards Rajasthan Renewable Energy Development Fund as and when the need arises.

4 Definitions

4.1 Following expressions used in the Policy would have meanings assigned to them as defined hereunder:

- 1 "Act" means Electricity Act 2003, including amendments there to.
- 2 "ABT" means Availability Based Tariff.
- 3 "CEA" means Central Electricity Authority.
- 4 "CERC" means the Central Electricity Regulatory Commission of India, constituted under sub-section (1) of Section 76 of the Electricity Act, 2003, or its successors.
- 5 "Ceiling Act, 1973" means the Rajasthan Imposition of Ceiling on Agricultural Holdings Act, 1973.
- 6 "Central Agency" means National Load Dispatch Centre (NLDC) as designated by the Central Electricity Regulatory Commission vide order dated 29.1.2010 for the purposes of the REC Regulations.
- 7 "Collector" means Collector of a district as

defined in the Rajasthan Land Revenue Act and includes every officer authorized to discharge the duties of Collector under the Act / Rules / executive orders of the Government of Rajasthan.

- 8 "CSP" means Concentrated Solar Power.
- 9 "Discom of Rajasthan" means a distribution licensee, such as Jaipur Discom, Jodhpur Discom and Ajmer Discom.
- 10 "District Level Committee" or "DLC" means the committee constituted by the State Government for a District from time to time under Clause (b) of sub-rule (1) of rule 2 of the Rajasthan Stamps Rules, 2004.
- 11 "Force Majeure" means any event or circumstance which is beyond the reasonable direct or indirect control and without the fault or negligence of the Solar Power Producer or Developer and which results in Solar Power Producers' / Developers' inability, notwithstanding its reasonable best efforts, to perform its obligations in whole or in part and may include rebellion, mutiny, civil unrest, riot, strike, fire, explosion, flood, cyclone, lightning, earthquake, act of foreign enemy, war or other forces, theft, burglary, ionizing radiation or contamination, Government action, inaction or restrictions, accidents or an act of God or other similar causes.
- 12 "Generating Plant Sub-station / Pooling Sub-Station" means Sub-station developed by the Solar Power Producer / Developer for interface with the receiving sub-station.
- 13 "Government" and "State" mean the Government of Rajasthan and the State of Rajasthan respectively.
- 14 "Interconnection Line" means Transmission / Distribution Line connecting Generating Plant Sub-station / Pooling Sub-station of Solar Power Producer / Developer to Receiving Sub-station of RVPN / Discoms of Rajasthan.
- 15 "Inter-connection Point" shall mean a point at EHV substation of Transmission Licensee or HV substation of distribution licensee, as the case may be, where the electricity produced from the RE generating station is injected into the Rajasthan Grid.
- 16 "IREDA" means Indian Renewable Energy Development Agency.
- 17 "Licensee" includes a person deemed to be a licensee under Section 14 of the Act.

- 18 "Mega Solar Power Project" means Solar Power Projects of capacity 500 MW or more established by a single developer at single location with single or multiple metering arrangements but having common Pooling Sub-station.
- 19 "MNRE" means Ministry of New and Renewable Energy, a Central Government Ministry responsible to develop and deploy new and renewable energy for supplementary energy requirement of the country.
- 20 "National Solar Mission or Solar Mission" means Jawaharlal Nehru National Solar Mission 2009 launched by Government of India.
- 21 "Nodal Agency" means Rajasthan Renewable Energy Corporation Limited (RREC) or any other agency designated by Government of Rajasthan for promotion of electricity generation from renewable energy sources.
- 22 "NVVN" means NTPC Vidyut Vyapar Nigam wholly subsidiary company of NTPC.
- 23 "Person" means an individual or a firm / company registered under the Company's Act 1956.
- 24 "Pooled Cost of Power Purchase" means the weighted average price at which the distribution licensee has purchased the electricity including the cost of self-generation, if any, in the previous year from all the energy suppliers excluding short-term power purchases and those based on renewable energy.
- 25 "PPA" means Power Purchase Agreement
- 26 "Receiving Sub-station" means EHV / HV Sub-Station developed by RVPN / Discom of Rajasthan for evacuation of power generated from Renewable Energy Sources.
- 27 "REC Regulations" or "CERC REC Regulations" means Central Electricity Regulatory Commission (Terms & Condition for recognition and issuances of Renewable Energy Certificate for Renewable Energy Generation) Regulations, 2010 notified by CERC vide Notification dated 14.1.2010 and amended time to time.
- 28 "Renewable Energy Certificate" or "REC" means the Renewable Energy (Solar) Certificate issued by the Central Agency in accordance with the procedure prescribed by it and under the provision specified in this regard by the Central Electricity Regulatory Commission (Terms & Conditions for recognition and issuance of Renewable Energy Certificate for Renewable Energy Generation) Regulations, 2010.
- 29 "Renewable Energy Power Plants" means the power plants other than the conventional power plants generating grid quality electricity from Renewable Energy Sources.
- 30 "Renewable Energy Sources" means and includes non-conventional renewable generating sources such as solar including its integration with combined cycle, as approved by the Ministry of New & Renewable Energy, Government of India.
- 31 "RERC" / "Commission" means Rajasthan Electricity Regulatory Commission.



- 32 "RREC" means Rajasthan Renewable Energy Corporation Ltd.
- 33 "RVPN" means the Rajasthan Rajya Vidyut Prasaran Nigam Limited.
- 34 "SECI" means the Solar Energy Corporation of India.
- 35 "SLEC" means State Level Empowered Committee constituted under the provisions of this Policy.
- 36 "RPO" means Renewable Purchase Obligation.
- 37 "SLSC" means State Level Screening Committee constituted under the provisions of this Policy.
- 38 "Solar Farm" means a single or a group of solar power projects established on the land of the Khatedar.
- 39 "Solar Park" means a group of solar power plants in the same location used for the generation of electric power.
- 40 "Solar Park Developer" means a person who develops and / or maintains solar parks and also creates and / or maintains common infrastructure facilities.
- 41 "Solar Power Producer" means a person that makes an investment for setting up of solar power project and generating electricity from solar energy.
- 42 "Solar Plant / Solar Power Plant" means a power plant or system utilizing solar energy through solar photo-voltaic or concentrated solar thermal devices including its integration into conventional fossil fuel for generating electricity.
- 43 "Solar PV Power Plant" means the Solar Photo Voltaic (SPV) Power Plant that uses sunlight for direct conversion into electricity through Photo Voltaic technology.
- 44 "Solar Thermal Power Plant" means the Solar Thermal Power Plant that uses sunlight through Concentrated Solar Power (CSP) technology based on either line focus or point focus principle for conversion into heat / steam which can be used for producing electricity.
- 45 "State Agency" means Rajasthan Renewable Energy Corporation Ltd. or any other agency designated by the Rajasthan Electricity Regulatory Commission for accreditation and recommending the Renewable Energy Project for registration with Central Agency in accordance with the procedure prescribed by it and under the provisions specified in the CERC REC Regulations.
- 46 "State Load Dispatch Centre" or "SLDC" means the centre established by the State Government for the purposes of exercising the powers and discharging the functions under Section 31 of the Electricity Act, 2003.
- 47 "Tariff" means the schedule of charges for generation, transmission, wheeling and supply of electricity together with terms and conditions for application thereof.
- 48 "WBA" means Wheeling and Banking Agreement.
- 4.2 The terms not defined above will have their usual meanings.





Solar PV Project at Ramgarh, Jaisalmer, 2012

5 Objectives

- a Developing a global hub of solar power of 25,000 MW capacity to meet energy requirements of Rajasthan and India.
- b Contributing to long term energy security of Rajasthan as well as ecological security by reduction in carbon emissions.
- c Providing a long term sustainable solution for meeting energy needs and considerably reducing dependence on depleting fossil fuel resources like coal, oil and gas.
- d Generating direct and indirect employment opportunities in all activities related to the generation of solar power.
- e Envisaging a solar centre of excellence that would work towards applied research and commercialization of nascent technologies to accelerate the march to grid parity.

6 RREC to act as Nodal Agency for Clearance of Projects

- a Registration of projects.
- b Approval of projects.
- c Facilitating allotment of Government land.
- d Facilitating water allocation for Solar Thermal Power Plants.
- e Facilitating approval of power evacuation plan and allocation of bays etc.
- f Facilitating execution of PPA / WBA with Discoms of Rajasthan / RVPN / NVVN (as may be applicable).
- g Accreditation and recommending the solar power project for registration with Central Agency under REC mechanism.

RREC will nominate State Level Facilitator for all projects of capacity above 20 MW



7 Grid Interactive Solar Power Projects

7.1 Setting up of Solar Power Plants sanctioned under guidelines of MNRE / National Solar Mission (NSM):

The State will promote setting up of Solar Power Plants sanctioned under the guidelines of MNRE / National Solar Mission (NSM).

7.2 Setting up of Solar Power Plants in Rajasthan for sale to Discoms of Rajasthan:

The State will promote setting up of solar power projects for sale to Discoms of Rajasthan on the tariff determined by RERC through competitive bidding process to the extent of Renewable Purchase Obligation (RPO) target fixed by RERC.

7.3 Utility Grid Power Projects for sale through RE (Solar) Certificate Mechanism:

The State will promote Solar Power Producers

to set up Solar Power Plants of unlimited capacity for sale through RE (Solar) Certificate mechanism. The Solar Power Producers will be required to apply for accreditation to the State Agency and thereafter to Central Agency for registration and issuance of RE (Solar) certificate under REC mechanism as per orders / regulations of appropriate Commission issued in this regard. The Power generated from these power projects shall be purchased by Discoms of Rajasthan at Pooled Cost of Power Purchase as determined by the appropriate Commission from time to time. The Solar Power Producers will sell RE (Solar) Certificates as per the regulations/orders of appropriate Commission.

7.4 Utility Grid Power Projects for Captive use / sale to 3rd Party / States other than Rajasthan through Open Access for promotion of investment in Rajasthan:

The State will promote Solar Power Producers to set up Solar Power Plants of unlimited capacity for captive use or sale of power to 3rd



Solar Power Plant at Gajner, Bikaner, 2013

party / States other than Rajasthan. Such Power Producer will also be eligible for RE (Solar) Certificate as per orders / regulations of appropriate Commission issued in this regard.

8 Setting up of Rooftop PV Solar Power Plants connected to LT Grid

The State will promote development of Rooftop PV Solar Power Plants connected to LT under Net Metering Scheme as per guidelines of RERC. The State Government shall allow the Net metering mechanism for grid connected system to the consumer(s) of the Discoms installing such systems subject to technical consideration and execution of net-metering agreement between such consumers and Discoms. The Discoms will develop a suitable and comprehensive consumer friendly IT application in this regard.

9 Decentralized and Off-Grid Solar Applications

- 9.1 The State will promote and incentivize decentralized and off-grid solar applications, including hybrid system as per guidelines issued by MNRE to meet various electrical and thermal energy requirements for domestic and commercial use.
- 9.2 The State will promote setting up of solar power plant for sale of power to individuals through its own distribution system.
- 9.3 The State will also promote setting up of local solar grid and stand-alone solar systems to provide electricity to remote villages / dhanis.
- 9.4 The State will promote the use of SPV technology as power source for irrigation uses by installation of SPV Pumping Systems.

10 Development of Solar Parks in the State

10.1 Solar Parks by RREC:

RREC will act as a Nodal Agency for development of Solar Parks in Rajasthan. A special purpose vehicle (SPV) in the form of a subsidiary company of RREC has been established for development of infrastructure and management of Solar Park. RREC / SPV will formulate guidelines in respect of allotment of land and sharing of development cost by the solar power producers.

10.2 Development of Solar Parks by Private Sector Developers:

- 10.2.1 State will promote development of Solar Parks by Private Sector Developers. The Private Sector Solar Park Developer will submit the application to RREC for development of Solar Park along with processing fee @ Rs 5000 per Hectare + service tax subject to maximum of Rs 10 Lacs + service tax for each Solar Park. The plan of solar park will be approved by RREC within a period of 30 days of submission of application.
- 10.2.2 The Private Sector Solar Park Developer(s) will be allowed to purchase agricultural land from Khatedar for developing Solar Park(s) in excess of ceiling limit in accordance with the provisions of Rajasthan Imposition of Ceiling on Agriculture Holding Act, 1973.
- 10.2.3 Government land, if such land falls within the park or in its vicinity, may be allotted to Private Sector Solar Park Developer(s) for development of Solar Park(s).
- 10.2.4 The Private Sector Solar Park Developer(s) shall be responsible for registration of the project of solar power producer within their park with RREC as per provisions of "Rajasthan Solar Energy Policy, 2014". These projects shall be governed by the provisions of Rajasthan Solar Energy Policy, 2014. All the facilities /concessions provided in the policy shall be provided to these Solar Power Producers.
- 10.2.5 The Private Sector Solar Park Developer(s) shall be allowed to create common infrastructure facilities for development of Solar Park(s) viz creation of power evacuation system, development of roads, etc.

10.3 Development of Solar Parks through Joint Venture Companies (JVCs):

The State will promote development of Solar Parks by investing up to 50% equity (including cost of land) in JVCs formed for development of Solar Parks of capacity 500 MW or more as per the guidelines issued by State Government.

11 Registration of Solar Power Project

- 11.1 The Solar Power Producer will submit the application to RREC in prescribed form appended with the Policy at Annexure-I.
- 11.2 Each Solar Power Producer will deposit processing fee with RREC as under:
 - For Project \leq 10 MW capacity – Rs 50,000 per MW.
 - For Projects $>$ 10 MW and \leq 50 MW capacity – Rs 5 lac per project.
 - For Projects $>$ 50 MW and \leq 100 MW capacity – Rs 10 lac per project
 - For Projects $>$ 100 MW capacity – Rs 30 lac per project.Processing Fee shall be non-refundable. The service tax and other charges as may be applicable shall also be payable in addition to the processing fee.
- 11.3 The Power Projects, which have been registered either under Policy-2004 or under Policy-2011, shall be deemed to have been registered under this Policy-2014 on the same registration number allotted earlier provided that such power projects apply for in-principle clearance within a period of 3 years from the date of coming into force of this Policy. Projects for which in-principle clearance has not been applied within the aforementioned time frame will have to deposit Rs 5000/MW plus applicable service tax to get themselves registered again. The same provision will apply for the projects which are registered after coming into force of this Policy.
- 11.4 If there is any requirement of registration with NVVN / MNRE / IREDA for sanction of project under National Solar Mission guidelines, the Solar Power Producer will have to register his project with NVVN / MNRE / IREDA as per their guidelines in addition to registration of project with RREC as above.

- 11.5 For the projects under RE (Solar) certificate mechanism (clause 7.3), in addition to registration with RREC as above, the Solar Power Producers will have to deposit accreditation / registration fee plus applicable service tax with State Agency / Central Agency as per procedure laid down by the regulations/orders of the appropriate Commission.
- 11.6 Any "parent" "subsidiary" or "ultimate parent company" may distribute / transfer capacity in between them maximum four times for setting up of projects at the time of in-principle clearance against one application / registration
- 11.7 No registration will be required for Rooftop PV solar power plant connected to LT Grid under this Policy.
- 11.8 No prior registration with RREC will be required for participation in the bidding. Only successful bidders will be required to register as per the clause 11.1 and 11.2.

12 Allotment / Procurement of Land

12.1 Allotment of Government Land to Solar Park Developer:

Government land will be allotted to Solar Park Developer as per the provisions of Rajasthan Land Revenue (Allotment of land for setting up of Power Plant based on Renewable Energy Sources) Rules, 2007, as amended from time to time. Such Solar Park Developer will also be empowered to further sub-lease the land.

12.2 Allotment of Government Land for a Solar Power Project:

- 12.2.1 The allotment of land to Solar Power Projects will be done as per the provisions of Rajasthan Land Revenue (Allotment of Land for setting up of Power Plant based on Renewable Energy Sources) Rules, 2007, as amended from time to time.
- 12.2.2 RREC will recommend to the concerned District Collector for allotment of Government land only on submission of cash security deposit of Rs 5.00 lac per MW by demand draft / RTGS in favour of RREC, Jaipur. In case land is not allotted, security deposit will be refunded. After the allotment of Government land, security deposit will be refunded on the execution of lease deed.

- 12.2.3 Any recommendation made by RREC regarding reservation of Government land in favour of solar power producer before coming into operation of this Policy will stand withdrawn from the date of coming into force of this Policy.
- 12.2.4 Any recommendation made by RREC regarding allotment of Government land to solar power producer after deposit of Rs 1 lac / MW and in case where land has not yet been allotted, such solar power producer shall have to deposit additional security of Rs 4 lac / MW within a period of one month from coming into operation of this policy, otherwise the recommendation for allotment of government land shall stand withdrawn and the security deposit will be refunded.
- 12.2.5 There will be no requirement of depositing security under this clause if project is sanctioned under NSM or through competitive bidding process by RREC / Discoms.
- 12.2.6 For setting up Solar Power Plant based on different technology, maximum land which can be allotted to the Solar Power Producer shall be as follows:

S. No.	Technology	Maximum land which can be Allotted
1.	SPV on Crystalline Technology	2.5 Hect./MW
2.	SPV on Crystalline Technology with tracker	3.5 Hect./MW
3.	SPV on ThinFilm / Amorphous Technology with or without tracker	3.5 Hect./MW
4.	Solar Thermal (CSP)-Parabolic Trough/Tower/ Other Technology with and without storage	a) Up to PLF of 21%: 3.5 Hect./MW b) For every 1% increase in PLF, 0.15 Hect./MW additional land will be allotted.

12.3 Solar Power Plant on Private Land:

The State will promote setting up of Solar Power Plant / Solar Farm on private land. Khatedar shall be permitted to set-up Solar Power Project on his holding or to sub-let his holding for setting up of such projects without the requirement of land conversion in accordance with the provisions of Rajasthan Tenancy Act 1955 and Rajasthan Land Revenue Act 1956.

Solar Power Producers shall also be allowed to purchase private land from Khatedar for setting up of Solar Power Plant in excess of ceiling limit in accordance with the provisions of Ceiling Act, 1973.

13 Incentives / Facilities available to Solar Power Projects

13.1 Grant of incentives available to Industries:

Generation of electricity from Solar Power Plant shall be treated as eligible industry under the schemes administered by the Industries Department and incentives available to industrial units under Rajasthan Investment Promotional Scheme shall be available to the Solar Power Projects.

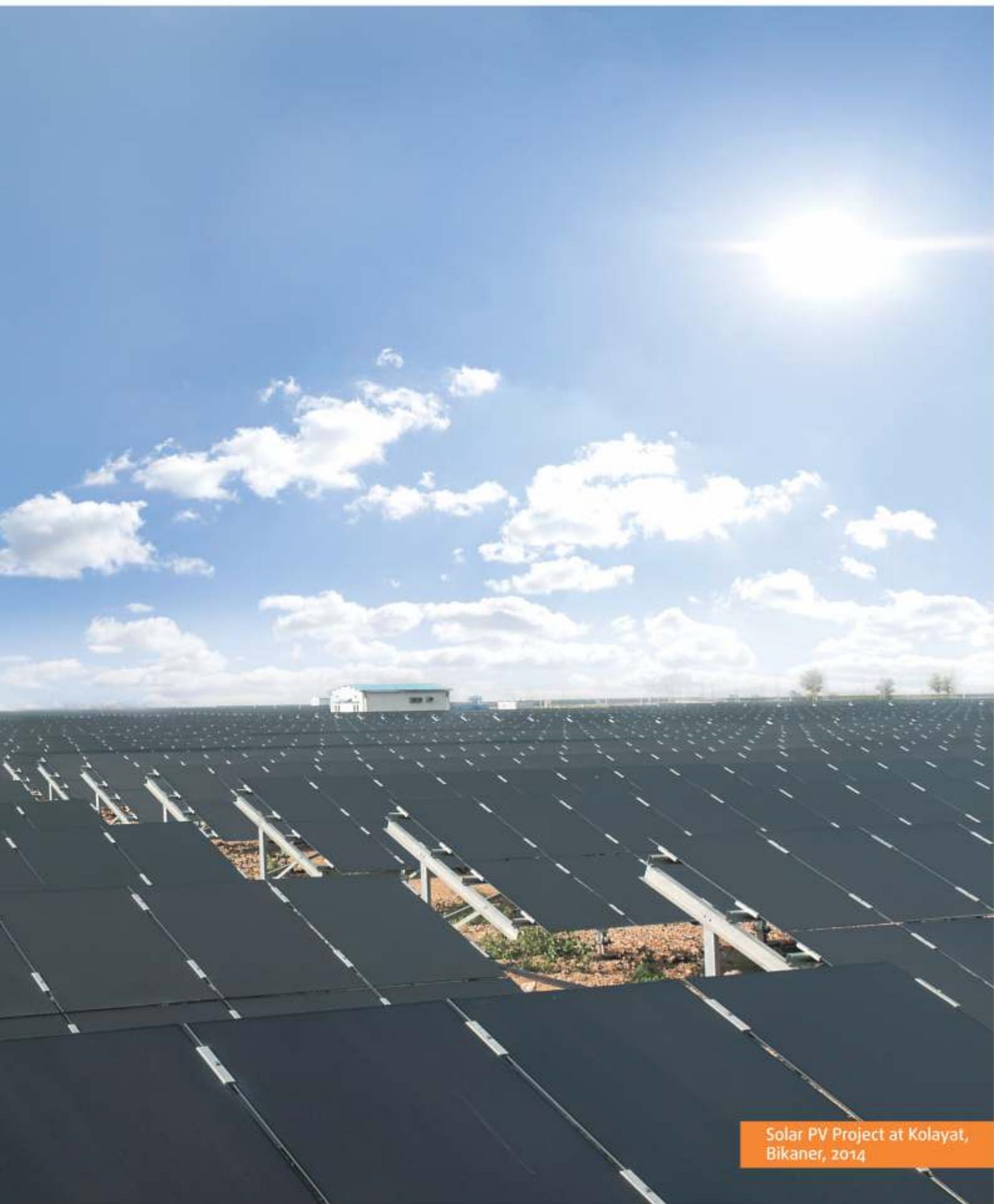
13.2 Availability of Water for Power Generation:

Water Resource Department will allocate required quantity of water from IGNP canal / the nearest available source for development of Solar Thermal Power Plants subject to the availability of water for power generation. Power Producer will intimate estimated water requirement to RREC along with source of water. After assessment / scrutiny, case of water requirement shall be forwarded to the Water Resource department. The modification(s) required, if any, in the existing canal system shall be done by the Water Resources Department at the cost of the Power Producer.

13.3 Clearance from Rajasthan State Pollution Control Board:

Rajasthan State Pollution Control Board with a view to encourage Solar Power plant in the state has notified solar power plant of all capacities under Green Category. The State Board will issue comprehensive consent to establish and consent to operate for one project. The State





Solar PV Project at Kolayat,
Bikaner, 2014

Pollution Control Board will also ensure expeditious disposal of consent applications within 15 days.

13.4 Banking :

Banking will be allowed as per the RERC regulations.

14 State Level Committees

14.1 State Level Screening Committee (SLSC):

The State Level Screening Committee (SLSC) consisting of the following will be constituted:

- (i) Principal Secretary / Secretary, Energy, Government of Rajasthan- Chairman.
- (ii) Managing Director, RREC.
- (iii) Managing Director, RVPN.
- (iv) Managing Director, JVVNL/AVVNL/ JdVVNL.
- (v) Director (Finance), RREC.
- (vi) Director (Technical), RREC- Convener

14.2 State Level Empowered Committee (SLEC):

The State Level Empowered Committee (SLEC) consisting of the following will be constituted-

- (i) Chief Secretary, GoR –Chairman.
- (ii) Additional Chief Secretary (Infra), GoR.
- (iii) Principal Secretary, Revenue, GoR.
- (iv) Principal Secretary / Secretary, Energy, GoR.
- (v) Principal Secretary, Water Resources Department, GoR .
- (vi) CMD, Rajasthan Rajya Vidyut Prasaran Nigam Ltd.
- (vii) Principal Chief Conservator of Forest, Rajasthan.
- (viii) District Collector of concerned District - Special Invitee.
- (ix) Chairman, Rajasthan Renewable Energy Corporation Ltd.
- (x) MD, Rajasthan Renewable Energy Corporation Ltd.-Member Secretary.

15 In-principle clearance of Projects

15.1 In-principle clearance of projects under clause 7.3 and 7.4:

In-principle clearance of projects under clause 7.3 and 7.4 will be granted by the State Level Screening Committee after evaluating / examining the project proposals on the following criteria:

- Detailed Project Report.
- Financial capability of the Power Producer (Annexure-II).
- Status of identification or availability of land.
- Status of Power Evacuation System for proposed project.
- For solar thermal plant, availability of Water (if required).
- For projects under REC mechanism, undertaking from the Solar power producers regarding accreditation and registration with State Agency/Central Agency
- Documentary evidence of Power Purchase Agreements in case of sale to 3rd Party through open access

15.2 In-principle clearance of Projects under Clause 7.1:

The projects under clause 7.1 will be considered as in-principle cleared from the date of signing of PPA with NVVN / MNRE / SECI as per the guidelines of NSM.

15.3 For projects under Clause 7.2:

RREC may act as a nodal agency for carrying out the tariff based bidding process on behalf of Discoms of Rajasthan. The bid process will be conducted by RREC on the request of Discoms of Rajasthan. These projects will not require in-principle clearance from SLSC.

15.4 Timeline for in-principle clearance:

Solar Power Producer to whom Government land is allotted will have to apply for in-principle clearance of the project within three months from the date of allotment of Government land. If Solar Power Producer fails to apply for in-principle clearance within the time prescribed, RREC will recommend for cancellation of allotment of Government land with the approval of SLSC.

16 Security Deposits

16.1 For projects under Clause 7.3 and 7.4:

After in principle clearance of the projects by the State Level Screening Committee for projects under Clause 7.3 and 7.4, the Solar Power Producers will be required to deposit

security amount of Rs10 lac / MW in the form of bank guarantee within one month from the date of issue of in-principle clearance. In case Power Producer fails to deposit security money within stipulated time, then in-principle clearance shall be cancelled without any notice which can only be revalidated after deposit of security amount with interest @ 12% per annum from the date of in-principle clearance. The security amount deposited by the Solar Power Producers shall not be convertible or transferable and shall only be refunded to the Solar Power Producer on his written request after commissioning of the Project. In case Power Producer fails to commission the Power Plant within the time schedule including extension as per Clause 21, the security deposit shall be forfeited.

16.2 For projects under clause 7.2:

The security deposit will be governed by provision of bid document and power purchase agreement.

17 Approval of Power Projects

- 17.1 All in - principle cleared projects of capacity more than 10 MW under clause 7.3 & 7.4 will be submitted to the State Level Empowered Committee (SLEC) for final approval.
- 17.2 All in principle cleared projects of capacity upto 10 MW under clause 7.3 & 7.4 will be submitted to the State Level Screening Committee (SLSC) for final approval.
- 17.3 Solar Power Producer to whom Government land is allotted will have to apply for final approval of the project within three months from the date of in-principle clearance by SLSC. If Solar Power Producer fails to apply for final approval of the project within the time prescribed, RREC will recommend for the cancellation of allotment of Government land with the approval of SLEC



18 Special Provision for approval of Mega Solar Power Projects

- 18.1 In order to expedite the process of approval of Mega Solar Power Projects of capacity of 500 MW or more, such project proposals along with detailed project reports will be placed by RREC directly before SLEC for its consideration.
- 18.2 Mega Solar Power Projects will also be eligible for benefits / concessions available under Rajasthan Investment Promotion Scheme.
- 18.3 SLEC will decide the schedule of commissioning of such Mega Solar Power Projects and will review its progress from time to time.
- 18.4 SLEC is also empowered to extend the schedule of commissioning of the project where there is a reasonable certainty of commissioning of the project. In such cases, extended completion schedule and penalties shall be decided by SLEC on case - to - case basis.

19 Power Purchase Agreement

The Power Purchase Agreement between the Solar Power Producer and Procurer of power will be executed in the following manner:

- 19.1 **Solar Power Project sanctioned under clause 7.2:**

For the projects sanctioned under clause 7.2 the Power Purchase Agreement / Power Sale Agreement will be executed as per the provisions of bid document.
- 19.2 **Sale of Power through RE (Solar) certificate mechanism (Clause 7.3):**

In case of solar power projects established for sale of power through REC mechanism, the Power Purchase Agreement will be signed between Solar Power Producers and the Discoms of Rajasthan as per the regulations/orders of appropriate commission issued from time to time in this regard.

19.3 Third party sale / captive use / sale to other States through Open Access (Clause 7.4):

- (i) In case of third party sale / sale to other state, the Power Purchase Agreement will be executed between the Power Producer and the procurer on mutually agreed rates. A separate agreement will be executed for Wheeling of power with Discoms of Rajasthan. The transmission agreement with RVPN will be executed separately, if the Solar Power Producer intends to use the system of RVPN.
- (ii) In case of captive use, agreement will be executed for wheeling and banking of power with Discoms of Rajasthan. The transmission agreement with RVPN will be executed separately, if the Solar Power Producer intends to use the system of RVPN.

20 Rajasthan Renewable Energy Development Fund

In cases where solar power projects are set up for sale of solar power to parties other than Discoms of Rajasthan, the Solar Power Producer shall contribute towards Rajasthan Renewable Energy Development Fund, a sum of Rs 1 lac / MW every year for the entire life-cycle of the project from the time of commissioning.

21 Completion Time Schedule for the Projects

- 21.1 The completion time schedule for the Solar Power Plants under the Clause 7.2 will be governed by provisions of bid document and Power Purchase Agreement.
- 21.2 The time schedule for completion, for the Solar Power Plants, sanctioned under Clause 7.3 & 7.4 subject to force majeure conditions, will be as under:

Type of Projects	Completion Time schedule
SPV	
Up to 20 MW capacity	Within 15 months from the date of SLEC approval
More than 20 MW and up to 50 MW capacity	Within 18 months from the date of SLEC approval
More than 50 MW	Within 24 months from the date of SLEC
CSP	
Up to 25 MW capacity	Within 24 months from the date of SLEC approval
More than 25 MW and up to 100 MW capacity	Within 36 months from the date of SLEC approval
More than 100 MW and up to 200 MW capacity	Within 42 months from the date of SLEC approval
More than 200 MW capacity	Within 48 months from the date of SLEC approval

Provided that extension in time schedule may be granted by the RREC on case to case basis after depositing penalty amount as under plus service tax as applicable.

Penalty Amount

a) For delay upto 1 month	Rs 25,000 per MW
b) For delay upto 3 months	Rs 50,000 per MW
c) For delay upto 6 months	Rs 1,00,000 per MW
d) For delay upto 9 months	Rs 1,50, 000 per MW
e) For delay upto 15 months	Rs 2,00,000 per MW

SLEC may consider extension beyond 15 months where there is a reasonable certainty of commissioning of the project. In such cases, extended completion schedule and penalties shall be decided by SLEC on case-to-case basis

22 Open Access for Third Party Sale

Open access will be granted to Solar Power Producer or beneficiary. They shall have to pay the applicable charges for open access and losses as approved by RERC / CERC from time to time.

23 Forecasting and Scheduling

The Solar energy generated will not be covered under scheduling procedure for Intra-State ABT. However, the actual solar energy injected in the grid during particular time block of 15 minutes shall be post-facto considered in draw



Solar Domestic lighting System at Barli, Jodhpur

schedule for sale of power to licensee / third party or for giving set-off against the consumption of recipient unit in case of captive use as per the relevant regulations of RERC. However, total available Solar Power Plant generating capacity shall be intimated to RVPN / Discoms of Rajasthan for next day.

24 Evacuation and Grid Interfacing

- 24.1 Evacuation of produced solar power shall be made through the transmission and distribution network being maintained by RVPN and Discoms respectively. For augmentation of Transmission / distribution system to evacuate the power from receiving Sub-station, RVPN / Discoms of Rajasthan shall develop / augment the necessary transmission / distribution network within mutually agreed timeframe.
- 24.2 Connectivity at EHV substation (400, 220 & 132 kV) and Distribution Substation (33/11 kV and LT) shall be decided / approved by RVPN and Discom respectively in consultation with RREC. Minimum capacity and voltage level of solar power project getting connected to RVPN's receiving GSS shall be 5 MW at 33 kV.
- In case solar power projects of capacity less than 5 MW seek inter-connection at RVPN's receiving GSS, shall bear the cost of line bay instead of applicable grid connectivity charges.
- 24.3 Grid interfacing shall be governed by CEA (Technical Standards for Connectivity to Grid), Regulations 2013 and the RERC (Rajasthan Electricity Grid Code) Regulation, 2008 with latest amendment.
- 24.4 Metering arrangement shall be made as per Central Electricity Authority (Installation & Operation of Meters) Regulations, 2006, the grid code, the metering code and other relevant regulations issued by RERC / CERC in this regard.
- 24.5 Transmission line from generating plant Sub-station / Pooling Sub-station to Receiving Sub-station:
- (i) Grid Connected Solar Power Plants commissioned under Tariff Based Bidding and NSM / MNRE:
- The power evacuation transmission line from Generating Plant Sub-station / Pooling Sub-station to the receiving RVPN / Discoms Sub-station will be laid as per terms & conditions of Bid document / RERC Regulations.

- (ii) Grid connected Solar Power Plants commissioned under clause 7.3, 7.4 and 8: The Power evacuation transmission line from the Generating Plant Sub-station / Pooling Sub-station to RVPN / Discoms receiving Sub-station will be laid as per regulations / orders of appropriate commission
- 24.6 The Solar Power Producer shall comply with the Grid Code including Load Dispatch and system operation code, metering code, protection code, safety code, etc. as applicable from time to time in the State.

25 Common Pooling Sub-Station

Solar Power Producers may construct Common Pooling Sub-Station to evacuate their generated solar power to the RVPN / Discom substation through common transmission line with separate metering system at their Common Pooling Sub-Station and main metering system at RVPN / Discom Sub-Station.

26 Grid Connectivity

- 26.1 For creation of proper facility for receiving power, the solar power producer shall pay grid connectivity charges as finalized by RERC from time to time to Discoms of Rajasthan / RVPN as applicable.
- 26.2 In case line bay and grid connectivity has been made by RVPN at a particular System Voltage (say 33 kV) and Solar Power Producer at a later date wants to supply the power on higher voltage (say 132 kV), on feasibility the requisite modification, viz. addition of line bay on higher voltage, interconnection with main bus, etc. shall be done by RVPN as a deposit work on behalf of the Power Producer. In case power evacuation from any solar power plant is made through temporary arrangement due to incomplete approved evacuation system, no charges will be payable by Solar Power Producer for shifting to the approved evacuation system.
- 26.3 In case Power Producer first connects his feeder to Discom's substation and later on wants to connect his feeder to RVPN's Sub-station, the

additional line shall be constructed by Power Producer and the addition of line bay in RVPN substation shall be done by RVPN as deposit work on behalf of Power Producer.

- 26.4 For grid connectivity / construction of line to be arranged by RVPN/ Discoms of Rajasthan, the Solar Power Producer shall submit time-frame for construction of their plant along with Bank Guarantee equivalent to the cost of bay and transmission / distribution line with an undertaking to use the system within prescribed period. In case there is any delay in utilization of system, a penalty @ 12% per annum for the period of delay on the amount of bank guarantee will be levied by RVPN / Discoms of Rajasthan. The Bank Guarantee shall be returned to the Solar Power Producer after commissioning of the project on depositing amount of penalty, if any on account of delay in the utilization of the system.

27 Reactive Power Charges

The drawl of reactive power shall be charged by RVPN as per the RERC orders, as amended from time to time.

28 Power to remove difficulties

The State Level Screening Committee will be authorized to issue clarification in respect of interpretation of the provisions of this policy as may appear necessary for removing the difficulty either on its own motion or on the written representation from the stakeholders.

The provision of the Electricity Act-2003 and the applicable CERC / RERC Regulations / Orders as issued from time to time shall prevail for the purpose of implementation of this policy.

Rajasthan Renewable Energy Corporation Limited

(A Government of Rajasthan Undertaking)

E-166, Yudhishtir Marg, C-Scheme, Jaipur
Tel: 2225859 / 2229341 / 2221650 / 2229055
Fax: 0141-2226028 | Website: www.rrecl.com

**Application form
for submitting proposals
under Rajasthan Solar Energy Policy, 2014**

I. APPLICANT DETAILS

1. **Name of the applicant / organization:** _____

2. **State whether the applicant / organization is a**
 - a) Company registered under Indian Companies Act 1956; Enclose certified copy of the relevant documents such as MOA, AOA along with certificate of registration): _____

 - b) Partnership Firm (Enclose certified copy of Partnership deed along with Firm's registration): _____

 - c) Any other entity (Enclose certified copy of the relevant documents such as registration etc.): _____

3. **Address**
 - i) **Office:** _____

 - a) Telephone No.: _____

 - b) Fax No.: _____

 - c) Email Address: _____

ii) **Name and Address of the authorized person**

- a) Name : _____
- b) Address: _____
- c) Telephone No.: _____
- d) Fax No.: _____
- e) Email Address: _____

4. **In case of any other entity, give details of partners / directors / owners:**

5. **Whether income tax assessee. If yes, please state the year up to which assessment made (copies of assessment for last three years to be enclosed):**

6. **If answer to 5 is No, state whether the promoter is an assessee:**

7. **Income tax permanent A/c. No.:**

8. **Give details of the turnover of the organization in last four years including part of the current running year (copies of the profit and loss account and Balance Sheet / Annual Report to be enclosed):**

9. **Do you propose to set up the plant in the name of existing company or SPV or propose some sister concern:**

II. PROPOSED POWER PROJECT

1. **Proposed Capacity (MW):**

2. Power Plant proposed to be set up under

- a) Under National Solar Mission (please specify the name of scheme under which the power plant proposed to be set up) _____
- b) Sale of energy to Rajasthan Discoms _____
- c) REC Mechanism: _____
- d) Third party sale: _____
- e) Captive Use: _____
- f) Any other (please specify): _____

III TYPE OF PROPOSED POWER PROJECTS

- a) **Solar Photovoltaic Power Plant (SPV)**
 - i) Name of Solar Technology Proposed: _____
 - ii) Battery Bank proposed: _____ Yes/ No
- b) **SPV – Wind Hybrid:** _____
- c) **Solar Thermal (CSP)**
 - i) Name of Solar Technology Proposed: _____
 - ii) With storage / without storage: _____
 - iii) Requirement of Water (Cusec.): _____

IV. FINANCIAL DETAILS:

- I. a) Estimated cost of the project proposed: _____
- b) Net-Worth of applicant _____

2. Details of the Certification of the Chartered Accountants:

- a) CA's Name and Address: _____
- b) Registration No.: _____

3. Details of the application / processing fee remitted:

- a) Amount Rs.: _____
- b) Demand Draft / RTGS Details: _____
- c) Date: _____
- d) Banker's Name and Address: _____

V. ANY OTHER RELEVANT INFORMATION: _____

VI. DECLARATION:

- (i) I / We certify that all information furnished is true to the best of my/our knowledge.
- (ii) I / We agree that Govt. of Rajasthan is the final authority to allot us the project.
- (iii) I / We shall not have any dispute with GoR / MNRE / NVVN / RREC / SECI for non-allotment of the project.
- (iv) I / We agree to sign necessary agreement with Govt. of Rajasthan / RREC / RVPN / DISCOM / NVVN / MNRE / SECI for which I / We have been duly authorised.
- (v) I / We agree to comply with the terms and conditions of Rajasthan Solar Energy Policy, 2014

Place:
Date:

Signature of the authorized
Signatory of the Organization with
Name, Designation & Seal

VII. DOCUMENTS ENCLOSED (as applicable):

- (i) A certified copy of the Memorandum & Article of Association of the company with inclusion of activity of generation of power from Renewable sources in its main object clause.
- (ii) Certified copy of the registration certificate/certified copy of the partnership deed.
- (iii) Certified copy of the Power of Attorney conferring powers on the person(s) who are competent to sign the application form / documents / execute the MOU / the agreement with GoR / RREC / RVPN / DISCOM / MNRE / NVVN / SECI / IREDA.
- (iv) Copy of PAN
- (v) Processing fee in the form of D.D. No. Dated payable to RREC, payable at Jaipur for Rs..... only / if RTGS, give RTGS details.
- (vi) Copy of Annual Audited accounts for last three years and for the current running year undited, if available duly certified.
- (vii) Certificate from the Chartered Account showing the "Net Worth" of the Company.
- (viii) Documentary evidence of power purchase arrangements in case of sale to 3rd party through Open Access

Signature of the authorized Signatory of
the Organization with Name, Designation & Seal

The Power Producer desirous to set up Solar Power Plant in the State of Rajasthan under RE (Solar) Certificate Mechanism & Captive use / sale to 3rd party / States other than Rajasthan through Open Access must fulfill the following minimum financial criteria.

Qualification Criteria for Solar PV / Thermal Projects

Net Worth

The "Net Worth" of the company should be equal to or greater than the value calculated at the rate of Rs 1 Crore or equivalent US\$ per MW of the project capacity. The computation of Net Worth shall be based on unconsolidated audited / unaudited accounts of the company. For the purpose of the computation of net worth, the best year in the last four years including current running year shall be considered. The Company, would thus be required, to submit annual audited accounts for the last three financial years and for part of the current running year (Un-Audited), while indicating the year, which should be considered for evaluation, along with a certificate from the Chartered Accountant to demonstrate the fulfilment of the criteria.

For companies, which are newly incorporated, the Net Worth criteria should be met seven days prior to the date of submission of application by the Project Developer. To demonstrate fulfilment of the criteria, the Project Developer shall submit a certificate from a Chartered Accountant certifying the Net Worth on the date seven days prior to submission of application. Further, the Project Developer shall submit the unaudited financial statements of the company for the date on which the Certificate of Chartered Accountant has been obtained.

{Note: For the Qualification Requirements, if data is provided by the Project Developer in foreign currency, equivalent rupees of Net Worth will be calculated using bills selling exchange rates (card rate) USD/INR of State Bank of India prevailing on the date of closing of the accounts for the respective financial year as certified by the Project Developer's banker.

For currency other than USD, Project Developers shall convert such currency into USD as per the exchange rates certified by their banker prevailing on the relevant date and used for such conversion.}

Net Worth calculation for an individual / partnership firm

Net-Worth	=	Proprietors / Partner's Capital reflecting in the Audited Balance Sheet
Add:		Free Reserves (Including the Credit balance of Reserve and Surplus appearing in the Balance Sheet)
Subtract:		Intangible Assets
Subtract:		Miscellaneous Expenditures to the extent not written off and carry forward losses.

Net Worth calculation for a company

Net-Worth	=	Paid up Share capital which includes <ol style="list-style-type: none">1. Paid up Equity share capital and2. Fully, compulsorily and mandatorily convertible Preference Shares3. Fully, compulsorily and mandatorily convertible Debentures)
Add:		Free Reserves (Including share premium provided it is realized in Cash or Cash equivalents.)
Subtract:		Revaluation Reserves
Subtract:		Intangible Assets
Subtract:		Miscellaneous Expenditures to the extent not written off and carry forward losses.

In case of a Consortium the financial requirement to be met by each Member of the Consortium shall be computed in proportion to the equity commitment made by each of them in the Project Company. Any consortium, if selected shall incorporate a Project Company with equity participation by the Members in line with consortium agreement before signing the PPA / WBA / Wheeling Agreement. The Project Developer may seek qualification on the basis of financial capability of its Parent Company and / or its Affiliate(s) for the purpose of meeting the Qualification Requirements. In case of the Project Developer being a Consortium, any Member may seek qualification on the basis of financial capability of its Parent Company and / or its Affiliate(s).

In case of land/any other asset, only the book value will be considered. The value of land / any other assets will not be re-valued for calculating net worth. Any reserve created due to this shall not be counted for calculating Net worth.

For the purposes of meeting financial requirements only unconsolidated audited annual accounts shall be used. However, audited consolidated annual accounts of the Project Developer may be used for the purpose of financial requirements provided the Project Developer has at least twenty six percent (26%) equity in each company whose accounts are merged in the audited consolidated account and provided further that the financial capability of such companies (of which accounts are being merged in the consolidated accounts) shall not be considered.

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Rajasthan Renewable Energy Corporation Limited

E-166, Yudhishtir Marg, C-Scheme, Jaipur

Tel: 0141 222 5859, 222 9341, 222 1650, 222 9055

Fax: 0141 222 6028

www.rrecl.com



MOST URGENT

RAIN WATER HARVESTING

राजस्थान सरकार

नगरीय विकास एवं स्वायत्त शासन विभाग, राज. जयपुर

क्रमांक : एफ 55 (4)पीए/एसई/डीएलबी/10/व.जल पुनर्भ./*7687-7920 दिनांक : 7/04/2011

1. आयुक्त,
राजस्थान आवासन मण्डल,
जयपुर।
2. आयुक्त,
जयपुर/जोधपुर विकास प्राधिकरण,
जयपुर/जोधपुर।
3. जिला कलेक्टर,
समस्त राजस्थान।
4. सचिव,
नगर विकास न्यास,
समस्त राजस्थान।
5. मुख्य कार्यकारी अधिकारी/
आयुक्त/अधिसापी अधिकारी,
नगर निगम/परिषद/पालिकायें,
समस्त राजस्थान।

MOST-URGENT

RAIN WATER-HARVESTING

विषय :- "वर्षा जल पुनर्भरण संरचना प्रणाली" (Roof Top Rain Water Harvesting Structure) के निर्माण के सम्बन्ध में।

प्रसंग :- विभाग के पूर्व समसंख्यक आदेश सं. : एफ 55 (4) पीए/एसई/डीएलबी/10/व.जल पुनर्भ./2132-2390 दिनांक : 16.04.10, 2081-2527 दिनांक 17.05.2010 एवं 2764-69 दिनांक 02.06.2010।

जैसाकि आपको विदित ही है कि भूजल अत्यन्त सीमित मात्रा में है। वर्षा की कमी, आबादी के बढ़ते दबाव एवं भूजल के अन्वधाधुन्ध दोहन से भूजल स्तर तेजी से नीचे गिरता जा रहा है। कम वर्षा के कारण व परम्परागत जल संचय एवं जल संग्रहण के स्रोतों (कुएँ, बावड़ी, तालाब) की ओर उचित ध्यान नहीं दिये जाने से राज्य को पानी की अत्यधिक कठिनाई का सामना करना पड़ रहा है। वर्षा के पानी के बिना उपयोग बहकर चले जाने के कारण न तो भूतल पर जल का संग्रहण हो रहा है, और न ही भूजल स्तर का पर्याप्त पुनर्भरण हो पाता है।

प्रदेश में पेयजल की विकट समस्या को माननीय मुख्यमंत्री महोदय द्वारा अत्यन्त ही गम्भीरता से लिया गया है। उन्होंने वर्षा के जल का भूजल पुनर्भरण/संग्रहण करने व पानी को सहेज कर सदुपयोग करने व शहरी क्षेत्रों में स्थित 300 वर्गमीटर व उससे अधिक क्षेत्रफल के समस्त भवनों में "छत द्वारा वर्षा जल पुनर्भरण संरचना" (Roof Top Rain Water Harvesting Structure) प्रणाली का अनिवार्य रूप से निर्माण करवाने हेतु समस्त नगर निकायों/शहरी विकास प्राधिकरण/नगर विकास न्यास/राज. आवासन मण्डल को निर्देशित करने हेतु निर्देश दिये हैं।

इस सम्बन्ध में लेख है कि राजस्थान नगर पालिका अधिनियम, 2009 की धारा 238 (1) में शहरी क्षेत्रों में स्थित 300 वर्गमीटर से अधिक के भूखण्डों पर निर्मित भवनों में "वर्षा जल पुनर्भरण संरचना" (Roof Top Rain Water Harvesting Structure) प्रणाली का अनिवार्य रूप से निर्माण करने हेतु प्रावधान किया गया है। धारा 238 (2) में यह प्रावधान है कि 300 वर्गमीटर से अधिक के भूखण्डों पर भवन निर्माण हेतु भूखण्ड मालिक द्वारा भवन के नक्शों में "वर्षा जल पुनर्भरण संरचना प्रणाली" का प्रावधान करने पर ही अनुमति जारी की जावे एवं वर्षा जल पुनर्भरण संरचना प्रणाली निर्माण हेतु शपथ-पत्र प्राप्त करते हुये सुरक्षा राशि जमा करवाई जावे एवं धारा 238 (3) के अनुसार भवन का निर्माण पूर्ण होने पर उक्त प्रावधान की पालना सुनिश्चित होने के उपरान्त ही भवन स्वामी को अधिवास प्रमाण-पत्र जारी किया जावे, अन्यथा कोई भी भवन तब तक अधिभोग में नहीं लिया जावेगा, जब तक कि भवन मालिक ऐसा प्रमाण-पत्र प्राप्त नहीं कर लेता।

साथ ही धारा 238 (6) में यह प्रावधान है कि शहरी क्षेत्र में निर्मित 300 वर्गमीटर से बड़े भवनों में सार्वजनिक जल वितरण प्रणाली से नया जल कनेक्शन लेने हेतु सम्बन्धित नगर निकाय (नगर निगम/परिषद/पालिका) द्वारा तब तक अनापत्ति प्रमाण-पत्र (NOC) जारी नहीं किया जावे, जब तक कि उस भवन के मालिक/रहवासी द्वारा अपने भवन में "छत द्वारा वर्षा जल पुनर्भरण संरचना" (Roof Top Rain Water Harvesting Structure) प्रणाली का निर्माण करवा लिया है।

अतः इस सम्बन्ध में माननीय मुख्यमंत्री महोदय द्वारा प्रदत्त निर्देशों के अनुसरण में पुनः निम्नानुसार निर्देश दिये जाते हैं :-

1. शहरी क्षेत्रों में स्थित 300 वर्गमीटर व उससे अधिक क्षेत्रफल के भूखण्ड में निर्मित/नवीन निर्माण किये जाने वाले समस्त भवनों में "छत द्वारा वर्षा जल पुनर्भरण संरचना" (Roof Top Rain Water Harvesting Structure) प्रणाली का अनिवार्य रूप से उसके मालिक अथवा उसमें रहवास करने वाले व्यक्ति द्वारा निर्माण करवाया जावे। 300 वर्गमीटर से कम क्षेत्रफल के भवन मालिक अथवा उसमें रहवास करने वाले व्यक्तियों को "छत द्वारा वर्षा जल पुनर्भरण संरचना" (Roof Top Rain Water Harvesting Structure) प्रणाली का निर्माण करने हेतु उन्हें प्रोत्साहित किया जावे। "छत द्वारा वर्षा जल पुनर्भरण संरचना" (Roof Top Rain Water Harvesting Structure) प्रणाली के निर्माण के लिये एक नमूना डिजाईन संलग्न प्रेषित की जा रही है।
2. शहरी क्षेत्रों में स्थित 300 वर्गमीटर व उससे अधिक क्षेत्रफल के भूखण्डों पर बनने वाले नवीन भवनों में जब तक उस भवन के मालिक/रहवासी द्वारा "वर्षा जल पुनर्भरण संरचना" (Roof Top Rain Water Harvesting Structure) प्रणाली का निर्माण नहीं करवा लिया जाता है, तब तक सम्बन्धित नगर निकाय (नगर निगम/परिषद/पालिका) द्वारा भवन में सार्वजनिक जल वितरण प्रणाली से नया जल कनेक्शन लेने हेतु अनापत्ति प्रमाण-पत्र (NOC) एवं भवन में रहने हेतु भवन स्वामी को अधिवास प्रमाण-पत्र जारी नहीं किया जावे।
3. निर्मित/नवीन भवन निर्माण के मालिक/रहवासी को एक निश्चित समयावधि में ऐसी संरचना बनाने के लिये निर्देशित किया जाये एवं भवन मालिक/रहवासी निश्चित समयावधि में संरचना नहीं बनाये जाने पर राजस्थान नगर पालिका अधिनियम, 2009 की धारा 238 (7) के प्रावधान अन्तर्गत ऐसे दोषी भवन मालिकों के विरुद्ध कारावास अथवा जुर्माने की कार्यवाही हेतु सक्षम न्यायालय में चालान की कार्यवाही की जावे।

4. इस सम्बन्ध में स्वायत्त शासन विभाग द्वारा मॉडल स्थानीय निकाय (नगरीय क्षेत्र, भवन) विनियम, 2010 के बिन्दु सं. 7.12 में शहरी क्षेत्रों में स्थित 300 वर्गमीटर अथवा ज्यादा क्षेत्रफल के भूखण्डों में सेटबैक क्षेत्र में उपयुक्त स्थान पर वर्षा के पानी को इकट्ठा करने के लिये "वर्षा जल पुनर्भरण संरचना" (Roof Top Rain Water Harvesting Structure) प्रणाली के निर्माण करवाने हेतु प्रावधान किया गया है। भवन विनियम की प्रति संलग्न है।
5. यह सुनिश्चित किया जावे कि शहरी क्षेत्रों में स्थित 300 वर्ग मीटर से कम क्षेत्रफल के भवनों/भूखण्डों का वर्षा जल सीवर लाईन में नहीं डाला जाये। उक्त भवनों का वर्षा जल सीवर लाईन में नहीं जाकर खुली नाला-नाली में बहाया जावे। ऐसे वर्षा जल एवं सड़कों, चौराहों व फुटपाथ क्षेत्र के वर्षा जल के संग्रहण/पुनर्भरण हेतु क्षेत्र के किसी निचले इलाकों (Low Lying Area) में स्थित खाली स्थान पर "वर्षा जल पुनर्भरण संरचना प्रणाली" (Storm Rain Water Harvesting Structure) का शहरी स्थानीय निकायों द्वारा निर्माण करवाया जावे।
6. शहरी क्षेत्रों में स्थित सामुदायिक भवन के सम्पूर्ण भूखण्ड के क्षेत्र, खाली पड़ी भूमि, खेल मैदानों, प्रदर्शनी स्थलों इत्यादि के वर्षा जल के संग्रहण/पुनर्भरण हेतु इलाके के किसी उपयुक्त स्थान पर "वर्षा जल पुनर्भरण संरचना प्रणाली" (Storm Rain Water Harvesting Structure) का भी शहरी स्थानीय निकायों द्वारा निर्माण करवाया जाना सुनिश्चित किया जावे।
7. आपके क्षेत्राधिकार की शहरी स्थानीय निकायों को वर्ष 2010-11 में दिये गये लक्ष्यों के विरुद्ध निर्मित करवाये गये "वर्षा जल पुनर्भरण संरचना प्रणाली" (Roof Top & Storm Rain Water Harvesting Structure) की सूचनार्थ लक्ष्यवार निम्न प्रपत्र में दिनांक 15 अप्रैल, 2011 तक निदेशालय को भिजवाने का श्रम करें :-

वर्ष 2010-11 की प्रगति

क्रम सं.	नाम स्थानीय निकाय	नगर निकाय द्वारा भवनों में निर्मित वर्षा जल पुनर्भरण संरचना प्रणाली (Roof Top Rain Water Harvesting Structure) की सं.			खुले स्थानों पर निर्मित की जाने वाली वर्षा जल पुनर्भरण संरचना प्रणाली (Storm Rain Water Harvesting Structure) की सं.			निजी भवन मालिकों द्वारा निर्मित वर्षा जल पुनर्भरण संरचना प्रणाली (Roof Top Rain Water Harvesting Structure) की सं.	
		लक्ष्य	प्रगति		लक्ष्य	प्रगति		प्रगति	
			भौतिक	वित्तीय		भौतिक	वित्तीय	भौतिक	वित्तीय
01.	02.	03.	04.	05.	06.	07.	08.	09.	10.
01.	नगर निगम, जयपुर	50			10				
02.	नगर निगम (अन्य प्रत्येक)	30			5				
03.	नगर परिषद (प्रत्येक)	20			3				
04.	नगर पालिका (जिला मुख्यालय) (प्रत्येक)	10			2				
05.	नगर पालिका (अन्य)	5			1				

8. निजी भवनों में एवं खुले स्थानों के वर्षा जल के संग्रहण/पुनर्भरण के लिये "वर्षा जल पुनर्भरण संरचना प्रणाली"(Roof top & Storm Rain Water Harvesting Structure) निर्माण हेतु शहरी स्थानीय निकायों के लिये वित्तीय वर्ष 2011-12 में निम्नानुसार लक्ष्य निर्धारित किये जाते हैं :-

वर्ष 2011-12 में आवंटित लक्ष्य

क्रम सं.	नाम शहरी स्थानीय निकाय	निजी भवनों में निर्मित की जाने वाली वर्षा जल पुनर्भरण संरचना प्रणाली (Roof Top Rain Water Harvesting Structure) की सं.	खुले स्थानों पर निर्मित की जाने वाली "वर्षा जल पुनर्भरण संरचना प्रणाली" (Storm Rain Water Harvesting Structure) की सं.	निजी भवन मालिकों द्वारा निर्मित "वर्षा जल पुनर्भरण संरचना प्रणाली" (Roof Top Rain Water Harvesting Structure) की सं. (शहरी निकायों द्वारा स्वयं निर्धारित किया जावेगा)	विशेष विवरण
01.	राजस्थान आवासन मण्डल	500	30		
02.	जयपुर विकास प्राधिकरण	50	30		
03.	नगर विकास न्यास (प्रत्येक)	25	10		
04.	नगर निगम, जयपुर	50	10		
05.	नगर निगम (अन्य प्रत्येक)	30	5		
06.	नगर परिषद (प्रत्येक)	20	3		
07.	नगर पालिका (जिला मुख्यालय) (प्रत्येक)	10	2		
08.	नगर पालिका (अन्य)	5	1		

उक्त आवंटित लक्ष्यों के अनुसार "वर्षा जल पुनर्भरण संरचना प्रणाली" (Roof Top & Storm Rain Water Harvesting Structure) का निर्माण मानसून शुरू होने से पूर्व हर स्थिति में 30 जून 2011 तक करवाया जाना सुनिश्चित करावे।

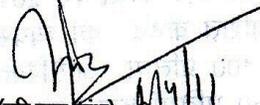
9. वर्ष 2011-12 में "वर्षा जल पुनर्भरण संरचना प्रणाली" (Roof Top & Storm Rain Water Harvesting Structure) का निर्माण चालू किये जाने हेतु शहरी स्थानीय निकायों द्वारा व्यापक स्तर पर कार्यवाही प्रारम्भ की जावे।
10. "वर्षा जल पुनर्भरण संरचना प्रणाली" (Roof Top & Storm Rain Water Harvesting Structure) का निर्माण करवाने के बारे में जनसाधारण को लाउड स्पीकर, पोस्टर-पम्पलेट्स, स्थानीय अखबारों में विज्ञापन, इलेक्ट्रॉनिक मीडिया के माध्यम से व्यापक स्तर पर जानकारी उपलब्ध करवाया जाना सुनिश्चित किया जावे।
11. इस कार्य के लिये प्रत्येक शहरी स्थानीय निकाय में एक नोडल ऑफिसर नियुक्त किया जावे एवं सूचना पट्ट पर उस अधिकारी का नाम, पदनाम, उनका दूरभाष नं. व कक्ष सं.

का भी उल्लेख किया जावे। "वर्षा जल पुनर्भरण संरचना" (Roof Top Rain Water Harvesting Structure) प्रणाली के निर्माण हेतु एक मॉडल डिजाईन का नक्शा विस्तृत रूप में बनवाया जाकर नगर निकाय के भवन में प्रदर्शित किया जावे।

12. "वर्षा जल पुनर्भरण संरचना" (Roof Top Rain Water Harvesting Structure) प्रणाली का निर्माण कार्य निजी स्तर पर करवाने के लिये प्रत्येक शहरी स्थानीय निकाय में कार्यकारी एजेन्सी नियुक्त की जावे।

यहाँ यह उल्लेखनीय है कि यह कार्यक्रम राज्य सरकार की सर्वोच्च प्राथमिकताओं में सम्मिलित कार्यक्रम है। अतः यदि "वर्षा जल पुनर्भरण संरचना प्रणाली" (Roof Top & Storm Rain Water Harvesting Structure) प्रणाली के अनिवार्य निर्माण हेतु प्रावधित प्रावधान लागू नहीं होते हैं, तो निगरानी के लिये जिम्मेदार अधिकारी व नोडल अधिकारी का व्यक्तिगत उत्तरदायित्व निर्धारित किया जायेगा।

संलग्न : उपरोक्तानुसार।


(जी.एस.सिंघ)

प्रमुख शासन सचिव,

नगरीय विकास एवं स्वायत्त शासन विभाग

क्रमांक : एफ 55 (4)पीए/एसई/डीएलबी/10/व.जल पुनर्भ./7921-815 दिनांक : 07/04/2011
प्रतिलिपि सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित है :-

1. प्रमुख सचिव, माननीय मुख्यमंत्री महोदय, राजस्थान सरकार, जयपुर।
2. विशिष्ट सहायक, माननीय मंत्री महोदय, स्वायत्त शासन विभाग, राज. जयपुर।
3. निजी सचिव, मुख्य सचिव महोदय, राजस्थान सरकार, जयपुर।
4. निजी सचिव, प्रमुख शासन सचिव, नगरीय विकास एवं स्वायत्त शासन विभाग, जयपुर।
5. निजी सचिव, प्रमुख शासन सचिव, जल संसाधन एवं जन स्वास्थ्य अभियांत्रिकी विभाग, राज. जयपुर।
6. निजी सचिव, समस्त जिला प्रभारी सचिवगण (प्रमुख शासन सचिव/शासन सचिव), शासन सचिवालय, राज. जयपुर।
7. निजी सचिव, शासन सचिव, स्वायत्त शासन विभाग, राज. जयपुर।
8. सम्भागीय आयुक्त (समस्त), राजस्थान।
9. महापौर/सभापति/अध्यक्ष, नगर निगम/परिषद/पालिकायें, समस्त राजस्थान।
10. मुख्य अभियन्ता (मुख्यालय), जन स्वास्थ्य अभियांत्रिकी विभाग, राज. जयपुर।
11. मुख्य अभियन्ता (मुख्यालय), जल संसाधन विभाग, राज. जयपुर।
12. उप निदेशक (क्षेत्रीय), स्थानीय निकाय विभाग, जयपुर, जोधपुर, कोटा, अजमेर, बीकानेर, उदयपुर।
13. समस्त अधिकारीगण, निदेशालय।
14. जनसम्पर्क अधिकारी, निदेशालय।
15. सुरक्षित पत्रावली।


(डॉ. आर. वैकटेश्वरन)
शासन सचिव,
स्वायत्त शासन विभाग

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20/9/10

राजस्थान सरकार
विधि (विधायी प्रारूपण) विभाग

788)
20/9

प0 2(28) विधि/2/2010

जयपुर, दिनांक 15-9-10

सूचनार्थ एवं आवश्यक कार्यवाही हेतु:-

1. अधीक्षक, राजकीय केन्द्रीय मुद्रणालय, जयपुर।
2. राजस्थान राजपत्र भाग 4 (क) के विशेषांक में दिनांक 15 सितम्बर, 2010 को निश्चित रूप से प्रकाशित करने की व्यवस्था करें। अधिनियम की 100 प्रतियां अतिरिक्त प्रकाशित करें जिसमें से 50 प्रतियां इस विभाग को भेज दें, 30 प्रतियां सचिव, राजस्थान विधान सभा को सीधे ही भेज दें और शेष प्रतियां विक्रय के लिए स्टॉक में रखें।
3. प्रमुख शासन सचिव, स्वायत्त शासन एवं नगरीय विकास विभाग।
4. निदेशक, जनसम्पर्क निदेशालय, जयपुर।
5. विधि संहिताकरण विभाग।

Tw 1042344
22/09/10

प्रमुख शासन सचिव

राजस्थान नगरपालिका (संशोधन)

अधिनियम, 2010

(2010 का अधिनियम संख्या 19) से संबंधित अधिसूचना।

क्रमांक : प0 2(28)विधि/2/2010 दिनांक 15 सितम्बर, 2010

विधि (विधायी प्रारूपण) विभाग

(ग्रुप-2)

अधिसूचना

जयपुर, सितम्बर 15, 2010

संख्या प. 2 (28) विधि/2/2010.- राजस्थान राज्य विधान-मण्डल का निम्नांकित अधिनियम, जिसे राज्यपाल महोदय की अनुमति दिनांक 13 सितम्बर, 2010 को प्राप्त हुई, एतद्वारा सर्वसाधारण की सूचनार्थ प्रकाशित किया जाता है:-

राजस्थान नगरपालिका (संशोधन) अधिनियम, 2010

(2010 का अधिनियम संख्यांक 19)

(राज्यपाल महोदय की अनुमति दिनांक 13 सितम्बर, 2010 को प्राप्त हुई)

राजस्थान नगरपालिका अधिनियम, 2009 को संशोधित करने के लिए विधेयक - अधिनियम 1

भारत गणराज्य के एकसठवें वर्ष में राजस्थान राज्य विधान-मण्डल निम्नलिखित अधिनियम बनाता है, अर्थात्:-

1. संक्षिप्त नाम और प्रारम्भ.- (1) इस अधिनियम का नाम राजस्थान नगरपालिका (संशोधन) अधिनियम, 2010 है।

(2) यह राजपत्र में इसके प्रकाशन की तारीख से प्रवृत्त होगा।

2. 2009 के राजस्थान अधिनियम सं. 18 की धारा 6 का संशोधन.- राजस्थान नगरपालिका अधिनियम, 2009 (2009 का अधिनियम सं. 18), जिसे इसमें आगे मूल अधिनियम कहा गया है, की धारा 6 की उप-धारा (1) के खण्ड (क) के विद्यमान उप-खण्ड (ii) के स्थान पर निम्नलिखित प्रतिस्थापित किया जायेगा, अर्थात्:-

"(ii) नगरपालिक प्रशासन का विशेष ज्ञान या अनुभव रखने वाले, नगर निगम के मामले में, छह व्यक्ति, नगर परिषद् के मामले में पांच व्यक्ति और नगरपालिक बोर्ड के मामले में चार व्यक्ति, जिन्हें राज्य सरकार द्वारा राजपत्र में अधिसूचना द्वारा नामनिर्दिष्ट किया जाये।"

3. 2009 के राजस्थान अधिनियम सं. 18 की धारा 48 का संशोधन.- मूल अधिनियम की धारा 48 की विद्यमान उप-धारा (1) के पश्चात् निम्नलिखित नयी उप-धारा जोड़ी जायेगी, अर्थात्:-

"(1क) जहां नगरपालिका या इसकी समितियों में से किसी भी समिति का कोई भी संकल्प नगरपालिका के हितों के विरुद्ध हो या इस अधिनियम और तदधीन बनाये गये नियमों के उपबंधों से असंगत हो तो वहां अध्यक्ष, ऐसे संकल्प पर अपनी राय अभिलिखित करेगा और उस मामले को राज्य सरकार को उसके विनिश्चय के लिए निर्दिष्ट करेगा और ऐसे संकल्प पर राज्य सरकार का विनिश्चय अंतिम और उस नगरपालिका के लिए आबद्धकर होगा।"

238-क. पार्किंग स्थान का उपबंध-(1) राजस्थान नगरपालिका (संशोधन) अधिनियम, 2010 (2010 का अधिनियम सं. 19...) के प्रारंभ के पश्चात् नगरपालिक क्षेत्र में संनिर्मित प्रत्येक भवन में ऐसा पार्किंग स्थान उपलब्ध कराना अनिवार्य होगा जो राज्य सरकार द्वारा विहित किया जाये:

परन्तु राज्य सरकार भूमि के क्षेत्रफल और भवन की स्थिति और उपयोग को ध्यान में रखते हुए, राजपत्र में अधिसूचना द्वारा, किसी भी भवन या भवनों के वर्ग को इस धारा के उपबंधों से छूट प्रदान कर सकेगी।

(2) नगरपालिका, धारा 194 के अधीन कोई अनुज्ञा तब तक मंजूर नहीं करेगी जब तक कि अनुज्ञा चाहने वाला व्यक्ति, उस धारा के अधीन अपेक्षित नक्शों में उप-धारा (1) के अधीन यथाविहित पार्किंग स्थान के लिए व्यवस्था नहीं कर देता और ऐसा पार्किंग स्थान उपलब्ध कराने का जिम्मा नहीं लेता और इसके लिए नगरपालिका के समाधानप्रद रूप में प्रतिभूति नहीं देता।

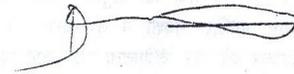
(3) धारा 194 या इस अधिनियम के किसी भी अन्य उपबंध में अंतर्विष्ट किसी बात के होते हुए भी, भवन, जिसके लिए इस धारा के उपबंधों के अधीन पार्किंग स्थान उपलब्ध कराना अनिवार्य है, का प्रत्येक स्वामी ऐसे भवन के पूर्ण होने के पश्चात्, विहित रीति से एक पूर्णता प्रमाणपत्र प्राप्त करेगा और ऐसा कोई भी भवन तब तक अधिभोग में नहीं लिया जायेगा जब तक कि ऐसा प्रमाणपत्र प्राप्त न कर लिया गया हो।

(4) उप-धारा (3) के अधीन पूर्णता प्रमाणपत्र जारी करने के लिए प्राधिकृत अधिकारी या प्राधिकारी ऐसा प्रमाणपत्र तब तक जारी नहीं करेगा जब तक कि उसका यह समाधान न हो जाये कि उप-धारा (1) के अधीन यथा विहित पार्किंग स्थान उस भवन में उपलब्ध करा दिया गया है।

(5) इस धारा के उपबंधों के उल्लंघन में नगरपालिक क्षेत्र में भूमि का किया गया या जारी रखा गया कोई भी विकास इस अधिनियम के प्रयोजनों के लिए अप्राधिकृत विकास समझा जायेगा।

(6) ऐसे भवन में, जिसके लिए इस धारा के उपबंधों के अधीन पार्किंग स्थान की व्यवस्था अनिवार्य है, किसी भी लोक जल प्रदाय प्रणाली से कोई भी स्थायी जल-संबंध तब तक अनुज्ञात नहीं किया जायेगा जब तक कि उसका स्वामी या अधिभोगी उप-धारा (3) के अधीन जारी किया गया पूर्णता प्रमाणपत्र प्रस्तुत न कर दे।

(7) कोई व्यक्ति जो इस धारा के किसी भी उपबंध का उल्लंघन करता है, दोषसिद्धि पर, और किसी भी अन्य कार्रवाई जो इस अधिनियम के किसी भी अन्य उपबंध के या तत्समय प्रवृत्त किसी भी अन्य विधि के अधीन उसके विरुद्ध की जा सकती हो, पर प्रतिकूल प्रभाव डाल बिना, ऐसे कारावास से जो सात दिन तक का हो सकेगा या ऐसे जुर्माने से जो पच्चीस हजार रुपये से कम नहीं होगा किन्तु जो एक लाख रुपये तक का हो सकेगा, या दोनों से दण्डनीय होगा।।



कापिल मेहता
प्रमुख शासन सचिव।

4. 2009 के राजस्थान अधिनियम सं. 18 की धारा 238 का संशोधन.—मूल अधिनियम की विद्यमान धारा 238 के स्थान पर निम्नलिखित प्रतिस्थापित किया जायेगा, अर्थात्:—

" 238. वर्षा जल संग्रहण का उपबंध.—(1) राजस्थान नगरपालिका (संशोधन) अधिनियम, 2010 (2010 का अधिनियम सं. 19) के प्रारंभ के पश्चात् नगरपालिक क्षेत्र में तीन सौ वर्ग मीटर से अधिक के भू-खण्ड पर संनिर्मित प्रत्येक भवन में, ऐसे प्रकार की और विशिष्टता वाली वर्षा जल संग्रहण प्रणाली, जैसी कि राज्य सरकार द्वारा उस क्षेत्र और भूमि के उपयोग को ध्यान में रखते हुए विहित की जाये, स्थापित करना और ऐसी प्रणाली को सदैव चालू हालत में रखना अनिवार्य होगा:

परन्तु यदि किसी विशिष्ट क्षेत्र में भू-जल स्तर को ध्यान में रखते हुए राज्य सरकार की यह राय हो कि ऐसे क्षेत्र में वर्षा जल संग्रहण प्रणाली स्थापित करना उचित नहीं है तो वह, राजपत्र में अधिसूचना द्वारा, ऐसे क्षेत्र को इस धारा के उपबंधों के प्रवर्तन से छूट दे सकेगी।

(2) नगरपालिका धारा 194 के अधीन कोई भी अनुज्ञा तब तक मंजूर नहीं करेगी जब तक कि अनुज्ञा चाहने वाला व्यक्ति उस धारा के अधीन अपेक्षित नक्शों में उप-धारा (1) के अधीन विहित किये गये प्रकार की और विशिष्टता वाली वर्षा जल संग्रहण प्रणाली के लिए व्यवस्था नहीं करता और ऐसी प्रणाली स्थापित करने का जिम्मा नहीं लेता और इसके लिए नगरपालिका के समाधानप्रद रूप में प्रतिभूति नहीं देता।

(3) धारा 194 या इस अधिनियम के किसी भी अन्य उपबंध में अंतर्विष्ट किसी बात के होते हुए भी, भवन, जिसके लिए इस धारा के उपबंधों के अधीन वर्षा जल संग्रहण प्रणाली अनिवार्य है, का प्रत्येक स्वामी ऐसे भवन के पूर्ण होने के पश्चात्, विहित रीति से एक पूर्णता प्रमाणपत्र प्राप्त करेगा और ऐसा कोई भी भवन तब तक अधिभोग में नहीं लिया जायेगा जब तक कि ऐसा प्रमाणपत्र प्राप्त न कर लिया गया हो।

(4) उप-धारा (3) के अधीन पूर्णता प्रमाणपत्र जारी करने के लिए प्राधिकृत अधिकारी या प्राधिकारी ऐसा प्रमाणपत्र तब तक

जारी नहीं करेगा जब तक कि उसका यह समाधान न हो जाये कि उप-धारा (1) के अधीन विहित किये गये प्रकार की और विशिष्टता वाली वर्षा जल संग्रहण प्रणाली उस भवन में स्थापित कर ली गयी है और वह चालू हालत में है।

(5) इस धारा के उपबंधों के उल्लंघन में किसी नगरपालिक क्षेत्र में भूमि का किया गया या जारी रखा गया कोई भी विकास इस अधिनियम के प्रयोजनों के लिए अप्राधिकृत विकास समझा जायेगा।

(6) ऐसे भवन में, जिसके लिए इस धारा के उपबंधों के अधीन वर्षा जल संग्रहण प्रणाली अनिवार्य है, किसी भी लोक जल प्रदाय प्रणाली से कोई भी स्थायी जल-संबंध तब तक अनुज्ञात नहीं किया जायेगा जब तक कि उसका स्वामी या अधिभोगी उप-धारा (3) के अधीन जारी किया गया पूर्णता प्रमाणपत्र प्रस्तुत न कर दे।

(7) कोई व्यक्ति जो इस धारा के किसी भी उपबंध का उल्लंघन करता है, दोषसिद्धि पर, और किसी भी अन्य कार्रवाई, जो इस अधिनियम के किसी भी अन्य उपबंध के या तत्समय प्रवृत्त किसी भी अन्य विधि के अधीन उसके विरुद्ध की जा सकती हो, पर-प्रतिकूल प्रभाव डाले बिना, ऐसे कारावास से जो सात दिन तक का हो सकेगा या ऐसे जुर्माने से जो पच्चीस हजार रुपये से कम नहीं होगा किन्तु जो एक लाख रुपये तक का हो सकेगा, या दोनों से दण्डनीय होगा।

स्पष्टीकरण.— इस धारा के प्रयोजनों के लिए, वर्षा जल संग्रहण प्रणाली से छत के ऊपर की संरचना और भूमिगत टंकी को सम्मिलित करते हुए, या तो घरेलू उपयोग के लिए या भूमिगत जल का पुनर्भरण करने के प्रयोजन के लिए भूमि में अंतःस्रवण के लिए वर्षा जल एकत्र करने हेतु संनिर्मित या स्थापित कोई संरचना या साधित्र, या दोनों अभिप्रेत हैं।

5. धारा 238-क का अन्तःस्थापन.—मूल अधिनियम की यथापूर्वोक्त संशोधित धारा 238 के पश्चात्, और धारा 239 के पूर्व निम्नलिखित नयी धारा अन्तःस्थापित की जायेगी, अर्थात्:—

LAW (LEGISLATIVE DRAFTING) DEPARTMENT
(GROUP-II)
NOTIFICATION

0144
2700688

Jaipur, September 15, 2010

No. F. 2 (28) Vidhi/2/2010.- In pursuance of Clause (3) of Article 348 of the Constitution of India, the Governor is pleased to authorise the publication in the Rajasthan Gazette of the following translation in the English language of the Rajasthan Nagarpalika (Sanshodhan) Adhiniyam, 2010 (2010 Ka Adhiniyam Sankhyank 19):-

(Authorised English Translation)

THE RAJASTHAN MUNICIPALITIES (AMENDMENT)
ACT, 2010

(Act No. 19 of 2010)

(Received the assent of the Governor on the 13th day of September, 2010)

An
Act

to amend the Rajasthan Municipalities Act, 2009.

Be it enacted by the Rajasthan State Legislature in the Sixty-first Year of the Republic of India, as follows:-

1. Short title and commencement.- (1) This Act may be called the Rajasthan Municipalities (Amendment) Act, 2010.

(2) It shall come into force on the date of its publication in the Official Gazette.

2. Amendment of section 6, Rajasthan Act No. 18 of 2009.- For the existing sub-clause (ii) of clause (a) of sub-section (1) of section 6 of the Rajasthan Municipalities Act, 2009 (Act No. 18 of 2009), hereinafter referred to as the principal Act, the following shall be substituted, namely:-

“(ii) six persons in case of Municipal Corporation, five persons in case of Municipal Council and four persons in case of Municipal Board, having special knowledge or experience in municipal administration, to be nominated by the State Government by notification in the Official Gazette:”

3. Amendment of section 48, Rajasthan Act No. 18 of 2009.- After the existing sub-section (1) of section 48 of the principal Act, the following new sub-section shall be added, namely:-

“(1A) Where any resolution of a Municipality or of any of its committees is against the interest of the

Municipality or inconsistent with the provisions of this Act and the rules made thereunder, the Chairperson shall record his opinion on such resolution and refer the matter to the State Government for its decision and the decision of the State Government on such resolution shall be final and binding on the Municipality.”.

4. Amendment of section 238, Rajasthan Act No. 18 of 2009.- For the existing section 238 of the principal Act, the following shall be substituted, namely:-

“238. Provision of rain water harvesting.-(1) In every building constructed on a plot of land exceeding three hundred square metres in municipal area after the commencement of the Rajasthan Municipalities (Amendment) Act, 2010 (Act No..... of 2010), it shall be compulsory to install a rain water harvesting system of such type and specifications as may be prescribed by the State Government, having regard to the area and use of the land and keep such system always in working condition:

Provided that if the State Government, having regard to the ground water level in a particular area, is of the opinion that installation of rain water harvesting system in such area is not appropriate, it may, by notification in the Official Gazette, exempt such area from the operation of the provisions of this section.

(2) The Municipality shall not grant any permission under section 194 unless the person seeking permission makes provision for rain water harvesting system of the type and specifications prescribed under sub-section (1) in the maps required under that section and undertakes to install such system and furnishes security for the same to the satisfaction of the Municipality.

(3) Notwithstanding anything contained in section 194 or any other provision of this Act, every owner of the building, for which rain water harvesting system is

compulsory under the provisions of this section, shall, after completion of such building, obtain a completion certificate in the prescribed form and no such building shall be occupied unless and until such certificate has been obtained.

(4) The officer or authority authorized to issue completion certificate under sub-section (3) shall not issue such certificate unless he is satisfied that a rain water harvesting system of the type and specifications prescribed under sub-section (1) has been installed in the building and is operational.

(5) Any development of land in a municipal area made or continued in contravention of the provisions of this section shall be deemed to be an unauthorized development for the purposes of this Act.

(6) No permanent water connection from any public water supply system shall be permitted in a building, for which rain water harvesting system is compulsory under the provisions of this section, unless the owner or occupier thereof produces a completion certificate issued under sub-section (3).

(7) Any person who contravenes any provision of this section shall, on conviction and without prejudice to any other action that may be taken against him under any other provision of this Act or any other law for the time being in force, be punishable with imprisonment which may extend to seven days or with fine which shall not be less than rupees twenty five thousand but which may extend to rupees one lakh or with both.

Explanation.- For the purposes of this section, ‘rain water harvesting system’ means any structure or apparatus or both, including roof top structure and under ground tank, constructed or installed to collect rain water either for

domestic use or for percolation into earth for the purpose of recharging ground water.

5. Insertion of section 238-A.-After section 238, amended as aforesaid, and before section 239 of the principal Act, the following new section shall be inserted, namely:-

"238-A. Provision of parking space.- (1) In every building constructed in a municipal area after the commencement of the Rajasthan Municipalities (Amendment) Act, 2010 (Act No..... of 2010), it shall be compulsory to provide such parking space as may be prescribed by the State Government:

Provided that the State Government may, having regard to the area of land and situation and use of building, exempt, by notification in the Official Gazette, any building or class of buildings from the provisions of this section.

(2) The Municipality shall not grant any permission under section 194 unless the person seeking permission makes provision for parking space as prescribed under sub-section (1) in the maps required under that section and undertakes to provide such parking space and furnishes security for the same to the satisfaction of the Municipality.

(3) Notwithstanding anything contained in section 194 or any other provision of this Act, every owner of the building, for which provision of parking space is compulsory under the provisions of this section, shall, after completion of such building, obtain a completion certificate in the prescribed manner and no such building shall be occupied unless and until such certificate has been obtained.

(4) The officer or authority authorized to issue completion certificate under sub-section (3) shall not issue such certificate unless he is satisfied that parking space as prescribed under sub-section (1) has been provided in the building.

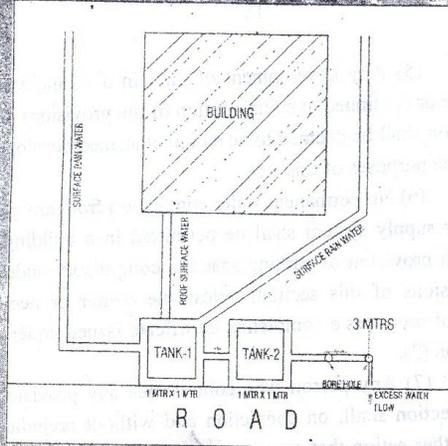
(5) Any development of land in a municipal area made or continued in contravention of the provisions of this section shall be deemed to be an unauthorized development for the purposes of this Act.

(6) No permanent water connection from any public water supply system shall be permitted in a building, for which provision of parking space is compulsory under the provisions of this section, unless the owner or occupier thereof produces a completion certificate issued under sub-section (3).

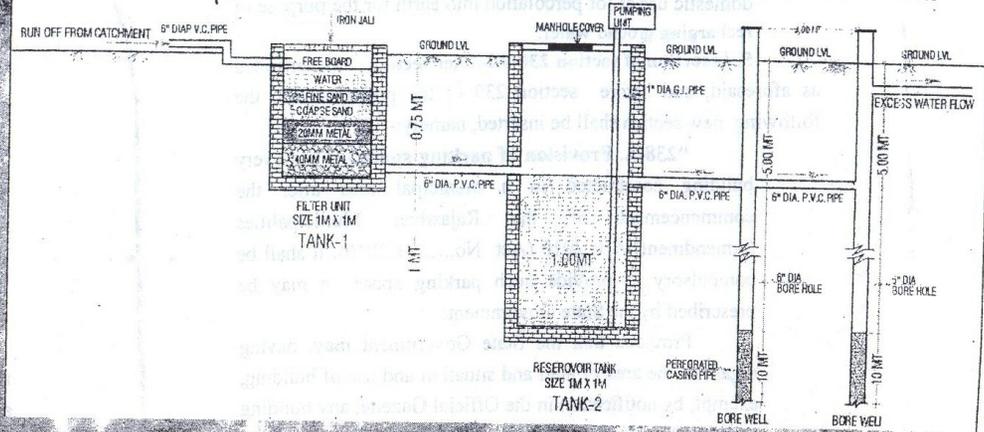
(7) Any person who contravenes any provision of this section shall, on conviction and without prejudice to any other action that may be taken against him under any other provision of this Act or any other law for the time being in force, be punishable with imprisonment which may extend to seven days or with fine which shall not be less than rupees twenty five thousand but which may extend to rupees one lakh or with both."

कृपया साक्ष्य,
Principal Secretary to the Government

ROOF TOP RAIN WATER HARVESTING



PLAN



SECTION

RAIN WATER HARVESTING SYSTEM

स्थानीय निकाय (नगरीय क्षेत्र, भवन) विनियम, 2010

विधिक प्रावधान

300 से 1000 वर्गमीटर से अधिक क्षेत्रफल के भूखण्डों हेतु

- अमानत राशि रूपये 35,000/- प्रति यूनिट की दर से ली जावेगी।
- आवेदक द्वारा उक्त संरचना का निर्माण नहीं करने पर न.निकाय उक्त राशि का उपयोग किसी एजेंसी के माध्यम से इसका निर्माण कराने हेतु स्वतंत्र होगा।

Today's rain water is tomorrow's life water

स्थानीय निकाय विभाग, राज. जयपुर

गजस्थान नगर निकाय मॉडल भवन विनियम, 2010

जाये तथा जो 4.50 मीटर से अधिक न हो। सौर ऊर्जा द्वारा पानी गरम करने का संयंत्र।

- (iv) जिन भूखण्डों में एक से अधिक सड़क लगती हो उनके लिए देय ऊंचाई एवं अन्य प्रावधान जैसे एफ.ए.आर. आदि चौड़ी सड़क को आधार मानकर देय होंगे।

7.12 वर्षा के पानी द्वारा भू-गर्भ का जल स्तर बढ़ाना:

300 वर्गमीटर अथवा ज्यादा क्षेत्रफल के भूखण्डों में सेटबैक क्षेत्र में उपयुक्त स्थान पर वर्षा के पानी को इकट्ठा करने के लिये एक गड्डे का निर्माण किया जायेगा, जिसका न्यूनतम क्षेत्रफल 1 व.मी. व गहराई 1 मी. होगी। इसमें आधे मीटर गहराई तक पत्थर अथवा ईट के टुकड़े तथा बजरी भरे जायेंगे ताकि पानी छनकर ढके हुए दूसरे गहरे गड्डे जो कि 1 X 1 X 1 मी. का हो, में जा सके। इस गड्डे से वर्षा के पानी को इकट्ठा करने के लिए समुचित नालियों की संरचना की जायेगी। प्रथम गड्डे को लोहे की जाली से ढका जायेगा ताकि समय-समय पर इसकी सफाई की जा सके। दूसरे गड्डे को पाइप के जरिये 6 इंच व्यास की ट्यूबवेल संरचना से जोड़ा जायेगा। प्रत्येक 6 इंच व्यास के ट्यूबवेल की न्यूनतम गहराई 15 मी. होगी। इस प्रकार के कम से कम 2 ट्यूबवेल होंगे, जिनमें आपस में 2 मी. की न्यूनतम दूरी होगी, जो आपस में जुड़े होंगे ताकि पानी सभी ट्यूबवेल में जा सके तथा बड़े भूखण्डों में प्रति 500 वर्गमीटर के हिसाब से तीन ट्यूबवेल के गड्डे अतिरिक्त होंगे। इस प्रकार के गड्डों को उस सतह तक खोदा जायेगा ताकि पानी रिसाव शीघ्र व अच्छी तरह से हो सके। इन गड्डों को ऊपर से पूर्णरूप से ढकना होगा। इसमें यह भी व्यवस्था करनी होगी कि इनमें पानी अधिक भर जाने के कारण अतिरिक्त पानी नाली के माध्यम से स्वतः की बहकर भूखण्ड के बाहर निकल जाये। 1 हैक्टेयर से बड़े भूखण्डों में सक्षम अधिकारी द्वारा तय किये अनुसार वर्षा के पानी को इकट्ठा करने के लिये समुचित क्षमता का भूमिगत टैंक बनाया जावेगा तथा जल के रिसाव हेतु समुचित ट्यूबवेलनुमा संरचना की जावेगी। अथवा अन्य किसी विधि से जैसे छोटा तालाब/पौण्ड (pond) आदि से जल के रिसाव की व्यवस्था की जा सकेगी। 1000 वर्गमीटर से कम क्षेत्रफल के भूखण्डों के लिए वर्षा जल संरक्षण की संरचना के लिए रु. 35,000/- प्रति यूनिट की दर से अमानत राशि ली जावेगी तथा आवेदक द्वारा उक्त संरचना का निर्माण नहीं करने पर संबंधित

निकाय उक्त राशि का उपयोग किसी एजेंसी के माध्यम से इसका निर्माण कराने हेतु स्वतंत्र होगा। इस राशि हेतु संबंधित निकाय पृथक से अकाउन्ट संधारित करेगा।

7.13 रीसाईकिलिंग ऑफ वॉटर -

5000 वर्ग मीटर तथा उस से बड़े भूखण्डों में स्नानागार तथा रसोई के अपशिष्ट जल (Waste Water) के शुद्धीकरण हेतु रीसाईकिलिंग की व्यवस्था करनी होगी इसमें टॉयलेट से निकलने वाला जल शामिल नहीं होगा। इस प्रकार शुद्धीकृत जल का उपयोग बागवानी तथा फलश के उपयोग में ही लिया जा सकेगा। स्नानागार तथा रसोई के अपशिष्ट जल के शुद्धीकरण हेतु निम्नानुसार व्यवस्था करनी होगी:-

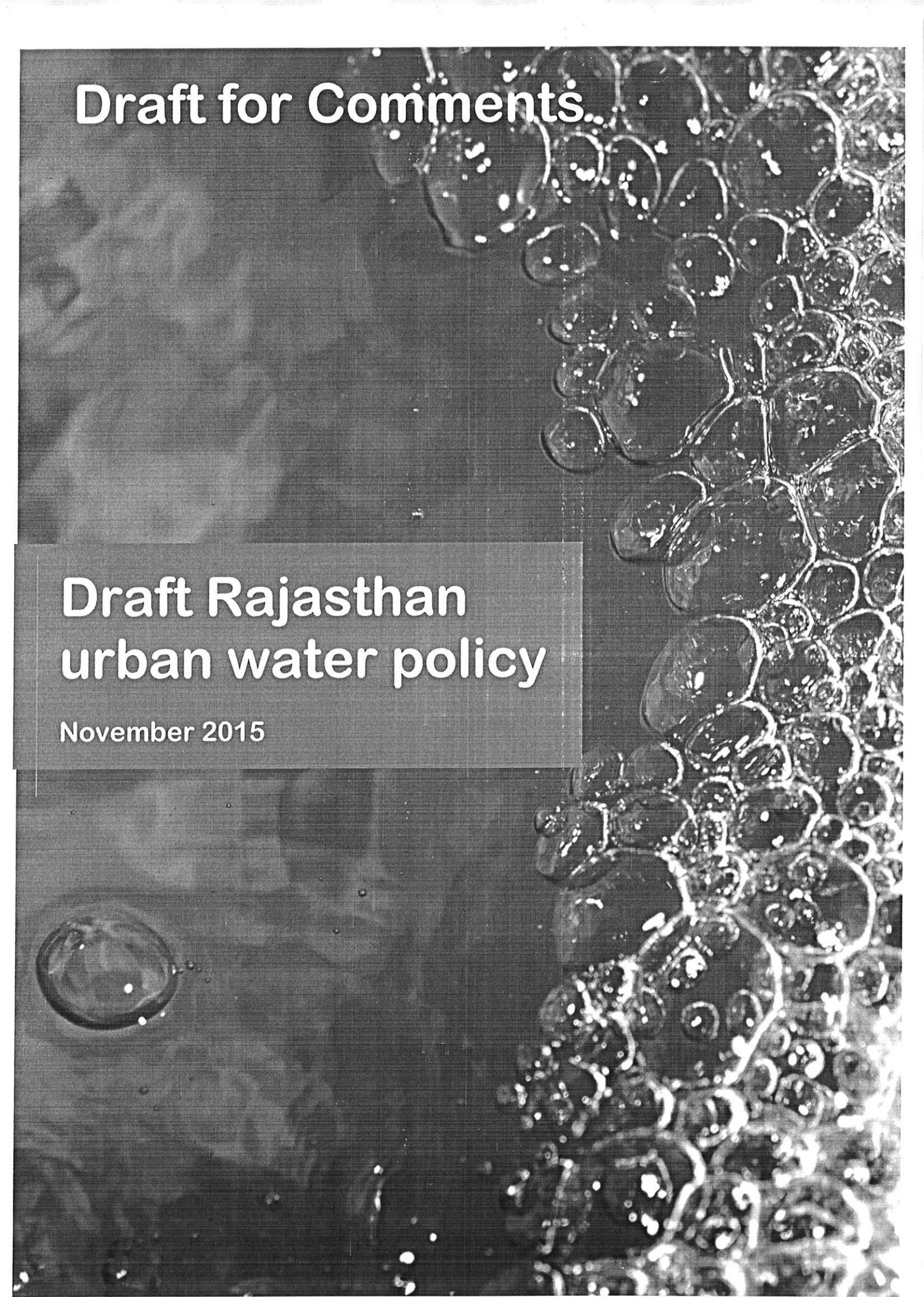
1. सेटलिंग (Settling-Tank) टैंक का निर्माण- सम्भावित अपशिष्ट जल की मात्रा से दुगुनी क्षमता का टैंक बनाना होगा।
2. शुद्धीकरण (Disinfection) हेतु क्लोरिन अथवा आयोडिन का उपयोग किया जायेगा।
3. फिल्टर (Filters) अपशिष्ट जल की मात्रा के अनुसार फिल्टर लगाना होगा जो कि एकटीव चारकोल, सेलूलोज, शिरामिक कॉटेरेज (Activated Charcoal, Cellulose or ceramic cartridge.) के उपयुक्त होंगे। इस प्रकार के अपशिष्ट जल के लिए पृथक पाईप लाईन उपलब्ध करानी होगी। यह किसी भी दिशा में सीवर लाईन से नहीं मिलाई जायेगी। इस प्रकार शुद्धीकृत जल का उपयोग पीने के पानी के रूप में नहीं किया जायेगा। उक्त व्यवस्था नहीं करने पर भवन निर्माता से 100/- रुपये प्रति वर्गमीटर निर्मित क्षेत्र पर प्रतिवर्ष पेनल्टी ली जावेगी।
4. शौचालय के अपशिष्ट जल के शुद्धीकरण हेतु आवश्यकतानुसार सीवरेज ट्रीटमेंट प्लान्ट स्थापित किया जाना होगा।

7.14 सौर ऊर्जा से पानी गरम करना

7.14.1 निम्न प्रकार के किसी भी प्रस्तावित भवन निर्माण में गर्म पानी करने हेतु सौर

ऊर्जा संयंत्र लगाना आवश्यक होगा -

- (i) होस्पिटल एवं नर्सिंग होम
- (ii) होटल, अतिथि गृह, विश्राम गृह, लॉज,



Draft for Comments

**Draft Rajasthan
urban water policy**

November 2015

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List of Acronyms

ADB	Asian Development Bank	LSGD	Local Self Government Department
AMRUT	Atal Mission for Rejuvenation and Urban Transformation	MIS	Management Information System
BCC	Behavioural Change Communications	MLD	Million Litres/ Day
BCM	Billion cubic metres	NABARD	National Bank for Agriculture and Rural Development
CAA	Constitutional Amendment Act	NCR	National Capital Region
CCDU	Communication and Capacity Development Unit	NRW	Non- Revenue Water
CIPP	Customer Interest Protection Plan	PHED	Public Health and Engineering Department
CPHEEO	Central Public Health and Environmental Engineering Organisation	PPP	Public Private Partnership
CSR	Corporate Social Responsibility	RHB	Rajasthan Housing Board
DA	District Authority	RO	Reverse Osmosis
DAs	Development Authorities	RPCB	Rajasthan State Pollution Control Board
DEWATS	Decentralized Wastewater Treatment Systems	RUIDP	Rajasthan Urban Infrastructure Development Project
DLB	Directorate of Local Bodies	RUIFDCo	Rajasthan Urban Infrastructure Finance & Development Corporation
DMA	District Metering Area	RWSSC	Rajasthan Water Supply and Sewerage Corporation
DPR	Detailed Project Reports	RWSSMB	Rajasthan Water Supply & Sewerage Management Board
EPC	Engineering Procurement Construction	SAAP	State Annual Action Plan
FYP	Five Year Plan	SCADA	Supervisory Control And Data Acquisition
GIS	Geographic Information System	SLNA	State Level Nodal Agency
GWD	Ground Water Department	TDS	Total Dissolved Solids
HQ	Head Quarter	TNA	Training Needs Assessment
HRD	Human Resource Development	UDH	Urban Development & Housing
IEC	Information, Education And Communication	UIDSSMT	Urban Infrastructure Development Scheme for Small and Medium Towns
INR	Indian rupees	UIT	Union Territory
IPC	Interpersonal Communication	UITs	Urban Improvement Trusts
JICA	Japan International Cooperation Agency	ULD	Urban Local Department
LIC	Life Insurance Corporation	WRD	Water Resources Department

Nature and intend of the draft policy document

The Draft Rajasthan Water Policy aims to influence the thought process and deliberations that will set an overall direction to developmental activities in the urban water sector.

The Policy aims initially at recognizing issues related to urban water management in aspects related to drinking water. The other components of the Policy thereafter share the Government's vision on how these issues could and should be addressed including implementation arrangements.

GoR has prepared a separate Draft Sewerage and Wastewater policy, which is in the process of deliberation and finalization. This is expected to set directions on aspects related to sewerage and septage management and waste water recycle / reuse. These aspects have been kept outside the scope of the draft water policy document. However, linkages between these two policies have been considered in various components described in the policy document. This is the objective underpinning this draft of the urban water and wastewater policy.

Process for finalising the policy document

This Policy is being drafted and promulgated by the Government of Rajasthan. In light of the precedent set during formulation of the state water policy (2010), the ability of the policy to influence water management in the state's urban sector will crucially depend on the stakeholder-participatory approach to be followed during policy document finalisation. Hence, the Government of Rajasthan invites interested organisations and other stakeholders to comment on the draft policy document.

This policy draft should be viewed as the start of a process — a draft — required to be finalised through a stakeholder-participation process. Stakeholder comments are invited on aspects relating to suitability / need for such a policy, content and coverage of this policy, and scope for improvement, to make the exercise more effective and efficient.

It is important therefore for all concerned stakeholders to review the draft, and share their comments with GoR through RUIDP. Comments / responses shall be documented and reviewed for appropriate action. The comments could be sent in English or Hindi to the following addresses either in hard copy, or email.

Attn: Project Director

Subject: Comments on the discussion draft of Rajasthan Urban Water Policy

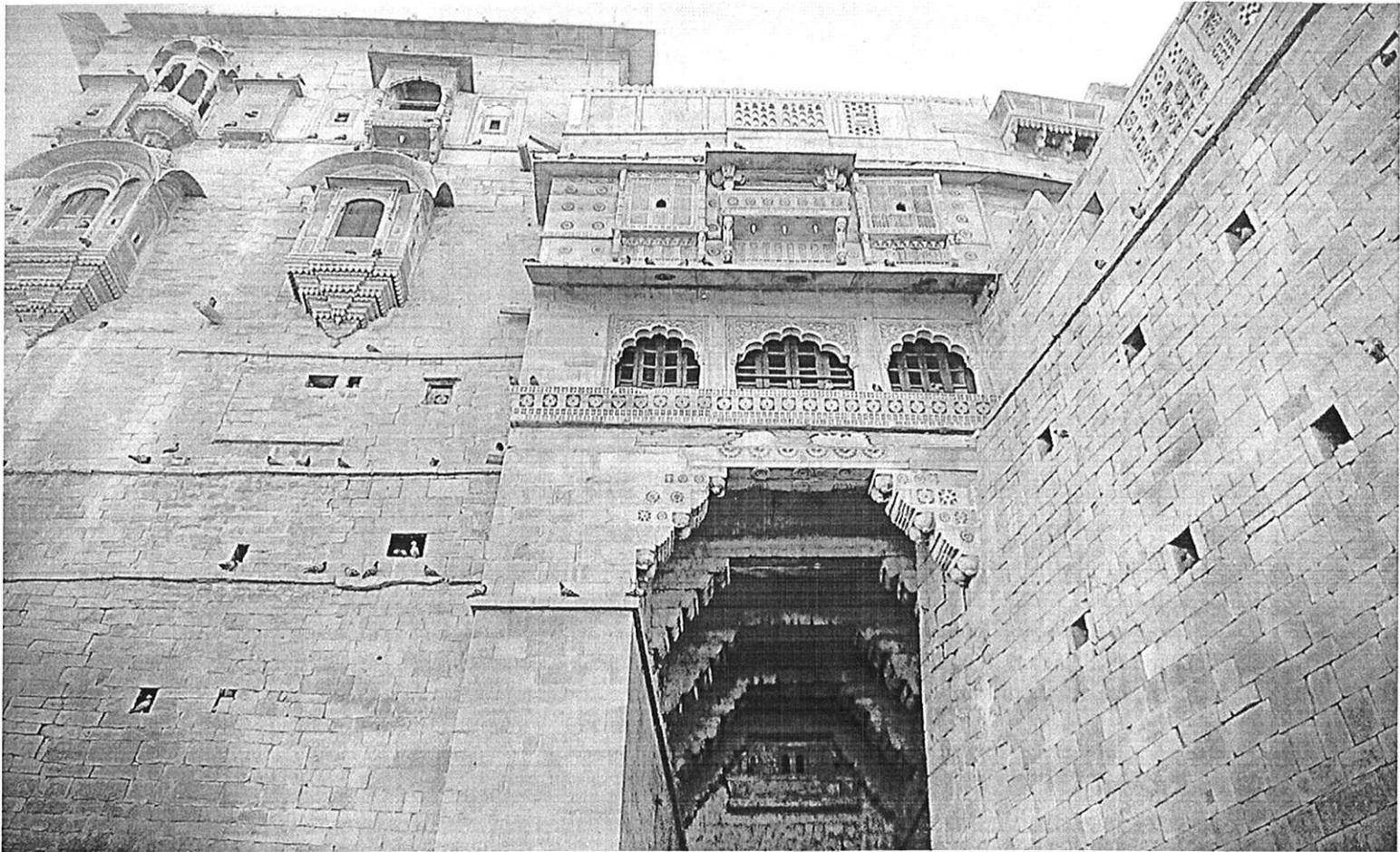
Rajasthan Urban Infrastructure Development Project.

AVS Building,

Jawahar Circle,

JLN Marg, Jaipur – 17

Email: mail.ruidp@gmail.com, mailruidp@gmail.com



1. Background and introduction

This policy document has been drafted considering the requirements for providing sustainable water supply and sanitation services in urban areas of the state. The recommendations made under the Rajasthan State Water Policy, 2010; the National Water Policy of 2012; and the National Urban Sanitation Policy, 2008, have also been considered.

This policy intends guide to all stakeholders including government institutions, municipalities, parastatal bodies, water and sanitation service providers, and water users to improve efficiency and sustainability of water and sanitation services. The policy provides an overarching framework for addressing the legal, regulatory, institutional, administrative and environmental issues and challenges faced by the urban water and sanitation sector.

Rajasthan is a water-deprived state. According to the Vyas Committee Report (2009), the average annual per capita availability in the state¹ is said to be less than 800 m³ [as against the generally accepted requirement of 1000 m³]. The state's surface water resources form not more than roughly 1% of that in the country, while the state accounts for 6% of India's total population. The groundwater level in Rajasthan has reportedly declined by more than 4 m over the last decade.² The quality of available water needs attention too. On a national

Figure 1: Key focus areas of the policy



¹ Vyas Committee Report, Government of Rajasthan, 2009

² Source: <http://wrmin.nic.in/forms/list.aspx?lid=304>

scale, 25% of all habitations with multiple quality issues in the country are located in Rajasthan, which include 40% of all fluoride-affected areas and, 83% of all salinity-affected areas and 23% of all nitrate affected areas.

Traditionally, Rajasthan's socio-economic culture has relied on a system of sustainable water management. Both the surface water and groundwater systems have been serving the local human and livestock populations traditionally. In addition, a key operational factor common across both of them has been a high degree of community participation, and the idea of socio-economic values built around a common objective of 'water for all'. The contemporary public water systems can be compared on utilising the potential of these systems.

Out of the state population of about 69 million, about 25% is urban, increasing at a rate close to 3% per annum. Currently, out of the total number of 185³ urban local bodies (ULBs) in the state, 183 are covered by piped water supply. According to the State Planning Department,⁴ only 23 ULBs were able to provide more than 100 litres per capita a day (lpcd); 79 provide 60–80 lpcd of water and 74 provide 40–60 lpcd as against a service-level benchmark of 135 lpcd. On the other hand, frequency of water supply is another major focus area, with the gap between water supply hours ranging between one and three days.

1.1 Institutional structure

The PHED is the primary entity responsible for planning, designing, building, operating and maintaining urban and rural drinking water supply in the state. Under the 74th Constitutional Amendment Act (74th CAA), responsibility of the operation and maintenance of certain urban water supply schemes is to be handed over to ULBs. The availability of resources with ULBs—skilled staff and funding—is, therefore, brought under sharp relief as the factor directly determining their capability to carry out their functions.

It is felt in future, role of PHED should focus more on bulk water supply and local distribution. On the other hand, O&M of the urban scheme should be that of ULB's who can manage independently and collect tariff to operate water supply on PPP or management contract basis.

1.2 Amount and quality of water supplied

Table 1: Per capita water supplied in selected towns¹

Urban centres	Per capita water supplied (lpcd)
Kuchera	40.83
Makrana	33.90
Malpora	30.90
Kumher	28.00
Churu	126.61
Bhadra	79.75
Govindgarh	27.16
Baswa	16.77
Jaipur	133.66
Udaipur	182.27
Satalkheri	26.10

Table 1: Per capita water supplied in selected towns, which presents the amount of water supplied in certain towns of the state, highlights the difference between the supply quantities across various urban centres.

³ Census of Rajasthan (2011 data): <http://www.rajcensus.gov.in/admin.html> and the State Commission on Urbanisation Report (Section 2.5.4)

⁴ Chapter 22, Mid-Term Review, Eleventh Five-Year Plan (2007-12), Planning Department, Government of Rajasthan

Table 2: Districts with a high proportion of unpotable groundwater sourcesⁱⁱ

District	Total number of samples	Total number of unpotable samples
Bhilwara	213	57
Nagaur	160	66
Bharatpur	199	42
Churu	248	31
Jaipur	1,868	350
Barmer	68	52
Jodhpur	55	26
Bundi	93	31
Udaipur	123	23

Some 70% of habitations in the state are facing contamination in their drinking water, which has high total dissolved solids (TDS) and too much salinity, fluoride and nitrates. Groundwater is a major source of water supply in the urban centres. Table 2 presents a select set of samples where the groundwater is the most unpotable.

1.3 Extent of piped water coverage

Table 3: Towns and extent of piped water supply in select towns/citiesⁱⁱⁱ

Urban centres	Percentage of households in the jurisdiction with piped water connections
Mandalgarh	49.80
Todaraisingh	64.70
Tonk	51.90
Uniara	37.80
Bayana	50.00
Deeg	31.80
Hindaun	8.00
Tijara	10.20
Gothra	21.60
Nimbahera	51.20
Satalkheri	41.30

At the policy level, it is intended to provide all households with a piped water connection and therefore, ULBs need to develop a strategy for extending pipe coverage in uncovered areas. Table 3 presents the situation in this regard in select urban centres of the state. The data is intended to highlight the gap between the existing coverage of piped water supply and the intended full coverage.

1.4 Recovery of operations and maintenance (O&M) costs and efficiency of revenue collection

At the policy level, O&M costs are hoped to be recovered. A vicious circle is often observed starting with low quality of assets, leading to poor service quality and, thus, unwillingness to pay. This in turn results in inadequate funding to improve asset quality. A branch of this circle covers higher dependence on subsidies (estimated at 74%⁵) and cross-subsidies. The tariff revenues of water supply and sewerage collected cover approximately 35% of the current O&M costs. Poor metering, billing and collection rates on one hand, and un-rationalised tariff levels/structure on the other, are considered as the main factors responsible for this financial scenario.⁶

To improve revenue collection, role of human activity for meter reading and assessment should be reduced. This can be undertaken by introducing latest meter & metering technology of smart meters & advance meter reading by remote.

Table 4 highlights the situation related to cost recovery (operating ratio⁷) in certain towns of the state, showing the varying levels of O&M cost recovery as against the target of full recovery.

⁵ Rajasthan: Water Assessment, International Finance Corporation, 2013

⁶ Lessons from Business Plans for Maharashtra, Rajasthan, Haryana and International Good Practices, World Bank, 2012

⁷ Total annual revenue assessed over total annual O&M costs

Table 4: Cost recovery in selected towns of the state^{iv}

Urban centres	Cost recovery (%)
Beawar	0.95
Kekri	100.00
Goredi Chancha	5.40
Kuchera	5.50
Nagaur	5.40
Todabhim	1.00
Bikaner	23.50
Churu	52.20
Alwar	16.50
Jaipur	2.80
Udaipur	26.11

At a deeper level, the efficiency of collection of bills is reported to vary between near zero (e.g. Bhinder and Deogarh) and about 100% (e.g. Padampur and Udaipur). It is to be noted that the efficiency of billing (revenue assessment) itself needs to be monitored.

1.5 Non-revenue water (NRW) levels

NRW results in commercial and physical losses to the water service provider. A high quantity of NRW hinders coverage expansion and service-level improvement. highlights the NRW levels of selected towns across Rajasthan, depicting the relatively high yet varying levels of NRW across the selected towns of the state.

Table 5: NRW levels for selected towns in Rajasthan¹

Urban centres	NRW level (%)
Kuchera	47.02
Hindaun	60.39
Gangapur	68.20
Todra	65.12
Kherli	45.12
Jaipur	42.19
Bassi	52.90
Viratnagar	46.29
Churu	35.22
Bhadra	12.40

1.6 Sources of water supply: Groundwater/surface water

Of the 222 schemes supplying water to the urban centres of the state, 14 (or 7%) depend on surface water, 54 (or 25%) on both surface and groundwater and the remaining 156 are entirely dependent on groundwater.^v Table 6 shows the extent of reliance of urban water supply on groundwater and surface water. These numbers are not exclusively for urban use. Currently, separate data monitoring urban reliance on ground/surface water sources is **not being collected**.

Table 6: Source of domestic water^{vi}

Source of water	Percentage of drinking water demand ^v satisfied by these sources	Percentage of drinking water demand ^v satisfied by these sources in Jaipur city
Groundwater	91	75
Surface water	9	25

^v Although this demand will include rural as well as urban areas, groundwater reliance in urban areas is likely to be even higher.

1.7 Metering

Data shows that over 32 urban centres in the state do not have metered household connections.^{vii} The extent of metering where meters are installed varies from 17% (e.g. Beawar) to 87% (e.g. Udaipur).

1.8 Duration and frequency of water supply

While majority of the towns (161) receive water supply once every 24 hours, a considerable number receives it less frequently—49 towns once in 48 hours, and 12 towns once in 72 hours. The duration of water supply varies from 20 minutes to over one hour every day. *The data demonstrates that cognisance has been taken of the difference between the current hours of supply and the intended 24x7 supply.*

1.9 Tariff mechanism

Even though ULBs are technically independent to determine water tariffs (as per the 74th Constitutional Amendment Act or CAA), the legitimacy of their decisions needs further strengthening. As such, in practice, they are not using their rights and responsibilities to determine the tariffs.

Each ULD would need to look for its own tariff structure, depending on individual water supply input. Such situations exist in many states like Madhya Pradesh, Gujarat, Maharashtra etc.

1.10 Customer grievance redressal

The policy recognises that there may not be any easily accessible mechanism for customers to register grievances, owing to which many actual complaints do not even get registered. The reported^{viii} redressal of a majority of customer grievances needs to be viewed in this context. Therefore, each water supply system should have an active customer service centre/call centre duly outsourced which is duly providing effective redressal service.

1.11 Human resources

Staffing at ULBs becomes critical from the perspective of O&M of water supply and sanitation systems according to the 74th CAA. The current levels of vacancies across ULBs range from 18% (e.g. Hanumangarh) to 51% (e.g. Tonk). The intent of this data is to contextualise and drive the approach adopted to address institutional and human resource-related aspects of improving water supply services.

1.12 Water transfers due to demand-supply gap

It is projected^x that by 2045, a demand-supply gap of 3,037 MLD in both groundwater and surface water will force considerations for more effective solutions for satisfying demand. *The policy recognises this in the way of adopting approaches for conjunctive water use and progressively greater use of recycled for non- consumptive usage.*



According to Vyas Committee report, by 2045 the state is estimated to experience water shortage of 9.4 BCM. In this shortage, surface water will contribute 2.4 BCM (25%) and groundwater 7.0 BCM (75%).

1.13 Investment in the sector

An outlay of 2,402.40 crore INR was provided for urban water supply sector in the 11th Five Year Plan or FYP 2007-2012, against which the actual expenditure incurred for the period 2007–11 was 1,749.99 crore INR (73%). For the 12th FYP (2012–2017), out of the total outlay of 14,615 crore INR for the water supply and sanitation sector, 5,394 crore

INR (37%)^x is planned to be spent on urban water supply. *The policy intends for: (a) future and planned investments to be correctly estimated; and (b) the intended investments to be effectively facilitated.*

1.14 Private sector participation

The following table presents selected new initiatives proposed to be taken up through private sector participation as part of the 12th FYP.

Table 7: Selected new initiatives for PPP/EPC projects as per the 12th FYP^{xi}

Name of the project	Project brief
Chambal-Bhilwara Urban Water Supply Scheme: Augmentation (Phase-II) ^{xii}	<ul style="list-style-type: none"> • 2.5 million residents of nine towns and 1,688 villages in Bhilwara and Kota districts, and 68 villages en route to Chittorgarh district will be covered. Source will be the Chambal river, near Bhainsroadgarh situated upstream of Jawahar Sagar • 2.5 billion INR on turnkey basis • Cluster scheme of 205 villages of Asind tehsil in Asind town
Preparation of model concession agreement for public-private partnership for improvement and management of the city's water supply distribution system	<ul style="list-style-type: none"> • Covers the towns of Ajmer and Udaipur • Focuses on developing additional sources of water and improving the existing water supply and sewerage systems in Udaipur and Ajmer

1.15 Rainwater harvesting

Efforts to harvest rainwater in urban areas are still underway. The following table presents the rise in groundwater level in *Buja* village achieved through the construction of *johad* (earthen check dams that catch rainwater). *The intent of this data is to demonstrate the potential of rainwater harvesting and traditional methods in improving the levels of groundwater.*

Table 8: Rise in groundwater level due to traditional water harvesting methods^{xiii}

Total depth of well (m)	Depth of water level before construction of <i>johad</i> (1985)	Depth of water level after construction of <i>johad</i> (1994)
25.30	19.30	7.63
20.40	90.40	8.05
13.10	8.50	2.44

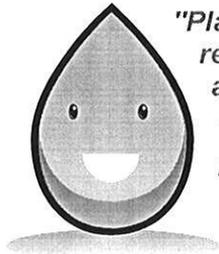
1.16 Institutional framework of the urban water supply sector

The following table presents an overview of the institutional framework applicable to the urban water supply sector in Rajasthan.

Table 9: Institutional framework for urban sector

Institutions/Agencies	Roles/Responsibilities
State government	<ul style="list-style-type: none"> • Policy, funding and tariff determination
Public Health and Engineering Department (PHED)	<ul style="list-style-type: none"> • Policy, asset creation, O&M, • billing and collection, quality monitoring
Rajasthan Water Supply and Sewerage Corporation (RWSSC)/ Rajasthan Water Supply & Sewerage Management Board (RWSSMB)	<ul style="list-style-type: none"> • Institutional decisions and financing for water supply projects of PHED
Water Resources Department (WRD)/ Ground Water Department (GWD)	<ul style="list-style-type: none"> • Overall water resources management, monitoring and regulation of groundwater
Urban development and housing	<ul style="list-style-type: none"> • Administrative department of urban development and housing; monitoring and supervising DAs/UITs/RHB (Rajasthan Housing Board)
LSGD/Directorate of Local Bodies (DLB)	<ul style="list-style-type: none"> • Administrative department of local government/ ULBs; monitoring and supervision of ULBs
Rajasthan State Pollution Control Board (RPCB)	<ul style="list-style-type: none"> • Environmental regulation and pollution control
Rajasthan Urban Infrastructure Development Project (RUIDP)	<ul style="list-style-type: none"> • Special project unit for urban water supply, sewerage and sanitation infrastructure creation for RUIDP project towns (funded by ADB)
Rajasthan Urban Infrastructure Finance & Development Corporation (RUIFDCo)	<ul style="list-style-type: none"> • Channelising funds for ULBs, nodal agency for JnNURM, UIDSSMT, Atal Mission for Rejuvenation and Urban Transformation (AMRUT) and others project units (asset creation for all towns)
Development Authorities (DAs)/Urban Improvement Trusts (UITs)	<ul style="list-style-type: none"> • Urban development; creation of developed land parcels; infrastructure development and service delivery for areas under jurisdiction
ULBs	<ul style="list-style-type: none"> • Operation and management of urban water supply in some ULBs
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Development Authorities (DAs)/Urban Improvement Trusts (UITs)	<ul style="list-style-type: none"> • Urban development; creation of developed land parcels; infrastructure development and service delivery for areas under jurisdiction
ULBs	<ul style="list-style-type: none"> • Operation and management of urban water supply in some ULBs
Private operators	<ul style="list-style-type: none"> • Management of urban water supply and sewerage in full of part – water treatment plants (WTPs), STPs, etc.

2. Need for a comprehensive policy



"Planning, development, operation and maintenance of all water resources.... in response to the growing need for drinking water..... [for] a general improvement of living conditions and employment is of utmost importance."

Rajasthan State Water Policy, 2010

GoR remains fully committed to the provision of safe drinking water and sanitation services for all of its citizens as a basic human right fulfilling a fundamental need.

In order to address the complex technical, institutional, social, environmental and sustainability challenges facing urban settlements, a comprehensive and specific urban water policy has been envisaged.

The *Rajasthan State Water Policy, 2010*, provides recommendations for drinking water:

Adequate drinking water facilities shall be provided to the entire population both in urban and in rural areas. Future irrigation and multipurpose projects shall invariably include a drinking water component wherever there is no dependable alternative source of drinking water. Drinking water needs of human beings and animals shall be the first charge on any available water and following actions shall be taken to fulfil this need:

- i. Increased budget shall be allocated for upgrading urban and rural domestic and livestock water supply.
- ii. Water rates shall be gradually increased to self-support the operation of urban and rural piped schemes.
- iii. Finance of rural water supply schemes shall be continued.
- iv. Water quality standards shall be ensured.
- v. Strict control over activities that endanger sources, such as hazardous wastes and sewage, shall be exercised.
- vi. Privatisation in urban water supply especially for meter reading, billing, etc. can be contracted out.

In addition to these, the goal of the state's urban water policy is to ensure socio-economic development and improved health status of urban population, especially the poor and disadvantaged with emphasis on gender specific issues, through the provision of sustainable water supply and sanitation services and protection of the environment. These provisions should be implemented keeping a balance between the notion of increasing future urban population and optimal usage of state water resources to meet overall state water requirements in sectors other than urban.

In this regard, the policy specifically endorses the following core principles:

- i. Environmentally and socially sustainable distribution and utilisation of water resources

- ii. Inclusive and participatory decision-making
- iii. Transparent decision-making processes to achieve socio-environmental as well as economic-financial objectives
- iv. Capacity-building for enhanced institutional ability to govern the sector effectively
- v. Ensuring, protecting and optimising investments
- vi. Public-private partnership (PPP) in the most appropriate manner
- vii. Public outreach for environment- and health-related outcomes
- viii. Establishment of an efficient, effective, affordable and accountable system for managing urban water supply and sanitation
- ix. Effective monitoring and evaluation of the initiatives taken up to improve water and sanitation services
- x. Financially self-sustainable water distribution systems, through full recovery of O&M costs
- xi. Clearly defined roles for bulk and retail distribution of water

DRAFT

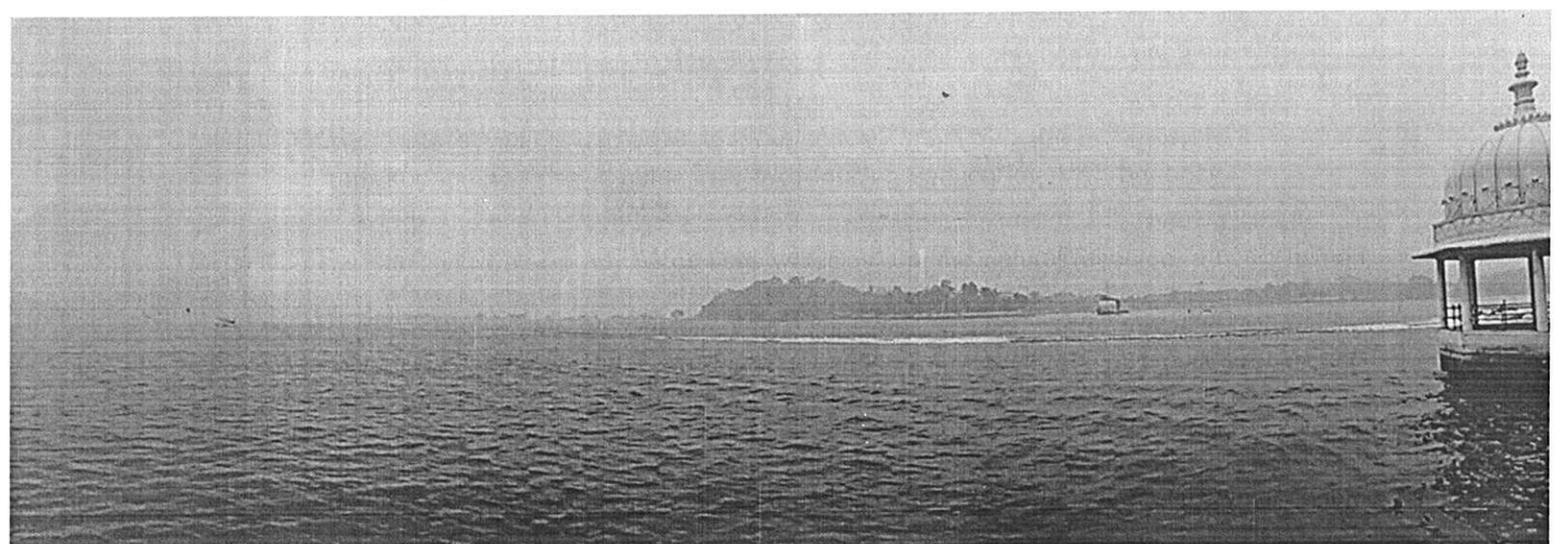
3. Goal and vision of the Draft Rajasthan Urban Water Policy 2015

3.1 Vision of the policy

The policy envisions providing universal and continuous access to potable piped water supply and sanitation services at an affordable price and in an equitable, sustainable and environmentally sustainable manner in all urban areas of the state. The following aspects are critical to achieve this goal:

- i. Coverage of all citizens in the urban areas for service provisioning
- ii. Adequate water and sanitation services provided to all urban customers
- iii. Equity across the geographic and demographic fabric of the customer base
- iv. Ensuring the system's financial sustainability in a progressive manner through improved efficiency, tariff rationalisation, corporatised operations, and decreased dependence on unsustainable resources
- v. Improving service levels in a well-defined and phased manner by ensuring interventions in the spheres of infrastructure, institution, autonomy and management, monitoring mechanisms and regulatory framework
- vi. Performance-linked appraisals and other incentive mechanisms for successful and professional operations of service-providing organisations
- vii. A mixed time frame of 5, 15 and 30 years according to the complexity and scale of the objectives to be achieved
- viii. Guidelines to decide water use, with priority for drinking water to be drawn from surface sources & guidelines for reducing service level & frequency of supply in time of drought & disaster.

The state drinking water policy recognises water as a prime natural resource, a basic human need and a precious asset of the state. The Sector Vision for 2025 as stated in the policy is: *"Support socio-economic development of state by ensuring safe, potable, affordable, accessible, reliable and equitable drinking water supply to all its citizens by creating robust and sustainable infrastructure backed up by strong institutional and financial structure and comprehensive legal and regulatory framework."* In addition, the state would focus on increasing PHED share in all water bodies by using better irrigation practices such as sprinkle, drip, and other water saving irrigation instead of flow irrigation to augment existing water supply levels.

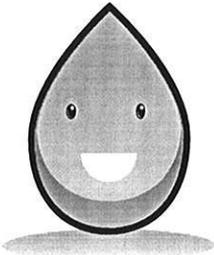


4. Objectives of the policy

GoR aims to provide safe and reliable water supply through piped distribution systems to all households at an affordable price. Briefly, the objectives are:

1. **Water coverage:** To provide 100% coverage to all households in urban areas of the state with at least 135 lpcd of potable water, supplied through 24x7 piped and metered individual water supply connections with reduced NRW levels; at the same time, priority will be given to increasing the coverage of water supply and sanitation services, especially in slum areas
2. **Sustainable water supply:** To ensure the availability, quality and sustainability of domestic water supplies by: (a) conserving existing water sources; (b) improving the efficiency of existing schemes (including reduction of losses) and their financial viability; (c) using all possible options of water treatment as per requirement; and (d) developing new and sustainable water sources
3. **Sector regulation:** To regulate the urban water and sanitation sector using institutional and legal means so as to provide adequate water to all users, ensure the safety and security of service provisioning systems, and facilitate long-term financial sustainability of the sector; to provide guidelines on the legal/ regulatory framework, and make efficient institutional arrangements for sustainable water supply services
4. **Environmental sustainability:** To improve the quality of life and environment through effective and efficient management of water services and formulation of guidelines for the conservation of Rajasthan's depleting water resources
5. **Restoration of traditional water management practices:** Focus on improving key infrastructure, local/community participation-based maintenance and revitalisation of traditional water systems so as to provide water services to the masses in a comparatively shorter period of time and with more efficient investment
6. **User participation:** To ensure effective participation of users in developing, operating and maintaining water supply services and to empower them to manage their own water supply services while ensuring gender-sensitivity and sustainability in sectoral decision-making; in addition, to encourage judicious allocation of water, with universal access to safe drinking water as the top priority
7. **Institutional capacity:** To improve institutional capacity and human resources of related departments and governing agencies so as to provide efficient, effective and sustainable water and sanitation services by working with empowered and capacitated local communities
8. **Integrated approach** towards improving water supply, sanitation and hygiene behaviour
9. Apart from this, **key objectives of the policy are:**
 - i. To ensure 100% sanitised cities
 - ii. To improve water supply services by focussing on customer satisfaction, coverage, frequency and reliability
 - iii. To raise public awareness and consciousness on water usage, issues related to unsustainable water practices, and water conservation
 - iv. To provide pointers on sustainable financing arrangements including PPP and community participation for water and sanitation sector
 - v. To assure accelerated growth by contributing to the state's economic and social advancement
 - vi. To ensure effective grievance redressal mechanism
10. To aim for financial sustainability of systems for water distribution
11. To allocate responsibility of bulk water distribution to PHED, and of retail water distribution to ULBs.

5. Structure and components of the policy

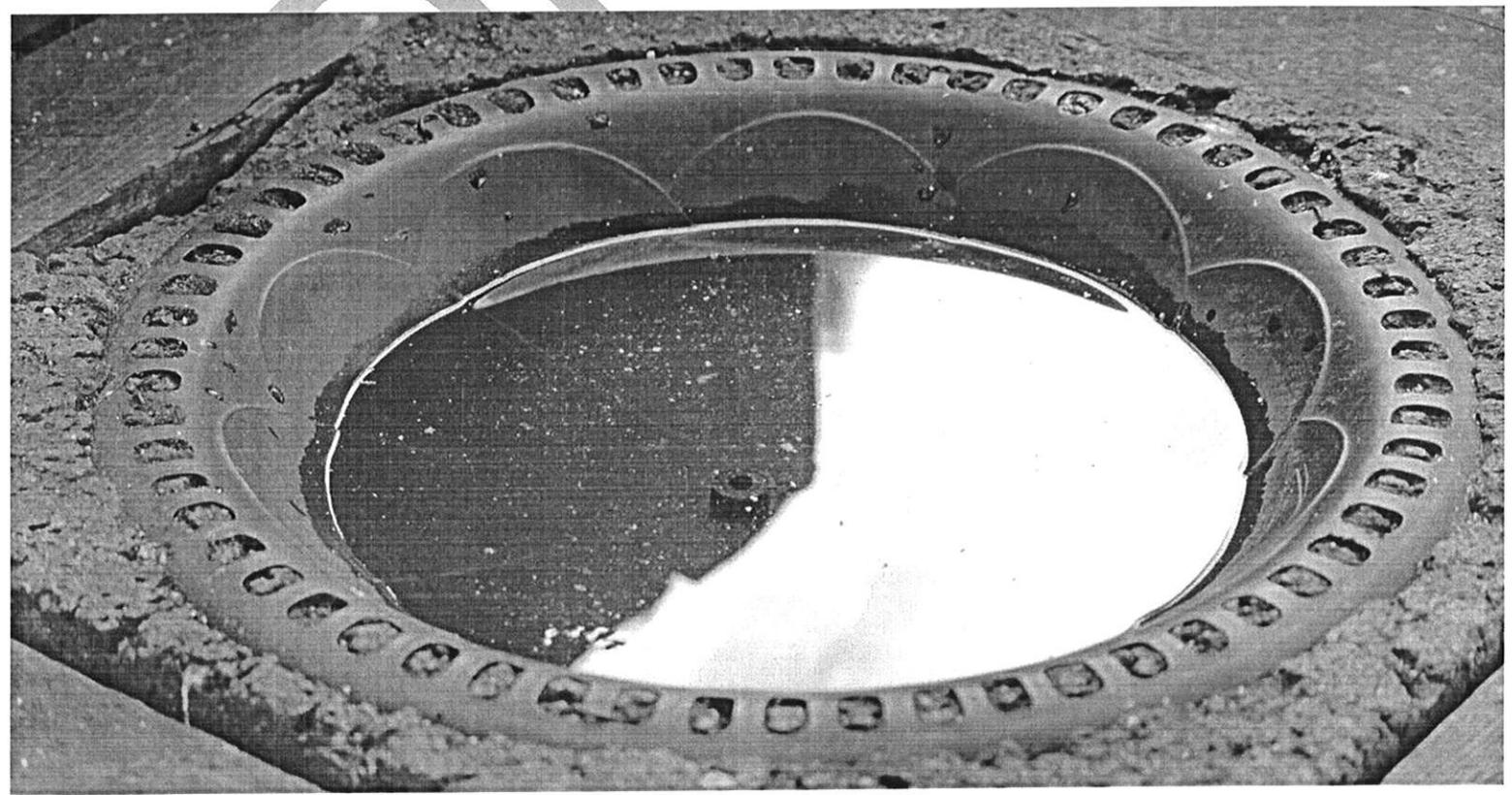


The structure of the policy

The policy starts by recognising the ground-level concerns and situation in the water and sanitation sector in Rajasthan. The objectives of the policy are based on the on-ground situation and the concerns to be addressed. The policy then proceeds to present the approach to be adopted, and the guidelines to be followed for addressing the concerns and achieving the objectives. The policy then proceeds to present the approach to be adopted, and the guidelines to be followed for addressing the concerns and achieving the objectives.

To achieve this, the structure of the policy covers envisioned functions of key stakeholders in urban water supply and sanitation sector of the state. These key stakeholders include key departments (PHED, UDH, LSGD), ULBs and other governing agencies. Key components of the policy include the following:

- i. Water supply service coverage
 - a. Provision of individual water supply and sewerage connections to households in slums and poor settlements
- ii. NRW reduction
- iii. Operationalisation of 24x7 water supply
- iv. Corporatisation of utilities
- v. Sustainable water management
- vi. Capacity-building and institutional strengthening
- vii. Effective multilayer and multilevel grievance redressal mechanism



6. Principles for implementation of the policy

The key principles that will govern the roadmap for implementation of this policy cover:

- a. **Autonomy of institutions/agencies:** The institutions/agencies in consideration shall have certain independence to make decisions for management of operations in their area/ jurisdiction. The autonomy shall be balanced by procedural measures to ensure accountability and consideration of views of all stakeholders.
- b. **Transparency:** State agencies shall voluntarily disclose information about project implementation, O&M, financial status and performance indicators in a manner that is easily accessible to the public.
- c. **Accountability:** The agencies shall build in-house capacity to ensure prompt responses to comments, grievances and queries shared by all stakeholders. The responsible department in the agency shall be trained to be up-to-date with key developments in the agencies, and ensure references to relevant public orders/notifications, while drafting responses to the queries or grievances.
- d. **Public participation:** A well-structured and reasonable processes for public deliberation (to be carried out before a draft of a decision or an order is prepared) and consultation (to be carried out after a first draft of a decision or an order is ready) shall be carried out targeting all stakeholders. Some of these stakeholders include civil societies (such as non-governmental organisations or NGOs), educational and research institutions, donor organisations, democratically elected representatives and the customers themselves.
- e. **Capacity-building of stakeholders (especially beneficiaries) to enable them to participate in the decision-making process:** For the state agencies to meet requirements of the abovementioned principles, relevant in-house capacity is required to implement functions related to transparency, accountability and public participation. The relevant governing agencies should, therefore, focus on developing vision and formulating plans to meet the requirements of training, human resource development and skill development as instrumental components to ensure self-sustenance of all the agencies concerned. On the other hand, beneficiaries should be capacitated to provide comments/suggestions by creating awareness about the issues related to water supply. They should also be provided with comfortable media to comment on such matters.

6.1 Relationship between PHED and ULBs

1. The state is committed to the decentralised management of urban water supply schemes, in accordance with the 74th CAA, by strengthening ULBs to manage schemes and provide improved services, with PHED as a partner and facilitator. It is also committed to continue with an integrated sector-wide approach to the development, execution and management of urban water supply and sanitation schemes through ULBs.
2. GoR will adopt a gradual approach to moving the service delivery responsibility to ULBs as per Constitutional requirements. PHED and UDH/LSGD/RUDSICO, therefore, will continue to play a key role, particularly as they bring technical expertise and experience. In addition, PHED would be restructured into: (i) a bulk water supply service provider to city utilities; and (ii) an O&M agency that will provide O&M and distribution services to ULBs and city utilities under a contractual framework.

3. PHED shall continue to be the nodal department for the implementation of drinking water supply projects in urban areas of Rajasthan. All projects shall either be implemented or coordinated by PHED so that the funds received from various sources are utilised optimally.
4. PHED shall also provide inputs on policymaking, planning and development, resource mobilisation and allocation, monitoring and evaluation, and information management.
5. PHED shall ensure time-bound implementation of all policies. The responsibility for implementation and service delivery will continue to be shared between PHED's operations wing and ULBs.
6. PHED shall, therefore, undertake the following:
 - a. Hand over the function of all single-town/city-level schemes to ULBs in a time-bound manner
 - b. Implement new schemes in all the towns that demand such services by passing a resolution in the ULB council, agreeing to the conditions of self-management, including beneficiary contribution towards capital cost, and taking over the management of created assets on a sustainable basis.
 - c. Transfer funds to implement new single-town schemes and all intra-town works of city schemes to ULBs, which will take responsibility for planning, technology selection (type of scheme), procurement (bid invitation, award), and construction activities. This includes providing funding support for major repairs in the schemes handed over.
 - d. Provide technical support and undertake major repairs for all schemes operated and maintained by ULBs.
 - e. Provide special considerations to all habitations predominantly inhabited by underprivileged or disadvantaged groups, persons belonging to scheduled castes, and persons residing in economically backward and other special areas (e.g. towns/cities along the international border, flood-prone and waterlogged areas, and so on).
 - f. Continue to be responsible for construction of common infrastructure, such as waterworks, laying of distribution pipelines up to the entry point of each town/city in multi-town/city schemes, and highly technical works such as sanitation facilities and reverse osmosis (RO) plants.
 - g. Provide teams to build the capacity of ULBs to strengthen these institutions and inculcate good governance systems and practices until they are able to take primary responsibility for the implementation and management of their water supply and sanitation systems:
 - These teams may be sourced from in-house resources and other departments (government institutions or universities).
 - Specific capacities to be enhanced shall include enforcement of rules and regulations, accountancy and bookkeeping, supervision of the work of technicians and pump operators, liaising with government departments, and managing minor repairs.
 - h. Provide a range of capacity-building services for ULBs, including training courses, practical training and exposure visits.
 - i. Provide teams to create and capacitate community-based organisations (CBOs) such as youth groups and mothers' clubs, as well as retired government officials and ex-servicemen, so they can participate in the sectoral decision-making by the ULBs. On

gender-related aspects, this includes promoting the contracting of local women's groups for O&M of water schemes.

- j. Assist ULBs to address a range of issues, including the following:
 - Motivate the community to share the responsibility for managing of town/city water supply and sanitation systems. This covers being responsive and responsible for promptly reporting the issues and problems in the systems.
 - Computerise books of accounts for greater transparency and accountability and to publicise information and make it easily accessible to all stakeholders.
 - Build strong partnerships with the community, based on transparency and trust.
 - Set up strong conflict resolution mechanisms within the town/city.

6.2 Indirect support to ULBs for effective implementation of the policy

In addition to the direct support components, components of indirect support shall also be considered. These components are of the nature of liaison between various departments in the following activities:

1. Engaging educational institutions (in return for an honorarium from the ULBs) for furthering community involvement and participation in decision-making
2. Clubbing water bills with other utility bills to facilitate payments; furthermore, coordination with banks to expand the outreach of billing and collection mechanisms
3. Legal support to recover water charges and fines from defaulters and to take punitive actions against unauthorised tapping from distribution networks.

7. Water management and source sustainability

The state government and water utilities (PHED and ULBs) shall take the following initiatives for effective water management in urban and surrounding areas:

- a. Harnessing economically utilisable surface water through improved planning, design and construction; promotion of the conjunctive use of groundwater and surface water to provide multiple sources of water supply to the town/city, and thus promote water security: such measures shall include rooftop rainwater harvesting, storm water harvesting, recycling and reuse of wastewater
- b. 'Water Grid' to interlink bulk water systems to enhance source sustainability
- c. Water conservation in all sub-sectors of urban water supply by optimum utilisation, use of water saving devices and improved practices
- d. Comprehensive and integrated planning for use of surface and groundwater resources including conjunctive use
- e. Investigating the economic and technical potential of the reuse of treated wastewater, and environmentally sustainable water resources development, reuse of treated sewage and urban effluents and mitigation of environmental degradation
- f. Financially sustainable development of water resources with pricing structure to reflect the use tariff as a tool to achieve multi-dimensional objectives of water management
- g. Encourage use of alternative cost-effective technologies for WTPs; life cycle-based process selection
- h. Involvement of private sector and local communities in development and O&M of sustainable water resources
- i. Effective efforts to reach out to all stakeholders to ensure sustainable water management
- j. Efficient and adequate human resources development and institutional infrastructure for adopting new technologies/practices and an innovative approach to achieve the objectives of sustainable water management
- k. Devising a studied proposal for establishing a tariff mechanism for treated wastewater
- l. Evaluation of the potential for groundwater recharging with particular emphasis on water-critical and overexploited areas
- m. Aquifer mapping and introduction of aquifer-wise planning based on modern technologies and setting up of community organisations at the town/city and aquifer level to plan and manage groundwater resources with a focus on drinking water supply
- n. Enhanced and informed public participation to manage groundwater extraction so as not to exceed the average medium-term recharge potential

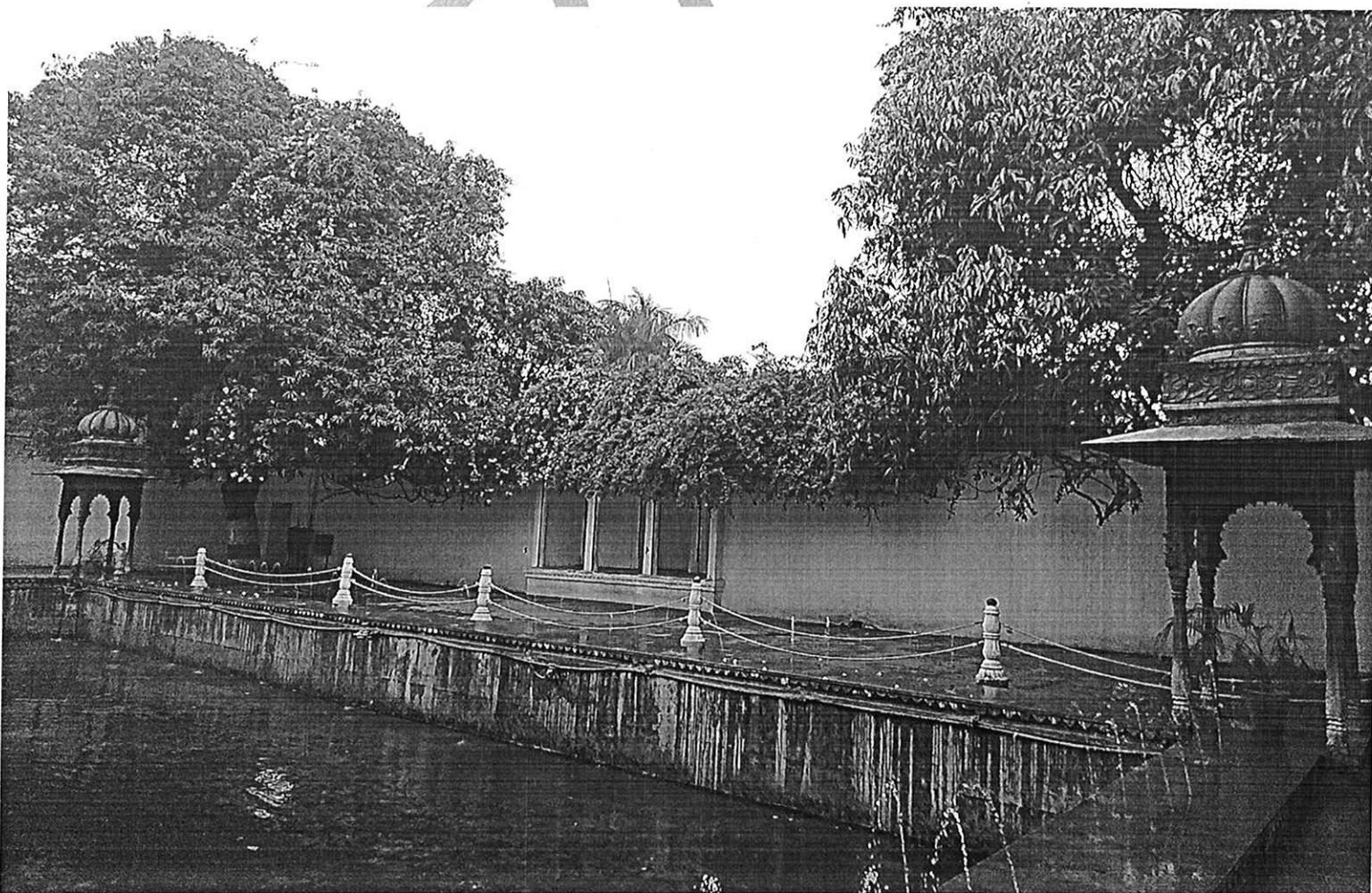
8. Water supply service coverage

The focus shall be on providing piped water to all households of the urban centre on equitable and continuous basis. The PHED and ULBs shall jointly prepare a roadmap for covering the entire population with piped water supply with special emphasis on targeting the urban poor.

8.1 Provision of individual water supply and sewerage connections to households in slums and poor settlements

The state government aims to take water closer to the households. The actual extent of the initiative (especially to determine how many public stand-posts will be removed to provide how many connections) shall be thoroughly discussed with and endorsed by all concerned stakeholders through a transparent process. The following points carry special significance in this regard:

- a. Priority will be to provide connections to poor households at affordable tariff, and follow a pro-poor connection charge policy. Options covering subsidies, rationalising or block tariff for this shall be considered by PHED, ULBs and the government, in consultation with the stakeholders.
- b. Priority will be to ensure a progressively reasonable maximum coverage of poor households under the given constraints.
- c. Priority will be to identify the poor, and prevent non-deserving groups to benefit from any pro-poor initiatives.



9. Operationalising 24x7 water supply

The State intends on providing 24x7 water supply to: (a) ensure continuous pressurisation of the piped system, and (b) eliminate the drudgery associated with intermittent water supply at odd hours of the day.

The following aspects shall be focussed on in this regard:

- a. The government shall develop schemes that would encourage 24x7 water supply and provide subsidies in a transparent and accountable manner as necessary.
- b. Technical guidelines shall be promulgated to govern the implementation of 24x7 water supply schemes.
- c. Technical support shall be provided to all ULBs to move towards metered 24x7 water supply systems in the future.



10. Metering

The state is committed to providing 100% individual metered household connections in all urban areas of Rajasthan. Accordingly, the PHED shall pursue the following initiatives:

- a. Delivery of free/reasonably priced water meters to all towns/cities with 100% private individual household water connections demanding 24x7 water supply
- b. Converting all existing unmetered water connections to metered ones within the next five years
- c. Ensuring that all household connections from new water supply schemes are metered
- d. Assisting ULBs on demand to procure and supply good-quality meters and ensure cost-effectiveness and quality control (similar arrangement to be provided for meter repairs, replacement of old meters and recalibration of meters)
- e. Providing a standard design of household connections to ULBs
- f. Assist in training local plumbers to ensure use of good quality materials for household water connections and proper connection of water meters
- g. Providing subsidised private water connections for slum areas and poor settlements in all towns/cities



11. NRW reduction

Reduction in NRW is envisaged to make more water available for distribution, and enhance the financial sustainability of the service providers. The following measures shall be undertaken to realise this vision:

- a. Establishment of a strong and dedicated governance framework to monitor levels of NRW and to demonstrate effects of NRW on financial indicators such as tariff and level of recovery of costs: An NRW cell shall be established in the large ULBs, and at the level of clusters of ULBs in the smaller ones.
- b. Non-revenue water shall be at a reasonable level: The reasonable level to be targeted at each of the urban centres shall be devised based on a comprehensive study and discussion among the PHED and the ULB officials.
- c. The following measures shall be undertaken to achieve reduction in NRW levels:
 - i. Planning and implementation of district metering area (DMA)-based water supply distribution systems
 - ii. Achieving 100% metering in service areas
 - iii. Installation of bulk water meters at nodal levels
 - iv. Replacement and repair (as applicable) of leaking and worn-out pipelines
 - v. Replacement of inefficient pumping installations
- d. NRW shall be directly linked to the reporting parameters on efficiency of the ULB as a service provider and the PHED as a facilitator of water supply service
- e. The NRW reduction measures shall be part of reorganisation, rehabilitation and extension of existing water supply schemes. Similarly it will be an integral part of O&M of new water supply schemes.

12. Development of water supply and sewerage GIS

An effective and comprehensive GIS-based database and MIS correctly mapping the assets, user base and the status of operations shall be established.

The following measures shall be taken in this regard:

- a. GIS technology shall be used for ground and surface water-mapping and conservation.
- b. GIS shall be used to map the accurate status on lifespan, usability and the levels of maintenance needed for proper operation of assets for water supply and sanitation.

12.1 Computerised gender-disaggregated customers' database

Women are often the most-affected group of beneficiaries when it comes to reliability, quality and quantity of water supply. Gender-disaggregated database of customer profiles shall be used for determining the location and details of such higher-affected community sections. The following points shall be considered in this regard:

- a. Incentives shall be provided for water sector organisations to prioritise gender disaggregation in database creation, maintenance and use.
- b. Institutional constraints that restrict gender disaggregation shall be removed. Roles and responsibilities of PHED and the ULBs shall explicitly cover gender-related functions.
- c. The information collected from the GIS-based system and MIS shall be analysed, and all future water initiatives shall take the results into consideration so as to empower women.



13. Corporatisation of utilities in major urban centres

Corporatised approach to service provisioning shall be adopted to make the services more focused and responsive to the needs of the situation. The arrangement shall aim to bring in economies of scale, operational autonomy, transparent management, more accountability, incentives to employees, and internal control systems in the form of audits, etc. which are necessary elements in delivering better public services.

The following guiding principles shall be adopted to devise a roadmap for corporatisation of water/sanitation service provisioning in major urban centres of the state:

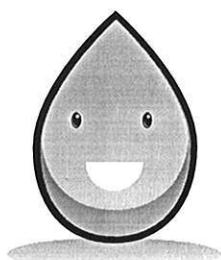
- a. Determination of the urban centres eligible for corporatisation. For instance, the scale of Jaipur could be considered as suitable for corporatisation.
- b. Taking an **integrated, holistic service delivery approach**, undertaking technical/system efficiency measures, and ensuring administrative and financial efficiency measures
- c. **Increasing the coverage of supply, including to the poor**, reducing non-revenue water and improving supply reliability, and incentivising demand side management
- d. **Taking technical efficiency** measures complemented by administrative efficiency measures like proper HRD policies and planning
- e. **Robust business planning and improvement in revenue**, with effective management of cash flows to improve financial management
- f. **Transferring ongoing business**, assets, liabilities, staff, rights, and service obligations to a ring-fenced, professionally-run entity

The corporatised entity shall have the following characteristics:

- a. **Separate legal entity:** The organisation shall be legally established as an independent entity.
- b. **Managerial autonomy:** Management will have control over all inputs and issues related to business within the proposed area of operations. The control and autonomy shall be balanced by transparency and accountability measures elaborated in various sections of this policy.
- c. **Transparency and reporting:** The entity will be subject to corporate law, which has evolving principles of good governance and accounting rules in the country.
- d. **Staffing:** The entity shall have its own staffing policies and rules, allowing for workforce benefits such as performance incentives and bonuses, together with more flexibility on hiring/retention of staff and over other disciplinary procedures.
- e. **Economic regulation:** The entity shall, in an autonomous, transparent, accountable and participatory manner, adjust tariffs. It shall manage its functions, ensuring benefits to the urban poor, preparing a roadmap for the 'Water for All' and '100% sanitised city' policies as per the National Urban Sanitation Policy, on a sustainable and affordable basis.
- f. **Partnerships:** The entity shall promote involvement of PPPs, NGOs/CBOs, corporate social responsibility (CSR) wings and take other measures to ensure greater acceptance and ownership among stakeholders. The corporatised entity shall have a board of independent directors consisting of renowned representatives of all categories of stakeholders, namely, academicians, NGOs, CBOs, eminent citizens, corporates and other significant stakeholders.

14. Tariff adjustment

Tariffs shall be treated as a comprehensive overlap among social, economic, financial, political and environmental objectives of good sectoral governance. Tariff setting shall, therefore, be viewed as a tool to achieve such multi-dimensional objectives. One of the key financial/economic objectives recognised by the policy is full O&M cost⁸ recovery, which is a beginning for ensuring long-term financial viability of water supply and sewerage services.



Note: In this context, the procedure for tariff determination is of the utmost importance. In the subsequent part of this section, the policy is focussing on two major key components in tariff determination, starting from procedural approach to tariff methodology followed by cost rationalisation

The following guidelines shall be followed for tariff adjustment:

- a. Tariffs shall be ideally set so as to be able to cover the 'reasonable and efficient' cost of service delivery. At the same time, tariffs shall be set such that they are affordable to the people. The trade-off between these aspects shall be duly considered to achieve a balance.
- b. Utilities shall pay reasonably for extraction of raw water from resources.
- c. Transparent, accountable and participatory processes shall be carried out by governing agencies in charge of determining the tariff.
- d. Connection charges may be incentivised to encourage people to take water supply and sewerage service connections.
- e. Financial performance of the service providers shall be monitored based on performance benchmarks to focus on efficiency in operations.
- f. Tariffs shall be adjusted annually to reflect the annual changes in prices.

14.1 Framework principles for water and sewerage tariff in urban areas

- a. A lifeline slab based on average consumption of an urban poor or other vulnerable household (generally between 6–8 kilolitres or kl per month per connection) and tariff level kept at an affordable level shall be defined so that these needy communities are protected with assured water services.
 - The net operating subsidy required to meet the lifeline needs shall be cross-subsidised from other customer groups.
- b. For optimal revenue collection, tariff shall have at least three slabs. Demand management considerations shall be reflected in the slab levels.
- c. High-consumption customers and commercial customers who use water for other than drinking purposes shall be levied with higher than the average cost of water both for recovering full cost of water; financing the subsidy for poor and to discourage wastage of

⁸ Although there are cases where capital as well as O&M costs can be loaded on utility tariffs, in the current context the prevailing thinking is reflected in the preference for recovering only O&M costs.

water to encourage demand management. At the same time, measures shall be carried out to ensure sensitivity towards judicious use of water and avoid the 'I pay, I will waste' mentality.

- d. Considering differential socio-economic conditions of different categories of urban local bodies, the respective tariff levels shall be separately fixed.
- e. Transparent subsidy framework shall be developed and instituted so that the poor and other vulnerable communities are protected and the cost recovery is insulated.

14.2 Cost rationalisation

- a. Rationalisation of the costs to be recovered through tariffs for water supply, reuse and recycle shall be a pre-requisite in the tariff adjustment process taking into considerations local parameters such as willingness to pay, support for tariff collection and support for imposition penalties in case on non-submission.
- b. A draft methodology document shall be prepared, detailing the steps for approving the costs to be recovered through tariffs.
- c. Comments/suggestions shall be invited about the cost components from all relevant stakeholders based on the draft methodology document publicised through easily accessible media.
- d. The draft methodology document shall be circulated to relevant departments of the government, concerned NGOs in the relevant sector(s), academic institutions, service providers dealing with provision of water or sanitation services, and experts in the relevant fields.
- e. Copies of the draft methodology paper shall be made available at all relevant government offices followed by due communication of its availability through relevant public media such as newspapers and social media (in all relevant languages).
- f. Public hearings (with the official quorum capacitated to understand all relevant state languages) shall be held at all major urban centres of the state to consider the views and comments of the stakeholders on the draft methodology document.
- g. Dates and venues for the public hearings shall be fixed and published in widely accessible public media such as newspapers and social media, in advance for a considerable period prior to the date of the public hearing.
- h. The process mentioned in steps (a to (g shall be completed within a stipulated time period, unless extended by the respective governing agencies, with due publicity of this fact.
- i. Upon receiving the comments/suggestions on the draft methodology document, a list relating to approval of costs to be recovered through tariff shall be prepared, expressing the views of the stakeholders. The list shall be publicised through easily accessible media.
- j. The methodology document based on the comments and inputs received shall be revised upon publicising the comments/suggestions for a reasonable time.
- k. The revised methodology document shall be considered as final and binding until a review is taken up as per the procedure determined by the governing agencies concerned.
- l. The costs approved through the above steps shall be considered for preparation of tariff proposal

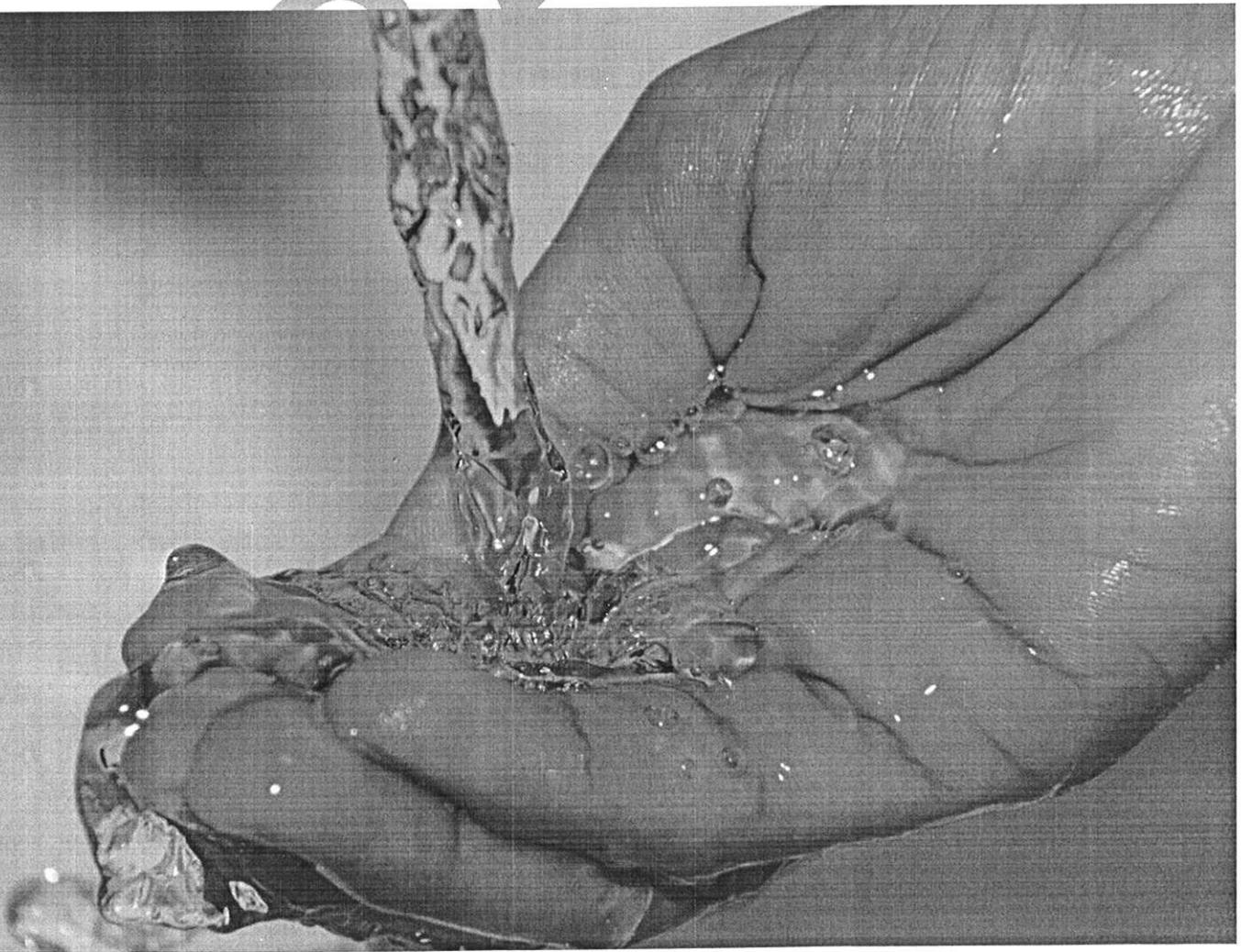
14.3 Tariff methodology

- a. Support shall be provided to the ULBs on demand to determine and devise rationalised tariffs that incentivise the conservation of water and minimise wastage.
- b. The RWSSMB shall be made fully functional. The board shall provide regular inputs to all service providers to oversee the implementation of the urban water policy.
- c. A draft methodology document shall be prepared for fixing the methodology for adjustment of water tariff, subject to (g below).
- d. Comments/suggestions shall be invited from all relevant stakeholders on draft methodology document publicised through easily accessible media.
- e. The draft methodology document shall be circulated to relevant departments of the government, NGOs concerned in the relevant sector(s), service providers dealing with provision of water or sanitation services, and experts in the relevant fields.
- f. Copies of the draft methodology document shall be made available at all relevant offices, followed by due communication of its availability through relevant public media such as newspapers and social media (in all relevant languages).
- g. Public hearings (with the official quorum capacitated to understand all relevant state languages) shall be held at all major urban centres of the state to consider views and comments of the stakeholders on the draft methodology document.
- h. Dates and venues for the public hearings shall be fixed and published in widely accessible media such as newspapers and social media in advance for a considerable period prior to the date of the public hearing.
- i. The process mentioned in (a to h above) shall be completed within a stipulated time period, unless extended with due publicity of this fact.
- j. Upon receiving the comments/suggestions on the draft methodology document, a list of comments received shall be prepared expressing the views by the stakeholders relating to tariff, followed by publicising the same through easily accessible media.
- k. The methodology document based on the comments received and inputs shall be revised upon publicising the comments/suggestions for a reasonable time.
- l. The revised methodology document shall be considered as final and binding until a review is taken up as per the procedure determined by the governing agencies.
- m. The revised methodology document shall be complete with a pro forma for drafting of tariff proposal. This shall be made publicly available to all relevant service providers.
- n. Inflation adjustment shall be considered in a transparent manner with or without the procedure of public consultation.
- o. The tariff adjustment process shall duly consider the achievements of the service providers in improving their performance. Tariffs across various service provider jurisdictions shall be different, based on the differences between their performances.
- p. Incentives shall be provided for maintenance to ULBs for achievements of envisaged goals in the urban water policy.

15. Performance monitoring of service providers

The following steps shall be carried out for effective performance monitoring of service providers:

- a. A performance monitoring template shall be prepared, that covers key performance indicators to assess the level of performance of the service providers.
- b. The template shall be finalised based on the stakeholders' comments and views obtained through easily accessible public media.
- c. The service providers shall provide regularly reports on their performance according to the performance monitoring template.
- d. The reports of the service providers shall be publicised through easily accessible media, and stakeholder comments shall be invited on the performance reports.
- e. The template as well as performance management plans of the service providers shall be updated based on stakeholder comments.
- f. Customer satisfaction surveys shall form an essential component of reporting on the performance of service providers.
- g. Reports of performance monitoring of service providers shall be available online for public reference.
- h. Real-time monitoring system shall be developed.



15.1 Design framework for service-level improvement

Each service provider shall prepare service-level improvement plans (SLIPs) to cover all households with water supply and sewerage (including septage). The PHED will also prepare State Annual Action Plan (SAAP) which will be state-level service improvement plan indicating the year-wise improvements in water supply and sewerage connections to households. These plans shall be prepared for next 30 years with short-term, medium-term and long-term plans.

The detailed project reports (DPR) for water supply, sewerage and septage management shall be prepared as per best engineering practices, socio-economic consideration and guidelines widely acceptable. However, the units which can be developed in modules (e.g. water treatment plants, sewage treatment plants, pumping stations, on-site treatment facilities, septage management, etc.) may be designed for appropriate shorter period as stipulated in the Central Public Health and Environmental Engineering Organisation (CPHEEO) manual.

The state government shall take up the projects for financial support in following order of priority:

- i. District HQ towns
- ii. Towns of strategic importance
- iii. NCR towns/heritage/tourism/water body towns
- iv. Other cities with each with a population of more than 50,000
- v. Not fully connected on the basis of coverage
- vi. Other towns

15.2 Earmarking of land for setting up water treatment plants

Earmarking of land for setting up water treatment facilities and pumping stations shall be done for all ULBs while preparing the master plans. Appropriate land allotment/transfer shall be done by the DA/UIT/state government.

15.3 Service-level benchmarks for urban water supply

It is intended to achieve the following benchmarks in the cities as per the priority order above:

S. No.	Proposed Indicator	Benchmark
1	Coverage of water supply connections	100%
2	Per capita supply of water	Minimum 135 lpcd, with 150 lpcd for Jaipur and NCR urban centres
3	Extent of non-revenue water	15%
4	Extent of metering	100%
5	Continuity of water supplied	24 hours
6	Efficiency in redressal of customer complaints	80%
7	Quality of water supplied	100%
8	Cost recovery	100%
9	Efficiency in collection of water charges	90%

16. Customer interest protection and promotion, and grievance redressal

The following steps shall be considered for ensuring protection and promotion of customer interests:

- a. A customer interest protection plan (CIPP) shall be prepared by all service providers, specifying clearly the steps planned to be taken for the protection and promotion of customer interests. This plan shall ideally be prepared together with the tariff proposal.
- b. The CIPP shall cover, but not be limited to, interfacing between customers and service providers, grievance redressal, as well as plans of the service providers to run their operations to best protect and promote interests of various categories of customers.
- c. The CIPP shall be finalised and modified as required based on comments and inputs from all stakeholders, obtained from easily accessible public media in languages including regional and local languages.
- d. The CIPP shall be used to monitor the performance of the service providers against the plans to protect and promote customer interests.
- e. The CIPP as well as the results of monitoring performance of the service providers in this aspect shall be publicised through easily accessible media.

16.1 Grievance redressal

A well-functioning system to register and address complaints regarding water supply and sanitation systems, and also to provide redressal of disputes shall be established targeting all customers of systems set up and operated jointly by ULBs and PHED. The PHED shall, therefore, explore all options for the following:

- a. Improving the existing system of customer care and making this improved system available to all urban habitations of the state
- b. Setting up a multi-level grievance redressal mechanism ranging from area sabhas to municipal wards and regional centres (multi-town/city level), which shall be well-staffed with competent members who are familiar with the nature of complaints likely to be received
- c. Setting up an effective, transparent and accountable mechanism to redress grievances of customers regarding water supply services, such as billing and collection

17. Water quality monitoring systems

The following guidelines shall be considered for monitoring the quality of water:

- a. It is ultimately the state government's responsibility (through respective agencies such as PHED) to take steps to protect and ensure quality of water.
- b. Appropriate independent monitoring mechanisms to keep a check on all water resources and water supply systems should be established, including mechanisms to check the quality of treated wastewater being discharged into the environment.
- c. The government should place a proper framework to address defiance of rules pertaining to the quality or polluting of water resources.

17.1 Water quality and water safety planning

With PHED in charge for bulk water supply and ULB- in charge of distribution system, the PHED shall undertake the following steps to address issues related to water quality in the state:

- a. Encourage ULBs to motivate local communities to shift to public water supply systems from individual or private sources of water.
- b. Provide support, in the interim, to all households that continue to use private water supply sources to test and advise on treating their water supply accordingly before use.
- c. PHED shall test samples drawn from all publicly provided common and household-level water supply sources for physical, chemical and bacteriological parameters, as per the CPHEEO norms, and display the results regularly through easily accessible public media.
- d. In case of disasters such as epidemics, floods or major failures of regular water supplies, water testing efforts shall be intensified beyond regular testing and appropriate treatment or alternative sources provided to ensure the supply of potable water (e.g. water tankers, drilling of supplementary bore-wells, connection to other water systems through additional pipelines, and so on).
- e. In areas where the water supply from deep tube-wells or hand pumps has higher-than-threshold-level of contaminants, including fluoride, salinity, or total dissolved solids (TDS), efforts shall be made to shift from groundwater-based sources to safer alternatives, such as conjunctive water supply, surface water sources, or RO systems.
- f. The PHED shall constantly explore and adopt new water treatment technologies, wherever applicable and effective.
- g. A water safety plan shall be prepared annually for each of the service providers, in consultation with all relevant stakeholders; it shall ideally be prepared together with the tariff proposal and the business plan.

17.2 Participatory water testing and safety monitoring

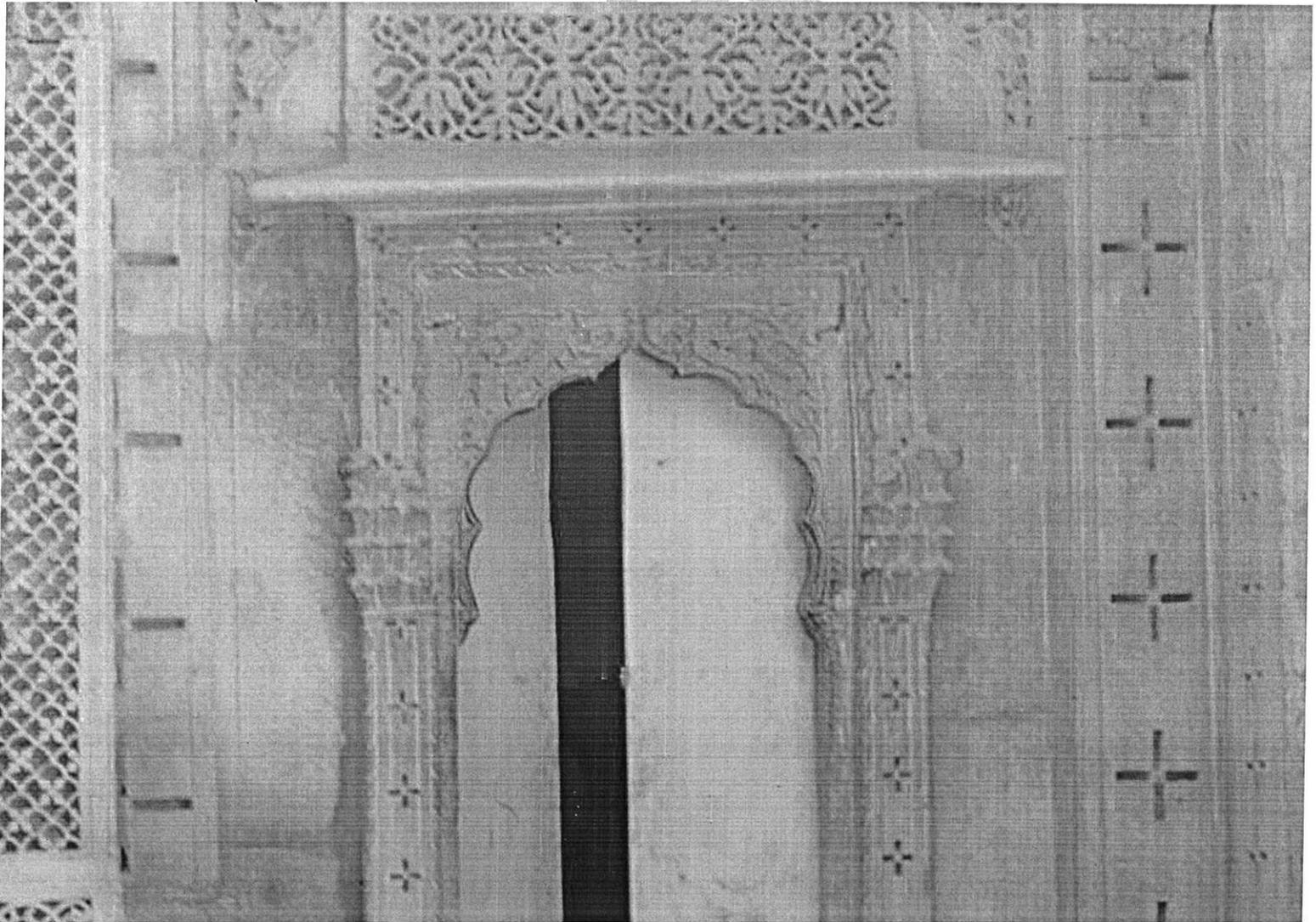
1. **Bacteriological quality** shall be tested by the community at common-source systems and at the household level, particularly where private individual sources like hand-pumps and submersible pumps are being used.

- a. For community-level water testing, hydrogen sulphide (H₂S) vials shall be distributed and awareness regarding the use of H₂S vials shall be spread within the local communities through all possible means (e.g. in local schools, area *sabhas*, meetings of ULBs, public health centres or PHCs, etc.)
 - b. Wherever testing reveals poor water quality, the community shall be made aware of household-level treatment options (such as chlorine tablets, boiling of water and treatment with sand and activated charcoal) and ULBs shall monitor disinfection efforts, until the water quality is improved to the satisfaction of ULBs and PHED.
2. **Chemical quality** for basic parameters shall be tested by the community using field test kits (FTKs) at common-source systems and at the household level, particularly where private individual sources like hand-pumps and submersible pumps are being used.
- a. **Physical quality** parameters such as taste and odour shall be included in the tests.
 - b. FTKs shall be placed in common locations within the community, such as local schools, water works sites and in panchayat offices, etc.
3. **Heavy metals:** Additional tests shall be carried out to test heavy metals in addition to the standard parameters used for chemical quality testing.
- a. All public water supply schemes shall be tested at state-level for heavy metals regularly.
 - b. All schools in the state having a private water source shall test their water supply for all basic parameters including heavy metals regularly.
4. **Testing facilities:** In addition to regular testing by the PHED at their own facilities, the following activities shall be carried out:
- a. If a PHC exists in the town/city, the pharmacists and other relevant staff at the PHCs shall be guided and an additional incentive given for testing basic parameters and guiding users accordingly.
 - b. Wherever applicable, equipment may be provided to engineering colleges (such as those attached to the Rajasthan University, Jaipur) after signing a Memorandum of Understanding (MoU) for testing and awareness generation of local communities.



18. Billing and collection efficiency

- a. A proper mechanism should be established that will allow water service providers to pursue appropriate legal action against defaulters provided the defaulters can economically afford to pay the bill.
- b. DMAs shall be created for effective management of billing and collection mechanisms.
- c. 100% billing shall be carried out, with alerts on billing being sent to the customers through both email and SMS.
- d. The collecting agency shall collect bills on a monthly basis, and the bills shall be volume-based. Also, the collecting agency shall use relevant technological equipment such as computerised customer databases, SCADA, online billing and payment, etc. that will encourage a higher bill collection rate.
- e. The service providers shall create incentives and disincentives that will allow people to pay on time. However, it should be noted that these should not be used to exploit the poor.
- f. A metered water connection shall ideally be installed within 10 working days of the water connection being approved and payment of the water connection fee.
- g. Set up a system of 'SMS Alert' for customers related for various activities related to billing and collections.



19. Water and wastewater linkages with economic growth and competitiveness of cities

Living conditions of a city are influenced to a large extent by availability of safe drinking water and wastewater facilities, which is critical to determine key growth factors, such as competitiveness, economic growth and prosperity. Priority shall be to focus on aspects of enhancing economic growth and competitiveness of urban centres in Rajasthan. These include:

- Designing a smooth and simple process for applying and obtaining water and sewerage connections
- Formulation of user-friendly web portal for online application of water and sewerage connections, checking status of applications, complaints and grievance redressal
- Providing incentives to realtors, developers for treatment of wastewater, decentralised treatment options, septage management, recharge of groundwater, rainwater harvesting, efficient and judicious use of water
- Introducing innovative uses of water to encourage tourist activities in major tourist centres of the state (e.g. Jaipur, Jaisalmer, Udaipur or Jodhpur)
- Integrating water distribution and wastewater management systems with town development mechanisms. This shall include stronger communication among the town planning department, urban development department, and the water resources department
- Undertaking projects that highlight the importance of water in deserts, highlighting key traditional ways of water conservation like khadin
- Encouraging use of traditional water conservation techniques and water connection in feasible areas.



20. Roadmap for achieving policy goals

A variety of reforms need to be initiated in the urban water and sanitation sector in Rajasthan. GoR has already taken the important step for the formation of the water sector reforms committee. This committee should take the leadership in driving the reform process in the entire sector. In addition, the policy is envisaged to achieve service-level benchmarks described above in a definite time frame.

Table 10: Key targets envisaged for the water and wastewater sector

City	Base year (2015-16)
Water supply system (including WTPs) and sewage system (including STPs)	5 years
District headquarters towns	
National capital region towns	
Heritage/tourism/waterbody towns	
Towns having less than 100% coverage	
Towns with population above one lakh	
Towns with population more than half but less than one lakh	10 years
Rest of the towns, with population below half a lakh	15 years
Property connection	
(i) Where system is already commissioned, 100% coverage of connections to be achieved	Within six months
(ii) New networks with 100% household connections	Within 90 days of commissioning of the system

21. Institutional, legal and financial set-up

The proposed projects shall be executed by PHED/ULBs/parastatal agencies or any agency authorised by them. The RUDSICO/PHED will act as SLNA (state level nodal agency) to provide technical and financial support for the following key components.

21.1 Behavioural change communications (BCC)

The PHED shall devise and implement appropriate BCC strategies (messages, materials, reach, etc.) and related institutional mechanisms, including the following:

At community level:

- With PHED in-charge of bulk water supply and ULB in charge of water distribution (as per 74th Constitutional Amendment) community level work will be relevant in ULBs.
- Continuous information, education and communication (IEC) activities through publications (brochures, pamphlets, newsletters and posters), folk media, print and electronic media, rallies, campaigns, workshops, interpersonal communication (IPC), street plays/puppet shows, public announcements, social mapping, etc. in relevant regional languages

Government officials:

- Expert-led workshops for PHED staff to promote a spirit of social engineering and change management
- Awareness generation and motivation by trained experts for PHED officials and officers at intermediary and grass-roots levels

21.2 Capacity-building

The policy wishes to specifically focus on the septage management part for capacity-building. The capacity-building measures shall be carried out with explicit and separate focus on all aspects of water supply, sewerage management and septage management.

The PHED shall design and implement a support programme, in conjunction with other competent institutions and resource persons at state and district levels, to cover the following aspects of capacity-building:

Government officials

- a. A training needs assessment (TNA) shall be designed and implemented through appropriate programmes for all state- and district-level officers of PHED involved in mainstreaming the approach to achieve the policy objectives.
- b. Training and capacity-building to PHED and ULB officials shall be provided to understand and design effective tariff adjustment procedure and mechanism involving full community deliberation and consultation.
- c. Training programmes shall be designed and carried out, based on the TNA, using high-quality training materials and resource persons, whose performance shall be evaluated.
- d. A specialised training institution for PHED shall be set up to provide continual training for all staff using tailored and highly-specialised training materials on technical and non-technical issues (e.g. social, IEC, administrative, time management, legal issues, and so on).

- e. Exposure visits for all levels of technical and non-technical officers and officials shall be provisioned, with adequate preparation prior to the visit and feedback subsequent to the visit to share lessons learnt.
- f. Regular induction and refresher trainings to all levels of PHED staff shall be provided.
- g. Orientation to all new staff on a regular basis shall be provided.
- h. Capacity-building performance shall be included as a criterion for annual performance appraisals and promotions.
- i. Training/orientation of personnel engaged in construction, testing/commissioning and O&M of water supply and sewerage works shall be provided on regular intervals. The executing agency (PHED/ULB/contractor) shall take all precautionary measures to ensure the safety of workers as well as the general public.

Community and elected representatives

- a. PHED shall prepare training materials and organise resource persons and training programmes to build the capacity of community women and men to oversee their water supply and sanitation schemes.
- b. Community capacity shall be developed to enable them to comment on tariff proposals and other matters inviting comments from stakeholders.
- c. The subject matter of these trainings shall cover all aspects of the pre-planning, planning, implementation, monitoring and post-implementation activities of water supply and sanitation schemes, including issues such as operation and maintenance (especially preventive maintenance), water management and conservation, accountancy and bookkeeping, hygiene awareness, behavioural change communication (BCC), etc.
- d. Women's participation will be encouraged and facilitated to attend training programmes by making special provisions (e.g. training near the town/city, non-residential trainings, and convenient timings) based on an assessment of their preferences.
- e. Regular induction and refresher trainings and orient all new ULB elected members shall be regularly provided.

21.3 Pre-legislative processes for urban sector legislation

The following steps shall be followed before drafts of legislation are prepared:

1. Stakeholder consultations shall be held to determine the purpose, extent and scope of the legislations.
2. A reasoned response to all comments received from the stakeholders shall be publicised in easily accessible media.
3. The first draft of the legislations shall be prepared based on these comments from the stakeholders.
4. Public and stakeholder consultations (including incorporation of views from civil society, corporates, academic institutions, government departments, independent institutions and the general public) shall be carried out to finalise the draft of the legislation.
5. Updates shall be publicised by the concerned governing agency on the status of the legislation in the state assembly or at other relevant forums within the government as applicable.

21.4 Legal arrangements

The PHED shall carry out the following activities to prevent vandalism and to be able to penalise offences:

1. Review the existing legal framework to identify amendments necessary in existing laws and new legal documents necessary to support the reform policy.
2. Draft new legislation based on the needs identified in the review of existing legal provisions.
3. In the interim period while new legislation is being drafted, include penal provisions in relevant existing legislations against offences such as the theft of water, illegal connections and pumping equipment and non-payment of water and sewerage bills.
4. In the absence of such legal documents, executive orders by the government are to be issued to penalise offenders and protect state water supply and sanitation infrastructure.

21.5 Financing arrangements

To achieve the objectives of this policy, GoR shall explore all possible funding sources including (but not restricted to) the following:

- a. Departmental funds of the PHED
- b. District-level pooled funds on IEC and BCC from different departments such as education and health
- c. Allocations from Gol, including the funds allocated under the National Urban Drinking Water Programme
- d. Financial assistance including Grants / Grant-in-Aid from various multilateral agencies such as the World Bank, ADB, JICA or other donor agencies
- e. Loans from financing institutions such as NABARD, LIC, etc.
- f. PPPs
- g. Regulatory escrow accounts and regulatory fees paid by the service providers in wake of the establishment of independent regulatory authorities.
- h. **Viability gap funding:** Gol provides 20% viability gap support for PPP projects to the extent of 20% of the project cost. The state will also provide additional viability gap funding up to 20% of the project cost, subject to other conditions of the financing being met.

21.6 Monitoring implementation of schemes

In order to monitor the implementation of water supply and sanitation schemes and to evaluate the feedback, the PHED shall take the following initiatives:

State level

1. RWSSMB shall check the overall performance (including financial and physical) of all water supply and sewerage schemes handed over to ULBs in the state, and to take remedial action as necessary.
2. Third parties shall be contracted to carry out performance verification, water audits and social audits.

City/town level

1. Setting up a city-level monitoring committee to check the overall performance (including financial and physical) of water supply and sewerage schemes handed over to the respective ULB
2. Contracting third-parties to carry out performance verification, water audits and social audits
3. Ensure regular visits to ULBs by the local government's staff (e.g. junior engineers and sub-divisional engineers of PHED) to attend meetings at ULBs and to address local problems

21.7 Communication and dissemination

1. The PHED shall formulate and implement a communication and dissemination strategy, through its communication and capacity development unit (CCDU). This shall cover issues such as implementation status and progress of water supply initiatives, water quality, grievance redressal, tariff rates, collection and cost recovery, BCC, PPPs, climate change, case studies of best practice and special studies.
2. Methods of dissemination shall include the print and electronic media, video documentaries, websites and blogs, and social media, in English and local languages. Successful and long-running advertisement campaigns such as *Amul* shall be considered as examples.

21.8 Interdepartmental coordination

The following steps shall be taken to ensure seamless interdepartmental coordination:

1. The health department shall guide urban communities on ways to control the health impacts of contaminated water and environmental pollution.
2. The education department shall inform school students regarding water quality and hygiene (including menstrual hygiene).
3. The Women and Child Development Department shall create awareness of water quality and hygiene among urban women.
4. The LSGD shall coordinate with PHED, PWD and UDHD to optimise the construction of roads, laying down of water supply pipes, and sewer network to minimise digging and reducing disturbance to existing systems and services.
5. The PHED shall forge inter-sectoral linkages with other line departments such as health, education, women and child welfare, urban development and housing as well as Jaipur Development Authority (and other local development authorities as applicable) through multilateral MoUs for cost-effective, efficient and integrated delivery of water supply, sanitation and hygiene-related programmes. This may include BCC including IEC, community mobilisation, capacity-building and awareness generation at the household, town/city or institutional level (e.g. schools and colleges).

21.9 Career paths

Measures shall be taken by all the departments and organisations concerned to ensure a progressive career path exists for professionals aspiring to contribute to the water and sanitation sector of the state. For instance, grievance redressal mechanism can hire entry-level graduates from non-engineering fields who can grow to become IEC, BCC, grievance redress or other non-technical experts. These initiatives shall supplement the existing career paths of engineering, etc.

22. Procurement and private sector participation

1. Informed investment decisions shall be made through thorough analysis that considers financial, social and environmental impacts (positive and negative) and implementation risks throughout the life cycle of the project to be implemented through private sector participation.
2. Analysis of planning options shall identify the long-term financial impact (e.g. recurrent costs, including depreciation and customer charges) of all planning outcomes before proceeding with capital investment decisions.
3. All feasible potential options to meet service levels, including non-asset solutions shall be considered in the options analysis. The assumptions underlying the analysis of options shall be justified and clearly documented in detailed project reports.
4. Stakeholders, including asset owners, shall be made aware of issues and risks associated with the implementation of projects proposed through a planning study.
5. PPPs shall be considered and designed with a long-term perspective to avail of new opportunities for the rapid expansion of urban water supply services, and to merge the skills, expertise and experience from public and private sectors to improve the services delivered to beneficiaries.
6. PHED shall explore and adopt appropriate options under the PPP model. Such PPP contracts shall be actively explored and adopted for options such as the following:
 - Build, operate and transfer (BOT) contracts for the installation and O&M of highly technical systems, such as RO plants, sewerage and other systems
 - Management contracts of O&M of groundwater and surface water-based water supply schemes.
 - PPPs involving the government, private sector, and also the communities to deploy locally tailored models for effective and sustainable service delivery
 - E-procurement of all works under national competitive bidding
7. Appropriate level of private investment shall be attracted and leveraged its efficiency to provide quality treatment facilities and services at optimal costs.
8. PPP/revenue-sharing may be proposed to build a wastewater recycling and reuse plant along with the associated sewerage network on design-build-finance-operate-transfer (DBFOT) basis or any other methodology of PPP/revenue-sharing option. The concession period may be high up to 30 years. Further, innovative solutions will be encouraged to make sure new concepts and unconventional ideas are not left out of the solution set.
9. Various sources of revenue to make the projects viable shall be explored. For instance,
 - Sale of reclaimed water
 - Sale of certified emission reductions (CER)
 - Sale of electricity/biogas/renewable energy certificates (RECs)
 - Fertiliser
10. A provision of at least 30% of treated wastewater may be made for reuse by retail consumers with further bifurcation as follows:

- Minimum 15% to small farmers as per rate decided by GoR
 - Minimum 15% by auction for other entities for individual and landscaping purpose.
11. Criterion for selection of PPP/revenue-sharing operators: One or a combination of the following criteria may be adopted for PPP operator selection through competitive bidding:
- Lowest bid in terms of user fee from consumers
 - Royalty paid to ULB per unit of treated waste water
 - Highest upfront fees
 - Lowest present value of subsidy
 - Lowest capital cost and O&M cost for projects
 - Highest equity premium
 - Quantum of state's support solicited in present value

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23. Climate change

Given the potential impact of climate change on water supply sources and usage pattern in the state, the PHED shall commission studies and formulate an appropriate climate change adaptation strategy for water supply and sanitation either as a standalone strategy or as a part of a larger climate change adaptation strategy for the state as a whole.

24. Revision and refinement of the policy

This policy document shall evolve based on the feedback collected from monitoring as well as comments and inputs from all stakeholders. The policy shall be revised every five years through a comprehensive consultative and deliberative process involving all stakeholders in the water and sanitation sector.



25. Implementation arrangements

It should be noted that the policy is not a justiciable document that can be enforced to the letter. It is a document where GoR has put in the best of efforts to: (a) envisage the future of the state's urban water sector; and (b) identify the roles that various stakeholders can play in realising the vision.

In this context, it will be crucial to note that in addition to a few 'new responsibilities' that may be required to be carried out by the stakeholders, they will have to dispense their existing responsibilities in 'new ways' of mutual coordination, by incorporating the principles of transparency, accountability, participation and capacity-building. In addition, the policy envisages to enhance technical capability to establish an exclusive state level design centre for identifying standardised technical parameters and levels by engaging with technical institutions and academia.

Based on this, the following broad aspects are considered important for implementing the policy:

- a. The RUIDP's Policy Support Unit (PSU) will be the anchoring entity for the policy. That is, the PSU will compile the comments from various stakeholders and ensure that the policy is revised accordingly.
- b. The PHED, LSGD and ULBs will work fully in sync with each other. The stakeholder inputs, media campaigns and routine decision-making shall be managed by fully coordinating with each other.
- c. According to the roles defined by the 74th CAA and this policy, the focal points of the decision-making will be entities that will 'host' or 'house' the processes required for decision-making. For example, ULBs will host the processes needed for rationalisation of the tariff as described in the policy. The other stakeholders (GoR, PHED, LSGD as well as the general public) shall be made parties to the decision-making through transparent, accountable and participatory mechanisms as described in the policy. A similar approach shall be taken for carrying out other responsibilities described in the policy for PHED, LSGD, ULBs, and the general public.

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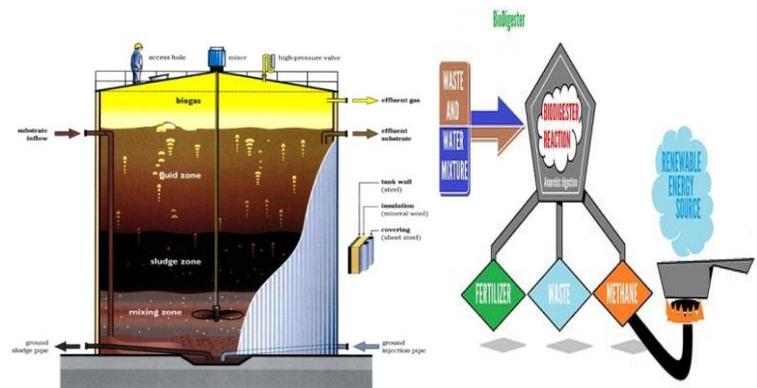
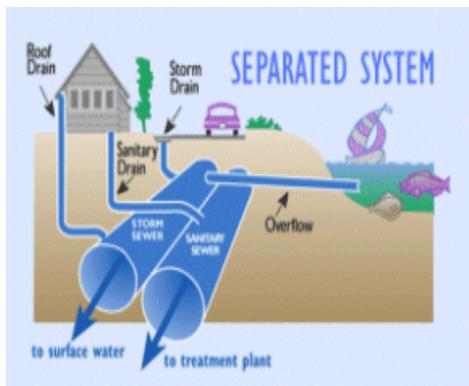
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सत्यमेव जयते

Government of Rajasthan

STATE SEWERAGE & WASTE WATER POLICY- 2016



Department of Local Self Government

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ABBREVIATIONS

BIS	Bureau of Indian Standards
BOD	Biochemical Oxygen Demand
BOO	Build Own Operate
BOT	Build Operate and Transfer
CER	Certified Emission Reduction
CGWA	Central Ground Water Authority
COD	Chemical Oxygen Demand
CPHEEO	Central Public Health and Environmental Engineering Organization
CPCB	Central Pollution Control Board
CSP	City Sanitation Plan
DBFOT	Design-Build-Finance-Operate-Transfer
DLB	Directorate of Local Bodies
DPR	Detailed Project Report
EOI	Expression of Interest
GIS	Geographical Information System
GPR	Ground Penetrating Radar
GoI	Government of India
GoR	Government of Rajasthan
HUDCO	Housing & Urban Development Corporation Limited
IIT	Indian Institute of Technology
LPCD	Liters per capita per day
LSG	Local Self Government Department, GoR
mm	millimeter
MOU	Ministry of Urban
MOUD	Ministry of Urban Development, GoI
NCR	National Capital Region
NGO	Non Government Organization
NMSA	National Mission for Sustainable Agriculture
NIT	National Institute of Technology
O&M	Operation & Maintenance
PPP	Public Private Partnership
RBMC	Revenue Based Management Contract
REC	Renewable Energy Certificate
RSPCB	Rajasthan State Pollution Control Board

RTPP	Rajasthan Transparency in Public Procurement
RUIFDCO	Rajasthan Urban Infrastructure Finance and Development Corporation
SMS	Sending Message Services
SLNA	State Level Nodal Agency
SS	Suspended Solids
SPS	Sewage Pumping Station
SPV	Special Purpose Vehicle
STP	Sewage Treatment Plant
UDH	Urban Development & Housing Department
UIT	Urban Improvement Trust
VAT	Value Added Tax
WHO	World Health Organization

1. BACKGROUND

Sanitation is defined as safe management of human excreta, including its safe confinement treatment, disposal and associated hygiene-related practices. While this policy pertains to management of human excreta and associated public health and environmental impacts, it recognizes that integral solutions need to take account of other elements of environmental sanitation, i.e. solid waste management ; generation of industrial and other specialized/ hazardous waste ; drainage ; and also management of drinking water supply. The State of Rajasthan has issued guidelines for State urban sanitation policy with a view that all cities & towns of Rajasthan become totally sanitized healthy and livable so that all urban dwellers have access to and use safe and hygienic sanitation facilities. In order to achieve this goal 100% human excreta and liquid wastes from all sanitation facilities, including toilets must be disposed off safely. Disposal of Waste water generated from cities or from industrial areas is a big challenge not only for Rajasthan state but also at national level. Treated wastewater generated from existing wastewater treatment plants can be considered as an important component of water resources of Rajasthan. Due to the terrain and the concentration of the urban population the majority of treated wastewater is discharged into various rivers or nalahs or on open land and only a part of it is used for irrigation.

The observations of Hon'ble Chief Minister during the site visit at Ochiai Reclamation Centre, Tokyo shall be put into practice to achieve the goal of health and hygiene for citizens:

1. A Separate System: Sewerage system to carry domestic sewage while drainage system for storm water.
2. Water reclamation centers to reclaim water after treatment of domestic sewage.
3. Where water Reclamation centers are situated in the midst of residential area, these can be built under ground to avoid the problem odour and parks can be maintained on the roof of treatment facility.
4. One of the Scheme of treatment may be Grit chamber, Primary sedimentation tank, Reaction Tank, Secondary sedimentation tank , Chlorination Tank followed by sand filtration.
5. Reverse osmosis filtration may be used for tertiary treatment.
6. Sludge may be dewatered, thickened and incinerated. Ashes remains may be used for landfill.
7. 100% households should be covered by sewerage
8. Sewerage and water supply activity should be coordinated.
9. Water tariff should be such as to discourage the people from wasteful use of water.

Policy is framed to resolve the following key issues & considering Hon'ble Chief Minister site visit observations :

1. Provision of adequate wastewater collection and treatment facilities for all the cities and towns in Rajasthan.
2. Protection of the environment and public health in the areas affected by the proposed systems, especially, surface water and ground water.
3. Consideration of treated effluents as a source for reuse (irrigation/ industrial).
4. Improvement of the socioeconomic conditions in the areas to be served by the proposed systems.

1.1 GOAL AND VISION OF THE POLICY:

The National Urban Sanitation Policy 2008, envisions, **“All Indian cities and towns become totally sanitized, healthy and livable and ensure and sustain good public health and environmental outcomes for all their citizens, with a special focus on hygienic and affordable sanitation facilities for the urban poor and women”**. The State Sewerage and Waste Water Policy is to ensure improved health status of urban population, specially the poor and disadvantage, through the provision of sustainable sanitation services and protection of environment. The policy specifically endorses the following core principles:

- (i) To protect public health.
- (ii) To protect the environment and the State's water resources.
- (iii) To promote proper functioning of network based sewerage systems and ensure connections of household so as to prevent dry weather flow in drains & streets.
- (iv) Treatment of sewage and sludge is required prior to discharge into the environment.
- (v) Promoting recycle & re-use of treated sewage for non-potable applications.
- (vi) To make Sewerage project economical and environmentally sustainable.
- (vii) Inclusive and participatory decision making.
- (viii) Transparent decision making processes to achieve socio-environmental as well as economic financial objectives
- (ix) Capacity building for enhanced institutional ability to govern the sector effectively.
- (x) Ensuring, protecting and optimizing investments.
- (xi) Public Private Partnership (PPP) in the most appropriate manner.

- (xii) Public outreach for environmental and health related outcomes.
- (xiii) Establishment of an efficient, effective, affordable and accountable system for managing urban sewerage and septage management.
- (xiv) Effective monitoring and evaluation of the initiatives intended to improve sewerage and Septage management services.
- (xv) Coverage of all citizens in the urban areas for service provisioning
- (xvi) Adequate sewerage and Septage facility provided to all urban customers
- (xvii) Equity across geographical as well as demographic fabric of the customer base.
- (xviii) Ensuring the system's financial sustainability in a progressive manner through improved efficiency, tariff rationalization and corporatized operations and decreasing dependence on unsustainable resources.
- (xix) Improved service levels in a well defined and phased manner by ensuring interventions in the spheres of infrastructure, institution, autonomy and management, monitoring mechanism and regulatory framework.

2. NEED FOR STATE SEWERAGE AND WASTE WATER POLICY

Safe Water supply and hygienic sanitation facilities are the two basic essential amenities the community needs on a top priority for healthy living. While provision of safe drinking water takes precedence in the order of provision of basic amenities to community, the importance of hygienic sanitation facilities through low cost on – site sanitation, conventional sewerage and sewerage treatment can no longer be allowed to lag behind, as about 80% of water used by the community comes out of houses in the form of waste water which unless properly collected, conveyed, treated and safely disposed off may eventually pollute our precious water resources and cause environmental degradation. The provision of safe drinking water alone is not enough to break the chain of disease causing pathogens. Safe disposal of the waste is even more important. This can be at an individual property level or at group housing level like apartment, complexes or at community level.

In most cities and towns of Rajasthan, only a minority of household is connected to a sewage system and only a small fraction of the sewerage from these household is treated effectively at primary or secondary sewage treatment plants. The rest of the urban population has either.

- (i) Some form of on-site sanitation like septic tank/soakage well for disposal of human excreta
- (ii) Kitchen & bathroom waste disposing into road drains or directly on roads, thereby creating unhygienic conditions or
- (iii) No sanitation facilities i.e. excrete in the open spaces around their homes.

About one fifth of urban India is dependent on on-site sanitation, or has no access to sanitation services. Therefore, it is imperative that urban authorities formulate effective policies and action plans for the planning and management of onsite sanitation services.

Two forms of Urban Sanitation Policy are relevant – the macro and the micro. The impact of the Urban Sanitation Service Infrastructure is well beyond the boundaries of individual municipalities. It has an impact on economy of a Region, environment & social development. The need to manage the macro economy of the area and to protect the environment and manage the socio economic development, the State Government should set a macro policy, broad objectives and principals of which should be:

- (i) A frame work within which the municipalities are guided to work, and
- (ii) A benchmark against which municipalities are aware that they must measure up for approval of their projects for financing.

In accordance with the Constitution of India and its 12th amendment, prime responsibility for installing and operating a sanitation service lies with the individual Municipal Bodies. Each Municipal Government should determine its own policy for a sanitation service at the micro level within the frame work of the guidelines established in the macro policy formulated by the State Government.

The operative sewerage disposal systems constructed in various cities and towns of Rajasthan are generally in a fair condition and in a continuous state of operation, however there are problems due to the insufficient institutional back up, insufficient funds for operation and maintenance, lack of sense of public ownership resulting in lack of involvement of beneficiaries in the upkeep of the system, and lack of well qualified and trained personnel. It may also be better to go moderate if need be to ensure success of Projects delivering full benefits.

3. OBJECTIVES

To overcome the shortage of water, for different purposes, use of potable water should mostly be for drinking purposes and re-use of water up to a certain quality after proper treatment of water for non-drinking purpose and last but not the least scientifically disposal of the remaining waste is the object behind formulating this policy.

- (i) To ensure 100 percent sanitized cities
- (ii) To improve water supply service focusing on customer satisfaction, coverage, frequency and reliability
- (iii) Supply of potable water incurs large amount of money but is used in non-drinking purposes.

- (iv) Pure water is available in scarce quantity whether from ponds, tube wells etc and the shortage becomes acute during summer therefore reuse of treated sewerage can provide incremental supply for non – potable applications and thus reduce need for augmenting supplies. In other words, water reuse promotes environmental sustainability by reducing burden on already stressed basin and aquifers and preventing their depletion.
- (v) Sewerage is disposed off unscientifically which heads to health hazards and pollutes ground water as well. Therefore water reuse results in lower volume of sewage discharge leading to reduction in environmental costs and health hazards.
- (vi) Water reuse ensures resource conservation & preservation of sensitive eco-system and reducing pollutant loading.

All cities and towns of Rajasthan become totally sanitized, healthy and liveable and ensure sustain good public health and environmental outcomes for all their citizens with a special focus on hygienic and affordable sewerage facilities for the urban poor and women. All urban dwellers will have access to and use safe and hygienic sewerage facilities and arrangements so that no one defecates in the open.

4. LEGISLATION AND GUIDANCE DOCUMENTS

The Government Sewerage and Waste water Policy should be read in accordance with the most current versions of the following: Legislation and document

- (i) Latest Manual on Sewerage and Sewage Treatment Systems, 2013
- (ii) Environmental (Protection) Act, 1986
- (iii) The Environment (Protection) rules,1986
- (iv) The water (Prevention and control of pollution) Act,1974
- (v) The water (Prevention and control of pollution) cess, Act,1974
- (vi) The water (Prevention and control of pollution) Amended rules, 2011
- (vii) The water (Prevention and control of pollution) Cess rules, 1978
- (viii) The water (Prevention and control of pollution) Rules, 1975
- (ix) National Urban sanitation Policy 2008
- (x) National water policy 2012
- (xi) Rajasthan Municipalities Act, 2009
- (xii) Quality standards suggested by Central Pollution Control Board and Rajasthan State Pollution Control Board.
- (xiii) Standards set by Bureau of Indian Standards (BIS)

- (xiv) Effluent Quality guidelines for health protection measures in aquaculture use of waste water
- (xv) Quality guidelines for health protection in using human wastes for aquaculture.
- (xvi) Service Level Benchmarks Fixed By Ministry of Urban Development

5. THE POLICY

5.1. On Resource Development

Wastewater is a perennial water source and shall form an integral part of renewable water resources and the State water budget. Each local body will consider it as a resource and make the plan for reuse as per the site conditions with the help of experts.

Collection and treatment of wastewater is a necessity to circumvent hazards to the public health and the environment. It becomes imperative when contamination of freshwater resources with wastewater is imminent. All local bodies will make city sanitation plan (CSP) for a period of 30 years considering future development and city development in line with city Master plan to avoid any conflicts in developing the city in the future. For the cities which do not have CSP may prepare a short term plan of 5 years from the base year for immediate implementation as per guidelines provided in Manual on Sewage Treatment System, published in 2013 by the Ministry of Urban Development, Government of India to address the issues of utmost importance and then ULBs may prepare CSP for 30 years. The CSP should also be in line with the guidelines of Swachh Bharat Mission. Collection and treatment of wastewater is mandatory to protect public health against water borne diseases, and where epidemics become a threat otherwise.

Existing levels of wastewater services shall be maintained and upgraded where necessary to enhance public health and the environment and separate plan is to be prepared by local body as per their requirement.

Treatment of wastewater shall be targeted towards producing an effluent fit for reuse in irrigation in accordance with WHO guidelines as a minimum. Reuse of treated wastewater in other purposes shall be subject to appropriate specifications.

Coordination shall be maintained with the official bodies in charge of urban development to account for the treatment and disposal of their liquid wastes. Central treatment plants shall be built to serve semi-urban areas, and collection of wastewater can be made initially through trucking until collection systems are justified.

Specifications and minimum standards as stipulated by CPHEEO shall be applicable for the use of septic tanks in urban areas. Particular attention shall be paid to the protection of underlying aquifers.

5.2. On Resource Management

It is highly imperative that Urban Local Body shall develop and manage wastewater systems as well as the treatment and reuse of the effluent.

A basin management approach shall be adopted where possible. The use of treated wastewater in irrigation and industrial application shall be given the highest priority and shall be pursued with care.

Effluent quality standards shall be defined based on the best attainable treatment technologies, and calibrated to support or improve ambient receiving conditions, and to meet public health standards for end users. Key factors will include the location of the discharge, its proximity to wells, the type of receiving water, and the nature and extent of end uses. Wastewater intended for irrigated agriculture will be regulated based on the soil characteristics of the irrigated land, the type of crops grown, the irrigation schedule and methods, and whether other waters are mixed with the treated wastewater.

Industries shall be encouraged to recycle part of its wastewater and to treat the remainder to meet standards set for ultimate wastewater reuse or to meet the regulations set for its disposal through the collection systems and/or into the receiving environment.

Wastewater from industries with significant pollution should be treated separately to standards allowing its reuse for purposes other than irrigation or to allow its safe disposal.

Consideration shall be given to isolating treated wastewater from surface and ground waters used for drinking purposes, and to the blending of treated effluent with relatively fresher water for suitable reuse.

Urban Local Bodies can engage Experts from Government Engineering Colleges of Rajasthan/ IITs/ NITs.

5.3. On Wastewater Collection and Treatment**(A) City Plan**

A proper and updated city plan is an essential pre-requisite for proper planning and design of all utilities and more so for the Sewerage Systems. The State shall endeavor to have proper digital city maps showing the levels prepared through modern available technology. The digital city maps should clearly show the city feature over ground and under ground including all utilities. Geographical Information System (GIS), Ground Penetrating Radar (GPR), Total station etc. tools may be used for preparation of city map. The city maps should be updated for every 10 years. An effective and comprehensive GIS based data base and Management Information System correctly mapping the assets, user base and status of operations shall be established.

(B) Design Period

Every city has to prepare a City Sanitation Plan (CSP) for next 30 years along with 5 year short term plan as per the guidelines of CPHEEO manual on sewerage published in 2013 . The City Sanitation Plan (CSP) for the city should take into account the likely changes in the city in next 30 years and plan for them and will be according to city Master plan. The Detailed Project Report (DPR) for sewerage should be in accordance to City Sanitation Plan . The design of the sewers and planning of space should be for the 30 year projection requirements. However, the units which can be developed in modules (e.g. Sewage Treatment Facility, sewerage Pumping machinery, on site treatment facilities, etc.) can be designed for appropriate shorter period as stipulated in CPHEEO manual. Earmark of land for Sewage Pumping Station (SPS) and Sewage Treatment Plant (STP) should be done for all Urban Local Bodies (ULBs) and appropriate land allotment shall be done by Development Authority/Urban Improvement Trust/State Govt. on priority.

(C) Priority of sanctioning sewerage Projects:

Priority for The work of laying sewerage network & connectivity (mandatory) and construction of STPs would be taken in a phased manner to provide full 100% coverage of town.

The Priority for sanction of Sewerage Project will be:

- (i) Cities with water supply service level equal to or more than 135 lpcd. Full coverage is to be provided in these cities.
- (ii) District Head Quarter not covered by Sewerage
- (iii) NCR Town/Heritage/Tourism/Water body town not connected by sewerage.
- (iv) Other cities not connected with sewerage having population more than 50,000.
- (v) Not fully connected on the basis of coverage

(D) On-Site Sanitation

This is being adopted by almost 80% of urban India consisting of some form of toilet that passes waste to leach pits, pits with mechanical removal options and septic tanks. The second on site disposal option being exercised is defecation in open space. This causes passing of the chemical and pathogenic infections to the ground waters, to the drains and water bodies outside resulting in severe risks to human health. Therefore followings points has to be considered in this matter:

1. Sanitary on site options can however be adopted after suitable investigation and care. There is a very strong case for adopting suitable on site options for the areas that cannot meet the requirements of 5.3
2. The options of the onsite system will depend on the substrata, space availability and social acceptability. They also are dependent upon the water absorption capacity of the soil. Rocky areas and high water table areas are not suitable for this at all as they do not provide any

protection against the pathogens. It is generally suggested that the risk factor for pollution is related to the traverse time between polluting point and the water table. A traverse time of 50 days is considered allowing low risk, 25-50 days is to be considered as medium risk area and less than 25 days is considered as high risk areas with the point of view of pollution of the ground water. Finer soils with high clay content have low permeability and thus greater risk reduction in lesser depths whereas coarse sands and rocky fissures provide high permeability and lower reduction. Generally a minimum distance of 2 to 3 m is required for risk reduction.

3. The on-site option for solids removal combined with carriage of the sewage through conduits to the general sewerage system can also be considered as a good option in critical areas. Such options could be a combination of small bore/shallow sewers for sewage collected after settling of solids in a tank (e.g. septic tank effluent) and in site disposal systems
4. All in site options must be adopted after full involvement of the local users who should know all the feasible options and must have a say in the choice. Assistance of NGO's and dedicated organizations for this option should be encouraged.
5. Criteria for design of tanks: These are for reference and are general guidance and modifications can be done as per site conditions after the approvals from experts.

No.	Distances between the bottom of pit and the maximum ground water level (mm)	Effective size of the formations soil in mm	Minimum horizontal distance of separations (mm)	Modification needed
1	>=2000	<=0.2 (fine sand, clay and silt)	3000	None
2	>=200	> 0.2 mm (coarse sand)	3000	Provide, 500 mm thick sand (0.2 mm effective size all around and seal the bottom)
3	<2000 mm	=< 0.2 mm (fine sand , clay and silt)	10000	None
4	<2000 mm	> 0.2 mm (coarse sand)		Provide, 500 mm thick sand (0.2 mm effective size all around and seal the bottom)

6. On Site technologies represent viable and affordable options if collection, transport, treatment and safe end use or disposal is managed properly.
7. Bio digester, Phytoid technology based on site solution accompanied by root zone treatment can be suitably used for onsite sanitation. Reed Bed filters, horizontal or vertical, can be deployed before final disposal / Re-use.

8. The ULB through its suction machines shall facilitate the clearance of sludge on payment basis. Municipality can also authorize any private person/Agency for clearance of sludge through mechanical means.

(E) Off – Site Sanitation

The ideal mode for sanitation is an off-site system which collects all the waste from within the city and transfers it to a treatment facility out city which treats it to acceptable levels of effluent and sludge which is then disposed /reused. The essential pre-requisite to a sustained functioning of the offsite facilities are:

- i. Adequate sewerage flow (approximately 100 lpcd minimum) which is possible only in town/areas with a minimum supply of 135 lpcd and 100% connectivity.
- ii. Availability of Land for Sewage Treatment Plant and Pumping Stations will be ensured while preparing the master plan of sewerage for town. Town planning department shall mandatorily earmark land for Sewerage Treatment Plant and other facilities. The Department, Authorities/UITs/State Govt. shall allot a land to ULBs for sewerage projects.
- iii. Where possible, gravity flow shall command the collection and conveyance lines.
- iv. Treatment plants shall be located away from any potential population growth. Location selection shall be coordinated and approved with the concerned governmental agencies. Due consideration shall be given to interact with landowners and adjacent communities.
- v. It is mandatory to construct decentralized Sewage Treatment Plants (STPs) for the treatment of waste water in high rise buildings, so that sewerage system in that area may function properly and the treated waste water may be utilized in the nearby area. It will also reduce the investment requirement for sewerage system.
- vi. The use of advanced wastewater treatment technologies shall be endorsed and encouraged. However, appropriate wastewater treatment technologies shall be selected with due consideration to operation and maintenance costs and energy savings, in addition to their efficiency in attaining and sustaining quality standards.
- vii. Innovative approaches to wastewater treatment, particularly for the small municipal systems have to be considered. Design criteria, performance specifications and guidelines for such systems shall be adopted and generalized
- viii. Design and performance specifications of wastewater treatment plants shall be as per guidelines given in the manual on sewerage treatment systems published by CPHEEO. Sufficient room in tendering for the construction of new plants shall be provided for competition to take place in both technologies and costs.

5.4. On Reuse of Treated Effluent and Sludge

1. Treated wastewater effluent is considered a water resource and is added to the water stock for reuse.
2. Priority shall be given to agricultural reuse of treated effluent for unrestricted irrigation. Blending of treated wastewater with fresh water shall be made to improve quality where possible. Crops to be irrigated by the treated effluent or blend thereof with freshwater resources shall be selected to suit the irrigation water, soil type and chemistry, and the economics of the reuse operations.
3. Crop nutrient requirements shall be determined taking into consideration the prevailing effluent quality. Overuse of nutrients shall be avoided.
4. Accumulation of heavy metals and salinity shall be monitored, managed and mitigated. Leaching of soils shall be advocated by the irrigation authorities.
5. Farmers shall be encouraged to determine the rate of water application needed for different crops, taking into consideration the value of nutrients in the treated water and other parameters.
6. Farmers shall be encouraged to use modern and efficient irrigation technologies. Protection of on-farm workers and of crops against pollution with wastewater shall be ensured.
7. Treated effluent quality should be monitored and users alerted to any emergency causing deterioration of the quality so that they will not use such water unless corrective measures are taken.
8. Studies should be conducted and projects designed and implemented to store the excess treated wastewater in surface reservoirs but artificial recharge is not permitted. Due attention shall be given to the quality of treated and groundwater and the characteristics of the strata.
9. Plans and studies for power generation from sludge, if proven technically, economically and financially feasible, shall be made with due attention to environment impacts.
10. Sludge produced from the treatment process would be processed so it may be used as fertilizer and soil conditioner. Care shall be taken to conform to the regulations of public health and environment protection norms.
11. **Industry:** Industrial reuse of reclaimed wastewater represents major reuse next only to irrigation in both developed and developing countries. Reclaimed wastewater is ideal for many industrial purposes,. Where effluent is to be used in the industrial processes, it should be the responsibility of the industry to treat it to the quality standards required. Pilot scale feasibility studies carried out in Australia have concluded that it is possible to economically

treat the domestic wastewater to achieve adequate quality for reuse as cooling water. Based on the conclusions of the feasibility study, a full-scale treatment plant employing cross-flow membrane microfiltration system may be installed. The membrane filtration system can remove all suspended solids, fecal coliforms, and giardia cysts. It could also significantly reduce human enteric viruses such as *reovirus* and *enterovirus*. The water reclamation plant at Eraring Power Station demonstrates the potential for reuse of wastewater in power generation and other industrial manufacturing facilities.

Industrial uses for reclaimed water include:

- (i) Evaporative cooling water:
 - (a) once-Through cooling system
 - (b) Re-circulating cooling system
 - (C) cooling water quality requirements
 - (ii) Boiler –Feed water- The use of reclaimed water differs little from use of conventional public supplies for boiler-feed water,as both require extensive additional treatment quality requirement for boiler feed make up water are dependent upon pressure at which boiler is operated
 - (iii) Industrial process water-
Suitability of reclaimed water for use in industrial process depends upon particular use like-
 - (a) Pulp and paper
 - (b) chemical industry.
 - (c) Textile industry
 - (d) Petroleum and coal
12. Whenever possible, other end uses of treated effluents; such as recycling, cooling, power generation, etc ... shall be considered.
13. Re-use Options: The following options or re–use of effluent have been identified: In general, public health concern is the major issue in any type of reuse of wastewater, be it for irrigation or non-irrigation utilization, especially long term impact of reuse practices. It is difficult to delineate acceptable health risks and is a matter that is still hotly debated. Potential reuse of wastewater depends on the hydraulic and biochemical characteristics of wastewater, which determine the methods and degree of treatment required. While agricultural irrigation reuses, in general, require lower quality levels of treatment, domestic reuse options (direct or indirect potable and non-potable) reuses need the highest treatment level. Level of treatment for other reuse options lie between these two extremes. The reuse options may be (artificial recharge of aquifers is not permitted):
- i. Irrigation
 - (a) Agriculture and forestry

- (b) Landscaping
- ii. Fish – farming
- iii. Industry
- iv. Non-potable Domestic Reuse:

The detailed project report should clearly define the best reuse option particular to town and strategy to obtain it. Action plan with clarity should be the part of Detailed Project Report (DPR), while preparing sewerage Projects. Before deciding the reuse of treated waste water authority must full fill the water quality norms and its legal implications.

14. Governing local body can sell the treated waste water and digested sludge to generate the revenue.

5.5. On Pricing, Financing and Investment

1. In view of increasing marginal cost of wastewater collection and treatment, wastewater charges, connection fees, sewerage taxes and treatment fees shall be set to cover at least the operation and maintenance costs. It is also highly desirable that part of the capital cost of the services shall be recovered. The ultimate aim is for a full cost recovery.
2. Appropriate criteria in order to apply the "polluter pays" principle shall be established.
3. Different charges for different areas may be applied. This shall be assessed for each geographical area as a function of end uses and effluent quality and will be subject to economic and social considerations.
4. Because of the limited financial resources available to Government of Rajasthan, setting investment priorities in wastewater will be compatible with government investment plans.
5. Criteria for prioritizing investments in the wastewater sector shall take into account the current and future needs of the state, needs to expand wastewater systems in urban areas and to provide wastewater systems to smaller towns and villages.
6. Priorities of wastewater projects shall not be disconnected from water supply projects and urbanization in general. Decisions will be made concerning them to attain optimum solutions to the need for services, availability of finance and availability of trained manpower.
7. Treated effluent shall be priced and sold to end users at a price covering at least the operation and maintenance costs of delivery.
8. It is the intention of the Government, through private sector participation, to transfer management of infrastructure and services from the public to the private sector, in order to improve performance and upgrade the level of service.

9. The role of the private sector will expand with management contracts, concessions and other forms of private sector participation in wastewater management.
10. The concepts of BOO/BOT shall be entertained, and the impact of such concepts on the consumers shall be continually addressed and negative impacts mitigated.
11. The private sector role in reuse of treated effluent shall be encouraged and expanded.
12. As per urban reforms (under various schemes by MOUD) 100% cost of O&M of sewerage system shall be recovered from consumer. The costs will depend on the system/technology adopted for collection of sewerage and treatment and the administration costs. It is important that the full cost of the service is assessed for each urban area instead of adopting a typical cost assessment. The full cost shall cover the following:
 - (i) Institutional aspect of the sanitation service e.g. the management information systems, accountancy and finance management, billing and collection, customer services, etc. and oversight activities.
 - (ii) Operating, maintaining (on a planned maintenance basis), repairing replacing and extending sanitation service physical infrastructure.
 - (iii) Keeping updated infrastructure and customer data on a GIS base.
 - (iv) Managers, staff, vehicles, equipment and consumables associated with above.
 - (v) Consumable like chemicals etc.
 - (vi) Power charges.
 - (vii) Spare Parts.
 - (viii) Any other O&M contract amount

5.6. Source of Funds for Sewerage Project

- (A) In general, implementation of reuse facility requires a substantial capital expenses. In addition to capital cost associated with reclaimed water facility, there are also additional operation, maintenance, and replacement and administrative costs. Hence responsible agencies may consider following **sources of Funds for Construction of Sewerage Project:**
 - (i) 15 paisa Urban CESS presently for Street Light through power bills to include Sewerage projects
 - (ii) Own Source of funds of ULB
 - (iii) Funds Provided by GOI under centrally sponsored scheme
 - (iv) Loan taken by State Government from multilateral international organization

- (v) Loan from NCR/HUDCO
 - (vi) Grant from Central/State Government
 - (vii) Funds deployed by PPP operators
- (B) The urban local bodies are proposed to have following sources for funds for O&M
- (i) User charges :- Sewer charges to be increased to 60% of the water charges to be recovered with water bill and mandatorily to be transferred to ULB within 60 days of recovery. Presently, it is 33% of water bill where sewerage along with treatment facility is provided. Sewer charges may be also be fixed in line with the Ministry's Advisory on tariff structure for urban water supply & sewerage services published in July 2013.
 - (ii) Sale of Certified Emission Reduction (CER)
 - (iii) Sewerage Connection fees
 - (iv) Revenue from sale of treated waste water
 - (v) Revenue from sale of fertilizer
 - (vi) Revenue from sale of bio-gas
 - (vii) Revenue from Sale of electricity generated

The government shall include the provision of the recovery of full capital cost of laying of sewerage system and prorate cost of STP for new colonies in town policy. It shall be mandatory for the ULBs to adhere to minimum 20% reuse and recycling of treated waste water. The treated waste water may be sold at a rate as decided by adopting transparent procedure as per Rajasthan Transparency in Public Procurement (RTPP) Act for market rate or as decided by State Government. The base tariff for treated waste water shall be 50% of drinking water supply tariff in case of industrial/commercial reuse and Rs. 3.00 per thousand liters increasing at the rate of 10% per annum, in case of agriculture/horticulture/fishery/landscape reuse. Untreated Waste Water may be sold to buyer for appropriate treatment by installing Sewage Treatment Plant by him as per Central Pollution Control Board (CPCB) requirement so as to reuse treated waste water, at the rate 50% of treated waste water tariff mentioned as above. Urban Local Bodies can issue letter of intent (LoI) accordingly. No untreated waste water without appropriate treatment shall be disposed/Reuse/utilized for any purpose.

5.7. (A). Sewerage Project Through Public Private Partnership (PPP)

1. Requirement of funds to meet the establishment of infrastructure for reuse of sewage after necessary treatment cannot solely be met by budgetary resource from Government and urban local bodies. To attract private investment and to leverage its efficiency and to provide quality treatment facility and services at an optimal cost, an enabling policy and institutional mechanism would be developed
2. Viability Gap funding:- GOI provide 20% viability gap support for PPP projects to the extent of 20% of project cost. State would also provide additional viability gap funding up to 20% of the project cost
3. PPP/Revenue Sharing operator may propose to build a waste-water recycling and reuse plan along with associated sewerage network on Design-Build-Finance-Operate-Transfer (DBFOT) basis or any other methodology of PPP/ Revenue Sharing option. The PPP partnership can be sought through Swiss Challenge Method of Procurement as per approved guidelines of GoR. The concession period may be high up to 30 yrs. The Rajasthan Transparency in Public Procurement (RTPPP) Act should be followed.
4. *The Swiss challenge system involves an unsolicited proposal for a government project, which allows third parties to challenge the original proposal through open bidding, and then lets the original proponent counter-match the most advantageous / most competitive offer. Under the Swiss Challenge Method, the project proponent that had first submitted the proposal for the development of the project, based on which the project was conceived and developed, is given the first right of refusal to match the most advantageous/most competitive bid received in the competitive bid process for the said project.*
5. Revenue sources for PPP/ Revenue Sharing operator:-
 - (i) Sale of reclaimed water
 - (ii) Sale of CER
 - (iii) Sale of Electricity/Biogas/REC (Renewable Energy Certificate)
 - (iv) Fertilizer
6. A provision of 20% of treated waste water may be made for re use by retail consumers with further bifurcation as follows:
 - (i) 10% to small farmers as per rate decided by GoR.
 - (ii) 10% by auction for big entities for individual and landscaping purpose.

7. Criterion for Selection of PPP/ Revenue Sharing operators: One or combination of following criteria may be adopted for PPP operator selection through competitive bidding, The Rajasthan Transparency in Public Procurement (RTPP) Act should be followed.
- (i) Lowest bid in terms of user fee from consumers
 - (ii) Royalty paid to ULB per Kl of treated waste water.
 - (iii) Highest upfront fees
 - (iv) Lowest present value of subsidy.
 - (v) Lowest capital cost and O&M cost for projects.
 - (vi) Highest equity premium
 - (vii) Quantum of state's support solicited in present value.
8. Incentives and Concessions proposed to PPP/Revenue sharing operator for setting up of STP for Reuse/Recycling of treated waste water
- (i) Land to PPP operator will be given on lease as per rules.
 - (ii) Reimbursement of 50% of amount of VAT paid on purchase of plant and machinery or equipment for a period up to 7 years, on investment of Rs. One Crore or more
 - (iii) Exemption from payment of 50% of electricity duty for 7 years
 - (iv) 50% exemption from payment of entry tax, on capital goods brought in to local areas before the date of commencement of commercial production, on investment of Rs. One crore or more
 - (v) Exemption from excise duty on pipes and treatment equipment for making waste water fit for agriculture and industrial use as per GoI. Notification no. 3/2004-CE dt. 08.01.2004 as amended from time to time: exemption to all items of machinery and their components/ parts and pipes required for setting up of water supply plants.
 - (vi) The sewerage projects financed by external organization will be exempted for excise and custom duty as per GoI notification excise 108/95 CE dt. 28.08.1995 as amended from time to time. Custom: 84/97 customs 11.11.97 as amended from time to time.

5.7 (B). Sewerage project through Hybrid Annuity based PPP Model

The projects, existing as well as new of Sewage Treatment Plants can be taken on Hybrid Annuity Based PPP model (HAM). The HAM is a mix of engineering, procurement and construction (EPC) and build-operate-transfer (BOT) formats, with the government and the private companies sharing the total project cost in the ratio of 40:60 respectively. This model

will reduce financial burden on the concessionaire during project implementation phase. The model will include the following

1. Concession period as well as payment period shall be 15 years
2. 40% of total payment shall be made after completion of the Sewage treatment plant. The remaining 60%, which shall include operation and maintenance costs and the assured profits, shall come in the form of fixed annuities.
3. The concessionaire shall be selected through competitive process based on Rajasthan Transparency in Public Procurement (RTPP) Act
4. PPP operator shall be eligible for incentives and concessions as mentioned in 5.7.(A).8

5.8. On Standards, Regulations and Quality Assurance

1. Particular attention shall be focused on adopting and enforcing effluent and sludge standards for municipal and industrial wastewater treatment plants and for discharges from industries, laboratories, hospitals, slaughterhouses and other businesses.
2. Extensive and comprehensive monitoring programs shall be developed. Influent to and effluent from the plants and throughout watercourses shall be measured and monitored against all appropriate parameters to ensure that public health objectives and treatment efficiency goals are attained.
3. All crops irrigated with treated or mixed waters shall be analyzed and monitored periodically.
4. Observation wells shall be installed near the treatment plants to monitor groundwater quality where necessary, and to mitigate adverse impacts where and when needed.
5. Data collected from the monitoring process shall be entered and stored, processed and analyzed through computer software, and results published periodically.
6. Roof and storm water connections to public sewers shall be prohibited. Collection of storm water shall be done separately and will be the subject of water harvesting.
7. Effluent and sludge standards for the disposal of hazardous liquid wastes shall be defined to ensure the safe disposal of such wastes.
8. RSPCB/ CPCB regulations for disposal norms shall be mandatory.
9. Industrial waste water is not allowed to be disposed off in the sewer line. ULB can issue notification for penalties to be imposed on the such industrial units.
10. Laboratories shall be maintained and properly equipped to provide services and reliable data needed to ensure enforcement of and adherence to standards and regulations.

5.9. On Legislation and Institutional Arrangements

1. Legislation and institutional arrangements for the development and management of wastewater shall be periodically reviewed. Gaps shall be filled, and updating of the institutional arrangements with parallel legislation shall be made periodically to cope with varying circumstances and for this government shall notify an agency giving full power to take necessary action in this matter.
2. The role of the Government shall be fine-tuned and its involvement reduced to be regulatory and supervisory. Involvement of the stakeholders in wastewater management and support shall be introduced and expanded.

5.10. On Public Awareness

- a. The public shall be educated through various means about the risks associated with the exposure to untreated wastewater and the value of treated effluents for the different end uses.
- b. Programs on public and farmer's awareness shall be designed and conducted to promote the reuse of treated wastewater, methods of irrigation, handling of produce. Such programs shall concentrate on methods of protection of farmers health, animal and bird health and the environment.
- c. Public awareness campaigns shall also be waged to educate the public on the importance of domestic hygiene, wastewater collection, treatment and disposal.
- d. It is observed that the system is dependent on the appreciation of the beneficiaries to the advantages and importance of the system to them and thereby working together towards making it successful. The co-operation is vital for following areas:
 - i. Protecting the system from getting choked due to entry of extraneous material in the sewer system. A vigilant public will help prevent this.
 - ii. The sewerage system yield full benefits or disease protection when there is 100% connectivity.
 - iii. It is important that the beneficiaries appreciate the benefits and pay for their upkeep. The systems require proper upkeep and the cost associated with maintenance and upkeep should at least be recovered from the beneficiaries. The principal of the polluter pays will be adopted only by an enlightened and participating public.
- e. A conscious campaign has to precede the planning and implementation of the sewerage Systems. ULB, Non Government Organizations and local neighborhood committees could give the process a thrust.

- f. A public participation process will not only aid in identifying potential consumers but also serve as a public education program. Potential users will be mainly concerned with the quality of reclaimed water and reliability of its delivery and the constraints in using reclaimed water. Also, connection costs or additional sewerage treatment cost might affect their ability to use the product. Consultations with various stake holders will aid in structuring of tariff and discounts for adopting reuse technologies, awareness on dual piping system, water conservation and safety issues.
- g. In chapter XII of Rajasthan Municipality Act 2009, there are mandatory provisions of taking sewer connections and penalty provisions against defaulters under section 202, 203, 204, 208, 214, 222 and 259. Municipal authorities must use these provisions and ensure 100% sewer connections.
- h. Municipal Bodies should decide and pass resolution regarding sewer connection charges. The provision should be widely publicized
- i. Series of 'Sewer connection camps' may be organized. The time and venue should be publicized widely to inform residents. The days, time and venue should be to suit the convenience of public.
- j. Ensure that all Government offices and schools are connected.

5.11. On the Human Resources Development & On Research and Development:

1. Capabilities of human resources in the management of wastewater shall be enhanced through training and continuous education. Work environment shall be improved and incentives provided.
2. Establishment of State Water & Waste water Training Center at state level. It will help in training of human resources in this sector.
3. Human resources performance will be continually appraised in order to upgrade capabilities, sustain excellence and provide job security and incentives to qualified individuals with excellent performance.
4. Applied research on relevant wastewater management topics shall be adopted and promoted. Topics such as the transfer of wastewater treatment technologies, low cost wastewater treatment technologies, reduction of energy consumption and others will receive adequate support.
5. Cooperation with specialized centers in the country and abroad shall be advanced, and raising of funds for this purpose shall be supported.

6. Transfer of appropriate technology suited for local conditions will be a primary target for the development activities and for adaptive research.

5.12. On Selected Priority Issues

1. To the extent that design capacities of wastewater treatment plants permit, priority of collection and house connections shall be accorded to expansion of urban areas served by treatment facilities. Users willing to contribute to the cost of the services in addition to fees and charges set by laws and regulations shall also be given priority.
2. Where design capacities of treatment facilities and of conveyance systems are approached or exceeded, priority shall be given to the expansion of such capacities.
3. Priority shall be accorded to situations and locations where waste-water disposal practices threaten the environmental integrity of freshwater resources, and where performance of cesspools and percolation pits pollute underground water aquifers.

5.13. On Service Level Benchmarks & Implementation Plan

1. It is intended to achieve the following bench marks in the cities as per priority as above:

S.No.	Propose Indicator	Benchmark
1	Coverage of toilets	100%
2	Coverage of sewage network services	100%
3	Collection efficiency of sewage network	100%
4	Adequacy of sewage treatment capacity	100%
5	Quality of sewage treatment	100%
6	Extent of reuse and recycling of sewage	20%
7	Efficiency of redressal of customer complaints	80%
8	Extent of cost recovery in sewage treatment	100%
9	Efficiency in collection of sewage charges	90%

2. Action Plan: It is envisaged to achieve service level benchmarks described as above in a time frame. Subject to availability of funds the time frame shall be as below :

CITY	Time Frame starting year 2016-17
District Head Quarter	5 years
National Capital Region , NCR Towns	
Heritage town	
Cities having coverage less 100%.	
Water Supply level more than 135 lpcd	
Cities with population above above 1 lac	
Cities with population above 0.5 lac less than 1 lac	10 years

CITY	Time Frame starting year 2016-17
Cities with population below 0.5 lac	15 years
Reuse	
100% Reuse of existing STP	3 years
New STP	120 days after commissioning
Property Connection	
(i) Where system is already commissioned 100% connection.	Within six months.
(ii) New Networks 100% connections	Within 90 days of commissioning

3. The sewerage projects shall be executed by Urban Local Body or any agency authorized by them. RUIFDCO (Rajasthan Urban Infrastructure Finance and Development Corporation)/ its successor company will act as SLNA (State Level Nodal Agency).

ANNEXURE 1

Vital Information & Suggestions on Sewerage System

1. **Urban sanitation scenario:** A report by MoUD-GoI was formulated based on Swachh Bharat Rankings. Under this survey, 476 class -1 cities in 31 States and Union Territories, each with a population of above one lakh, were surveyed during 2014-15 under the National Urban Sanitation Policy, for assessing total sanitation practices covering a set of parameters including the extent of open defecation, solid waste management, septage management, waste water treatment, drinking water quality, surface water quality of water bodies and mortality due to water borne diseases etc.

In case of Rajasthan, Jaipur was able to make it to the rank of 370, followed by Ajmer at 401 and Udaipur at 417. No city from the state was able to secure position in the top 300 rankings under the survey. The following table presents a summary of the findings of the survey.

Key indicators for urban sanitation status for the state of Rajasthan as compared to national level

	Indicators					Sanitation Ranking (National Urban Sanitation Policy) No. of cities			
	Piped Sewer system (%)	Sewage Treatment (%)	House hold having Toilet Facility within Premises (%)	Community Toilets (%)	Open defecation (%)	Total	Red	Black	Blue
India	32.70	30.00	81.40	6.00	12.60	423	229	190	4
Rajasthan	30	18.00	70.00	2.00	28.00	19	16	3	0

2. The physical Infrastructure required to be planned can be broadly classified as:
- (i) **A sewerage system:** Including the onsite disposals system, network of pipes that collect sewage from domestic, institutional, commercial and industrial premises and the collector and interceptor sewers and possibly pumping stations that convey the sewage to treatment plant. Storm water and industrial waste water shall not be allowed in the Sewerage system. Heavy penalties is to be imposed on the industries discharging industrial waste water in the sewerage system. Industries should make separate arrangement for treatment of Industrial waste water.
 - (ii) **Treatment plant:** Where the quality of the sewerage is improved for its safe disposal or reuse. The sludge generated by the sewage treatment process is also

normally processed at the plant for safe disposal and reuse. Treatment plants must have disinfection unit and treated waste water shall not be allowed to discharge/ reuse without disinfection to eliminate the pathogens present in the treated waste water. In each STP (proposed and existing) about 100 m- 200 m distance be declared as exclusion zone and in this zone thick plantation is to be done and priority is to be given to indigenous plants.

- (iii) **Effluent disposal facilities:** For conveying the treated liquid effluents to the point at which they are either safely disposed of into the ground or to a body of water – a water course or lake or to a point where they are directly reused in agriculture, fish farming, forestry, industry or planned reuse site. The disposal in the water body shall be taken up only when other options are not feasible/ appropriate.
 - (iv) **Sludge disposal:** By means of which liquid, semi-solid or dried sludge are transported to the point where they are either safely disposed to sanitary landfill or recycled, principally for use in agriculture. It shall be ensure that there shall be no crude dumping of STP sludge as it may create unhygienic and anesthetic conditions. Adequate processing of sludge must be carried out before disposal.
3. The proposed systems should satisfy the following:
- (i) Satisfy its purpose based upon appropriate technology.
 - (ii) Will respond to environment and social concerns.
 - (iii) Will generate a satisfactory rate of return.
 - (iv) Be both sustainable and affordable.
4. The sewerage system is designed for well into future (generally 30 years) consisting of one or more outfall sewers, trunk sewers and laterals generally operating by gravity, but with force mains and pumping stations where required. The systems are to be designed on separate system to accept the domestic waste including sludge but excluding any rain water and industrial waste as acceptable. The house collection system should be designed so as to achieve this. Households sludge connectivity should be ensure for smooth functioning of the STP. Awareness program should be planned for households sewer connection.
5. Both the alternatives (i) centralized system and (ii) decentralized system should be evaluated before deciding type of system. Where funds are restricted or for smaller towns based on possible re-use of treated waste- water decentralized approach may be adopted.
6. The system is beneficial when all the premises are connected to the system and there is no waste water flowing in the drains. The service lines to connect the house connections to the sewer system should be laid along with the laying of the sewers up to the boundary of the premise and plugged so that it can be extended by the premise owner within his premise.
7. The surface drains should not be connected to the sewer systems as they also carry rain water, solid wastes and silt which tend to choke the sewers.

8. The program of construction of the sewerage systems especially in the existing inhabited colonies should be made very carefully. Any systems that are laid but not commissioned are prone to be filled up by dirt and solid waste. This is likely to make the commissioning very difficult at a later date.
9. It is desirable to start from the downstream end of the out fall and commission it. The trunk mains should be taken up after this and commissioned as the work progresses. The laterals that get connected to the commissioned sections of outfall/trunk sewers only should be laid.
10. The construction program for the STP and sewer network should be planned and executed in such a fashion so that both of these get commissioned at the same time.
11. It is generally not possible to take up work for the whole city at once and the work may have to be prioritized. A method of prioritizing can be:
 - (i) Population of area
 - (ii) Areas where lack of sewer system is creating insanitary living conditions or unacceptable odor levels, e.g. areas with a high population density and no drainage system or found with low permeability adversely affecting septic tank soak ways.
 - (iii) Areas with high groundwater level requiring the use of cess-pools and so where frequent emptying of the tanks is either impractical or extremely costly.
 - (iv) Area where the quality of the ground water is adversely affected by septic tank effluent and ground water is a source of drinking water or discharges in a polluted state to a water course.
 - (v) City Centre, commercial Centre etc.
12. In general pumping stations are to be avoided on the sewerage systems to the extent possible because of the additional costs involved in construction and operation. They have to be installed if the design so requires. Now a properly designed and constructed pumping system can give trouble free service. The pumping stations can be suitably automated for better operation.
13. During construction full care needs to be taken for diverting traffic and for fencing and safety of the excavation sites. The provisions for properly supporting the trenches should be taken. Special care should be taken for ensuring proper backfill and immediate repair of the roads after the work is completed.
14. The most common form of installing sewer is open excavation of trenches or open cut. This method has limitations on account of depth that can be handled, time taken and the disruption of the services of the concerned street for the work period. Usually this method is not feasible beyond 5-6 m depths. Alternative techniques of trench less technologies involving tunneling and micro tunneling are used for laying sewers where open cut is not feasible on any of the above counts. This procedure though prevalent in developed countries, is not common in

India, but should be considered as an alternative where the situations warrant. The techniques of thrusting pipes in ground can also be used in specific cases.

15. Laying sewer and water pipelines & road restoration
 - (i) In case water supply line or sewerage is to be carried out in the same street, the work of water supply line or sewerage should be done first and the road work be done after they are completed to avoid damage to the road once constructed.
 - (ii) If both the work of sewerage and water supply pipelines is to be carried out in a street, it should be ensured that both the works are carried out at the same time to ensure that the road is not disturbed two times.
 - (iii) The issue of relative placement of the water line and sewer line in relation to possibilities of pollution should also be paid attention. For that horizontal and vertical separation should be followed with the provision in Manual.
 - (iv) Where the laying is being completed under a road, backfilling and compaction should be done as per specifications. If excavated area has a road pavement, it should be finished at top with a road pavement of the same standard and specifications as the existing pavement. It is desirable to use mechanical compaction devices for ensuring proper compaction and to avoid sinking of the repaired pavement.
16. Sewer network has not been utilized/remain under-utilized in the cities where sewerage facility is available. A large number of households are not connected to sewerage network resulting in prevalence of problems of sanitation, health and hygiene. Hence steps has to be taken at local level for utilization of network.
17. For more effective and quicker utilization of sewerage network created/under creation, greater participation of residents of the city is required. Following steps may be taken to connect every house hold with sewerage network:
 - (i) Information, Education and communication (IEC) activities to be carried out to interact with citizens to convince them to take sewer connection. IEC activities may be taken up using newspapers, cinema slides, Nukkad Natak, Radio, SMS, Facebook, Twitter, Audio-Viedo clips, Films on local cable network etc.
 - (ii) NGOs working in this field and volunteers may be engaged to motivate people to take sewer connections. Children and Schools may provide excellent motivation tool. Competition at school/community level may be held to provide enthusiasm to carry out this activity.
 - (iii) The plumbers of the city may be enlisted. Workshop of Plumbers must be carried out to train them to carry out sewer connections, without doing any damage to sewer network and connecting waste water of Bathroom, Kitchen and Toilet in proper fashion to avoid any problem of choking.

- (iv) A tentative estimate for joining the system of house to sewer line after categorization of houses in different categories such as A, B, C.... based on requirements should be prepared by Municipal Body and must be provided to residents so that there may not be overcharging incidences by the plumbers.
- (v) In order to have proper functioning of sewerage, residents should be educated so that solid waste must not find access to sewerage system. The kitchen and bathroom should be provided with mesh.

18. Septage collection and treatment

Septage generation rates vary widely from place to place depending on septic tank use practices, number of users, water used for flushing, efficient functioning of tank and contamination control. It can be considered that the volume of sludge evacuated from a septic tank corresponds more or less to the volume of the septic tank, plus some cleansing and rinsing water. Septage is highly concentrated and therefore needs more care in handling and management.

- (i) Guidelines for selecting septage management initiatives:

Effective technologies shall be selected based on local needs. It is suggested to pilot a few septage management service initiatives with appropriate tools of process monitoring to further refine and develop an effective model for septage management at state level. Effective management system shall be established to monitor the collection, transport, treatment and disposal of septage. The following table presents the guidelines for selecting septage management initiatives.

Guidelines for selecting treatment and disposal options and financing norms for septage

Town Category	Conditions	Recommended technologies	Capital cost	O&M cost	Facility ownership	Financing Norms
Un-sewered Class-III, IV and V towns and Rural communities	Remote land parcels available with suitable site and soil conditions	Land application of septage	Low	Low	Municipality or private	Fees to users
	Land available but not remote	Land application after stabilization	Low to medium	Low to medium	Municipality or private	Fees to users
	Inadequate land area available with suitable site and soil condition, WWTP available within 30km with adequate capacity	Disposal at WWTP	Low to medium	Low to medium	Municipality	Fees to users
Partially sewerer medium size (Class-II towns)	Land area available with suitable site and soil condition but close to settlements	Land applicable after stabilization	Low to medium	Low to medium	Municipality or private	Fees to users
	Inadequate land area, but available WWTP	Disposal at WWTP	medium	medium	Municipality or private	Fees to

	capacity					users
	Inadequate land area, no WWTP capacity available	Disposal at independent treatment facility or CSTF*	High	High	Municipality or private	Fees to users
Class-I and metro-cities	Available WWTP capacity		medium	medium	Municipality or private	Fees to users
	No WWTP capacity		High	High	Municipality or private	Fees to users
*Common septage treatment facility						
Source: Compiled by centre for science and environment						

19. Operation & Maintenance

- (a) Operation and maintenance should be carried out in accordance with the provisions of CPHEEO manual for O&M as amended time to time. It is important to plan for the proper operation and maintenance of the assets created for sewerage disposal. Operation and maintenance should be carried out in accordance with the provision of CPHEEO manual for O&M period of minimum 10 years. Dedicated fund should be provided/planned for proper operation and maintenance of sewerage system and STP.
- (b) The important inputs for proper upkeep of the systems are a proper institutional arrangement for overseeing the work, appropriate technical back up, adequate funds, and active cooperation of an enlightened beneficiary public. A monitoring committee/vigilance committee should be constituted to monitor the waste water and storm surface water. A toll free number for helpline proposes should be created for public grievances.
- (c) Most often there will be lack of technical know-how and experience for operating the systems which are fairly sensitive and require professional attention. The O&M component of the contract can be for 10 years. The responsibilities should be clearly defined in the contract..
- (d) Procurement of suitable equipment for ensuring proper maintenance like jetting machines, vacuum tankers, high power suction machines, sewer rods, bucket cleaning machines, etc..
- (e) Possibilities may be explored for Operation and maintenance on basis of cluster approach of urban bodies for using the facilities jointly and saving on investment.
- (f) Funds for O&M:
The cost involved in running the plant, transportation of the raw sewage etc makes the system in loss. The present practice is that the sewage collected at STP is released in natural drains or rivers which make them highly polluted affecting the human

health downstream of the point of sewage in river. This makes it necessary to treat the water to extent it can be utilized for irrigation, Industrial or other purpose. Treatment to tertiary level also involved additional cost. Local body will plan to generate funds for O &M.

The tariff for domestic, industrial and irrigation water may be increased so that the reclaimed water becomes competitive or cheaper than the normal water. Local body may provide information on quarterly basis regarding quantum of treated wastewater available including long term availability especially in areas which have been declared notified/over-exploited by Central Ground Water Authority (CGWA), so that interested parties/Departments can make an application for reservation of treated waste water.

20. The Municipal Bodies should take into confidence all the stake holders and frame a suitable micro level policy for the sewerage disposal system within the guide lines stipulated in the State Policy and taking into account the local ground level realities. They should take advice from professionals for understanding the options. Such a Policy can include at municipal level:

- (i) Physical Targets for Sanitation Coverage with a view of assigning time schedule and setting priority for covering various parts of the city.
- (ii) The standard of the service level that may be targeted and should be achieved by regular efforts.
- (iii) Effluent disposal standards can be fixed earmarking sites for sewage treatment facilities. Identification of effluent disposal options and sites.
- (iv) If more than one municipality can be gainfully combined for the system, identifying the options and working for such an agreement.
- (v) Identifying and laying down the targeted recycle/reuse option of the effluent and sludge.
- (vi) Recognition of the principle of "the polluter pays" i.e. recovery of the financial liabilities being undertaken for the system.
- (vii) User to involve in participation for creation of fund for capital work.

21. Proposals for commercial or industrial development may be permitted, subject to:

- (i) The overall objectives of the policy not being compromised, and
- (ii) The statutory authority being satisfied after considering the advice of consultative authorities that intended wastewater disposal arrangements are acceptable.

22. Design framework for service level improvement

Each ULB shall prepare Service Level Improvement Plans (SLIPs), to cover all households with sewerage (including Septage). These plans shall be prepared for next 30years with short term, medium term and long term plans.

The detailed project Reports (DPR) for sewerage and Septage management shall be prepared as per best engineering practices, socio-economic consideration and guidelines widely acceptable. However, the units which can be developed in modules (e.g. Sewage Treatment Plants, Pumping Stations, On-sites Treatment Facilities, Septage Management etc.) may be designed for appropriate shorter period as stipulated in CPHEEO manual.

23. References For Design Of Sewerage System

The sewerage system and its appurtenances will be designed and implemented as per the guidelines laid out in the "Manual on Sewerage and Sewerage Treatment" latest edition published by the Central Public Health and Environmental Engineering Organization (CPHEEO), Ministry of Urban Development, Government of India following the latest developments in the industry and good engineering practices and National Sanitation Policy by GoI.

The details regarding the various Treatment Plant Process are available in the "Manual on Sewerage and Sewage Treatment (latest edition)" published by CPHEEO under direction of the Ministry of Urban Development, GoI and Guidelines of Principal Secretary, UDH & LSG, GoR.

PPP MODELS FOR CONSIDERATION:

(A) Re-Use for Irrigation/ Agriculture

Choice of sewage treatment technology

Following effluent standards may be adopted:

BOD	<	10 mg/l
COD	<	100 mg/l
TSS	<	10 mg/l
Total Nitrogen	<	20 mg/l
Total Phosphorus	<	5mg/l

Other parameters to be decided by the local authorities as per site condition with the consultation of experts.

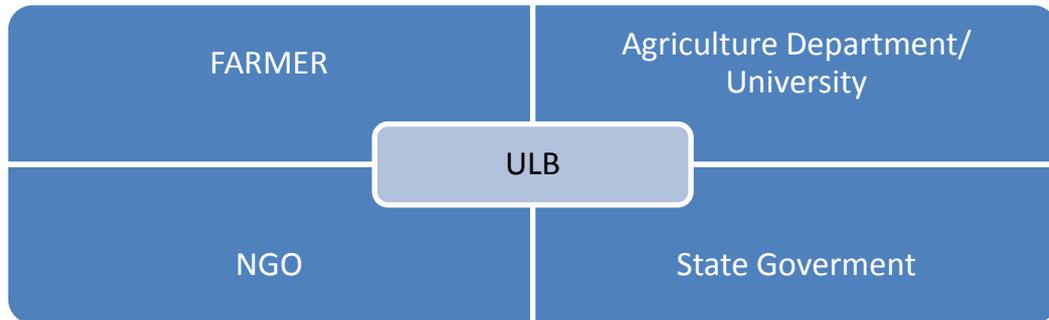
(i) Choice of Irrigation System: Automatic Micro Irrigation (saves water more than 50%, increase in yield by more than 50% and saving in labor by 100%)

Micro-controller based Drip Irrigation system: Drip irrigation is a method that saves water and fertilizer by allowing water to drip slowly to the roots of plants. Automatic micro controller based drip irrigation system ensures that the irrigation take place only when there is requirement of water. The components of micro controller based drip irrigation system include Flow Meter, Control Valve, Chemical Injection Unit, Drip lines with Emitters, Moisture and Temperature Sensors and Micro controller Unit etc.

(ii) Modality to carry out

The stake holders for a successful micro-irrigation by treated waste water are

- (1) Urban Local Body: owner of treated waste water providing treated waste water to consumer and collecting revenue for it.
- (2) Farmers: User of treated waste water and paying
- (3) Agriculture University/Dept.: Knowledge hub for choice of crop, application of fertilizer and other considerations and techniques to achieve high production for the benefit of farmer.
- (4) GoI/GoR: providing subsidy for drip irrigation systems in various schemes including National Mission for Sustainable Agriculture (NMSA)
- (5) NGO: For IEC and co-ordinating among all stakeholders.



(iii) For new projects

Urban Local Body within the scope of STP shall construct an overhead treated waste water tank with required capacity, with minimum 22m staging to create a head sufficient enough for water transmission for micro-irrigation purpose. The treated waste water is to be pumped from underground treated waste water sump (one hour capacity)/as required, by installation of required capacity pump sets with inbuilt starters in main panel. The work up to outlet of treated waste water overhead reservoir shall be the part of STP work. **For Existing/ under construction STPs** the above work can be taken up through Turn- key Contractor/ **Revenue Based Management Contract (RBMC)** operator.

The proposed micro-irrigation project shall have two parts:

- (1) ULB part: mains , submains, flowmeters, valves and other equipments to provide treated waste water upto the inlet of field of farmer.
- (2) Farmer's part: field in which he shall install microcontroller based drip irrigation system to get maximum yield in minimum water.

Urban local body will invite tenders on 'Revenue Based Management Contract' basis for development of microcontroller based drip irrigation system. The scope of RBMC operator includes

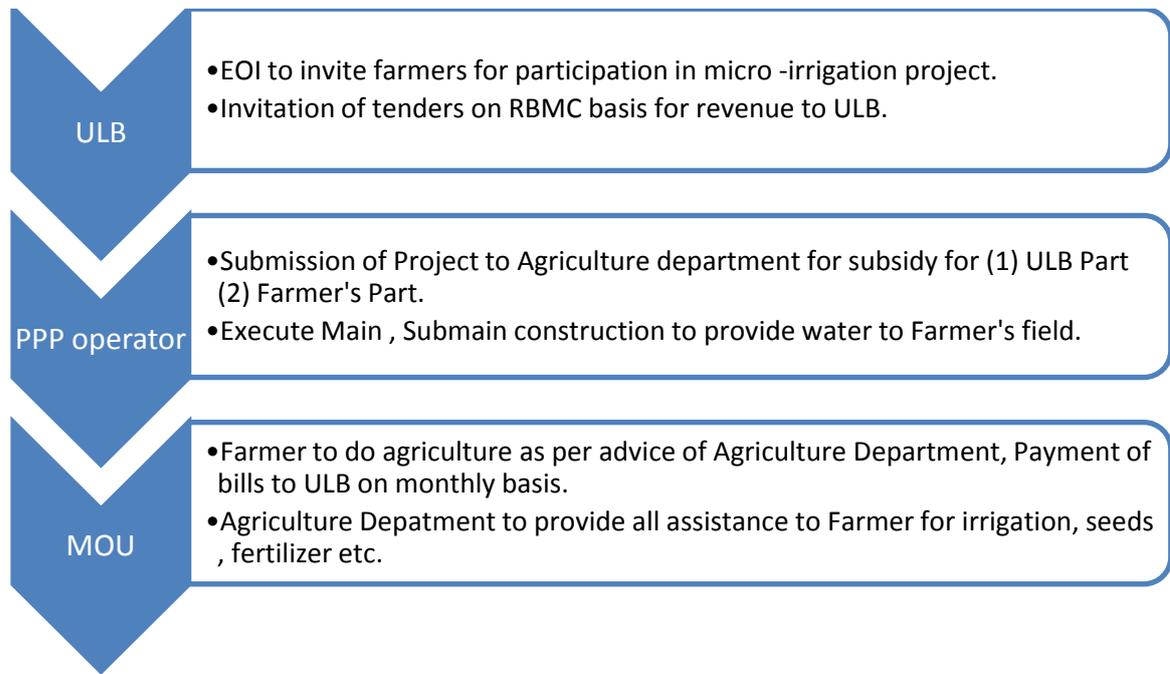
- (1) Design and submission of complete project to Agriculture department, as per its guidelines, in the name of ULB to claim subsidy for ULB and assist farmers to claim subsidy, for installation of micro-irrigation project.

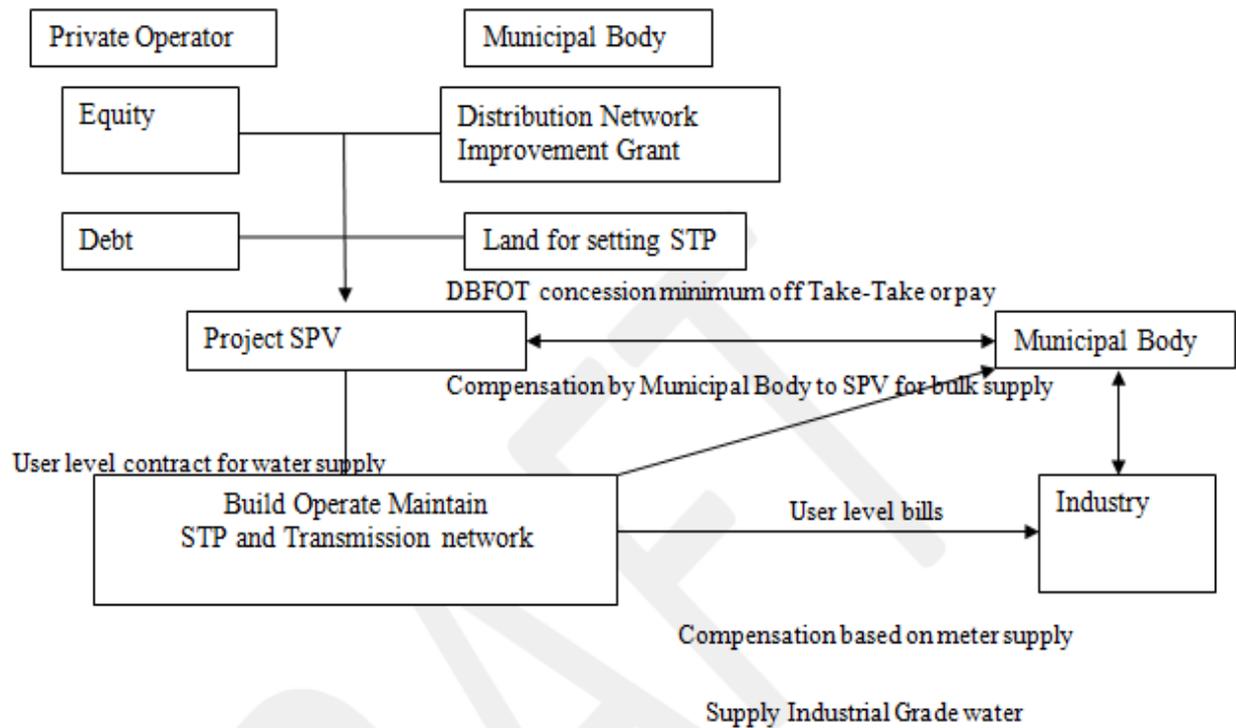
- (2) After approval of the project from GoR, RBMC operator shall deposit required amount to ULB to be deposited to GoR to claim the subsidy in the name of ULB for main, sub-main part of micro-irrigation project.
- (3) For subsidy to individual farmer RBMC operator shall assist farmer to complete formalities so that he may deposit the difference amount to GoR to claim subsidy for his field.
- (4) Bear all the capital cost as well as recurring cost as required for the successful functioning of micro-irrigation system on ULB part.
- (5) Installation of main-submain of required size to provide treated waste water at the inlet point of each field.
- (6) Install and maintain flow meter at each outlet i.e., inlet point of field.
- (7) Collect revenue as per bill bimonthly.

The subsidy claimed by ULB for mains and sub-mains including equipment's shall be transferred to RBMC operator as per progress of the work. The concessionaire shall be the bidder who shall provide maximum revenue to ULB in lieu of treated waste water per kl but not less than Rs. 3.00 per kl. The concession period may be 10 years to coincide with O&M period of STP.

Before inviting tenders on RBMC basis ULB shall invite EOI from farmers for their participation in micro-irrigation. This will help in identifying farmers and their field area necessary for assessment by RBMC operator. An NGO may be appointed by ULB for encouraging farmers to participate in micro-irrigation project. The interested farmer will be assisted in preparation of individual project by RBMC operator to claim subsidy from GoR for installation of Microcontroller based drip irrigation system in their fields. Farmer has to sign a MOU with ULB, RBMC operator and Agriculture University to do agriculture as per the advice of Agriculture department / University so as to achieve maximum yield from his field.

Agriculture University/ Department shall provide training to farmers including continuous expertise and guidance for requirement of watering, fertilizer, soil condition, type of crop, seeds etc., so that farmer may get maximum benefit out of micro-irrigation project.



(B) Reuse for Industrial Purpose

All assets of the Project SPV to be transferred to Municipal Body at the end of the Concession Period.

DBFOT : Design Build Finance Operate Transfer

ANNEXURE-2:

Status of Sewerage and Water Supply in Rajasthan

S. No.	Name of ULBs	Population		Name of the Schemes/program ongoing/Sanctioned *Proposed	% Coverage				Population Benefitted (year 2011)				Population benefitted (year 2016)
		As per Census 2011	Present 2016		Existing	After completion of ongoing /sanctioned projects JnnURM/UIDSSMT /RUIDP Ph1,2,3/State Fund/Own Resource	In proposed project *	Total	Existing	After completion of ongoing /sanctioned projects JnnURM/UIDSSMT/RUIDP Ph1,2,3/State Fund/Own Resource	In proposed project *	Total	
1	MAKRANA	116295	127808	State Fund, RUIDP Ph IV*	0%	70%	30%	100%	0	81407	34889	116295	127808
2	BASWARA	101017	111018	State Fund, RUIDP Ph III & RUIDP Ph IV*	0%	80%	20%	100%	0	80814	20203	101017	111018
3	HANUMANG ARH	150958	165903	UIDSSMT Ph I, RUIDP Ph III, AMRUT*	0%	90%	10%	100%	0	135862	15096	150958	165903
4	JAIPUR	3046163	3347733	JDA, JMC, RHB, RIICO, JnNURM, RUIDP Ph I, Smart city*, AMRUT*	80%	2%	18%	100%	2436930	60923	548309	3046163	3347733
5	JODHPUR	1056191	1160754	JoDA, JoMC, RUIDP Ph I, UIDSSMT Ph I, AMRUT*	60%	20%	20%	100%	633715	211238	211238	1056191	1160754
6	KOTA	1001694	1100862	RUIDP Ph I, UIDSSMT Ph I, NRCB, Smart city*, AMRUT*	10%	48%	42%	100%	100169	480813	420711	1001694	1100862

7	BIKANER	644406	708202	RUIDP Ph I, UIDSSMT Ph I, RUIDP III, AMRUT*	30%	50%	20%	100%	193322	322203	128881	644406	708202
8	AJMER	542321	596011	RUIDP Ph I, JnNURM, Smart city*, AMRUT*, NRCB*	40%	30%	30%	100%	216928	162696	162696	542321	596011
9	UDAIPUR	451100	495759	UIT, NLCP, Smart city*, AMRUT*	10%	10%	80%	100%	45110	46463	359527	451100	495759
10	ALWAR	322568	354502	RUIDP Ph II, AMRUT*, NCRPB*	15%	40%	45%	100%	47514	129027	146027	322568	354502
11	BHARATPUR	252838	277869	RUIDP Ph II, AMRUT*, NCRPB*	0%	18%	82%	100%	0	45511	207327	252838	277869
12	DHOLPUR	133075	146249	RUIDP Ph II, AMRUT*	0%	90%	10%	100%	0	119768	13308	133075	146249
13	S.MADHOPUR	121106	133095	RUIDP Ph II, AMRUT*	29%	0%	71%	100%	35121	0	85985	121106	133095
14	CHURU	120157	132053	RUIDP Ph II, AMRUT*	0%	51%	48%	99%	0	61280	57675	118955	130732
15	CHITTORGARH	116406	127930	RUIDP Ph II, AMRUT*	0%	21%	79%	100%	0	24445	91961	116406	127930
16	NAGAUR	105218	115635	RUIDP Ph II, AMRUT*	0%	19%	72%	91%	0	19991	75757	95748	105227
17	BUNDI	104919	115306	RUIDP Ph II, AMRUT*	0%	5%	78%	83%	0	5246	81837	87083	95704
18	BHILWARA	359483	395072	RUIDP Ph II, AMRUT*	0%	80%	20%	100%	0	287586	71897	359483	395072
19	KISHANGARH	154886	170220	UIDSSMT Ph I, AMRUT*	0%	14%	86%	100%	0	21684	133202	154886	170220
20	SHRIGANGANAGAR	237780	261320	State Fund, RUIDP III, AMRUT*	0%	80%	20%	100%	0	190224	47556	237780	261320

21	PALI	230075	252852	UIDSSMT Ph I, RUIDP III, AMRUT*	0%	80%	20%	100%	0	184060	46015	230075	252852
22	TONK	165294	181658	RUIDP III, AMRUT*	0%	80%	20%	100%	0	132235	33059	165294	181658
23	JHUNJHUNU	118472	130201	UIDSSMT Ph I, RUIDP III, AMRUT*	0%	80%	20%	100%	0	94778	23694	118472	130201
24	BHIWADI	104921	115308	AMRUT*, NCRPB*	0%	0%	100%	100%	0	0	104921	104921	115308
25	BEAWAR	151152	166116	AMRUT*	0%	0%	100%	100%	0	0	151152	151152	166116
26	GANGAPURCI TY	119090	130880	AMRUT*	0%	0%	63.7%	64%	0	0	75860	75860	83371
27	HINDONCITY	1056191	1160754	AMRUT*	0%	0%	67%	67%	0	0	707648	707648	777705
28	BARAN	117992	129673	AMRUT*	0%	0%	43%	43%	0	0	50737	50737	55759
29	SIKAR	244497	268702	AMRUT*	0%	0%	100%	100%	0	0	244497	244497	268702
30	SUJANGARH	101523	111574	AMRUT*	0%	0%	77%	77%	0	0	78173	78173	85912

ULBs with population 50,000 to 1 lac being provided/provided partial sewerage coverage

S. No.	Name of ULBs	Population		Name of the Schemes/program ongoing/Sanctioned *Proposed	% Coverage				Population Benefitted				Population benefitted (year 2016)
		As per Census 2011	Present		Existing	After completion of ongoing /sanctioned projects UIDSSMT/RUIDP Ph 2/State Fund/Own Resource	In proposed project *	Total	Existing	After completion of ongoing /sanctioned projects UIDSSMT/RUIDP Ph 2/State Fund/Own Resource	In proposed project * RUIDP Ph IV/ NCRPB	Total	
1	LAXMANGARH	53392	58678	UIDSSMT (T), RUIDP Ph IV*	0%	100%	0%	100%	0	53392	0	53392	58678
2	DIDWANA	53749	59070	State Fund,	0%	61%	39%	100%	0	32787	20962	53749	59070

				RUIDP Ph IV*				%					
3	JALORE	54081	59435	UIDSSMT Ph I, RUIDP Ph IV*	54%	0%	46%	100 %	29204	0	24877	54081	59435
4	NIMBEHEDA	61949	68082	UIDSSMT (T), RUIDP Ph IV*	0%	100%	0%	100 %	0	61949	0	61949	68082
5	NOKHA	62699	68906	ULB, RUIDP Ph IV*	85%	0%	15%	100 %	53294	0	9405	62699	68906
6	NAWALGARH	63948	70279	UIDSSMT (T), RUIDP Ph IV* (Heritage)	0%	76%	24%	100 %	0	48600	15348	63948	70279
7	JAISALMER	65471	71953	RUIDP Ph II, RUIDP Ph IV*	0%	56%	44%	100 %	0	36664	28807	65471	71953
8	JHALAWAR	66919	73544	RUIDP Ph II, RUIDP Ph IV*, AMRUT*	0%	40%	60%	100 %	0	26768	40151	66919	73544
9	RAJSAMAND	67798	74510	RUIDP Ph II, RUIDP Ph IV*	0%	25%	75%	100 %	0	16950	50849	67798	74510
10	SURATGARH	70536	77519	UIDSSMT (T), RUIDP Ph IV*	0%	49%	51%	100 %	0	34563	35973	70536	77519
11	BALOTRA	74496	81871	State Fund, RUIDP Ph IV*	0%	60%	40%	100 %	0	44698	29798	74496	81871
12	KARALI	82960	91173	RUIDP Ph II, RUIDP Ph IV*	0%	57%	43%	100 %	0	47287	35673	82960	91173
13	FATEHPUR	92595	101762	State Fund, RUIDP Ph IV*	0%	58%	42%	100 %	0	53705	38890	92595	101762
14	SARDAR SHAHAR	95911	105406	UIDSSMT Ph I, RUIDP Ph IV*	0%	56%	44%	100 %	0	53710	42201	95911	105406
15	BARMER	96225	105751	RUIDP Ph II, RUIDP Ph IV*	0%	28%	72%	100 %	0	26943	69282	96225	105751
16	SRI DUNGARGARH	53294	58570	RUIDP Ph IV*	0%	0%	100%	100 %	0	0	53294	53294	58570
17	ABU ROAD	55599	61103	RUIDP Ph IV*	0%	0%	100%	100 %	0	0	55599	55599	61103
18	RAJGARH (CHURU)	59193	65053	RUIDP Ph IV*	0%	0%	100%	100 %	0	0	59193	59193	65053
19	KUCHAMAN	61969	68104	RUIDP Ph IV*	0%	0%	100%	100 %	0	0	61969	61969	68104
20	BADI	62721	68930	RUIDP Ph IV*	0%	0%	100%	100 %	0	0	62721	62721	68930

21	CHOMU	64417	70794	RUIDP Ph IV*	0%	0%	100%	100%	0	0	64417	64417	70794
22	LADNU	65575	72067	RUIDP Ph IV*	0%	0%	100%	100%	0	0	65575	65575	72067
23	RATANGARH	71124	78165	RUIDP Ph IV*	0%	0%	100%	100%	0	0	71124	71124	78165
24	DAUSA	85960	94470	RUIDP Ph IV*	0%	0%	100%	100%	0	0	85960	85960	94470

Name of ULBs with population <50,000 being provided/provided partial sewerage coverage

S. No.	Name of ULBs	Population		Name of the Schemes/program ongoing/Sanctioned *Proposed	% Coverage				Population Benefitted				Population benefitted (year 2016)
		As per Census 2011	Present		Existing	After completion of ongoing /sanctioned projects	In proposed project *	Total	Existing	After completion of ongoing /sanctioned projects	In proposed project*	Total	
1	MOUNT ABU	26982	29653	UIDSSMT Ph I, RUIDP III	0%	80%	0%	80%	0	21586	0	21586	23723
2	JHALRAPATAN	38131	41906	UIDSSMT Ph I, RUIDP Ph IV*	0%	10%	90%	100%	0	3813	34318	38131	41906
3	SUMERPUR	41223	45304	UIDSSMT Ph I	30%	0%	0%	30%	12367	0	0	12367	13591
4	NATHDWARA	42016	46176	State Fund	0%	50%	0%	50%	0	21008	0	21008	23088
5	CHIRAWA	45500	50005	UIDSSMT (T)	0%	61%	0%	61%	0	27755	0	27755	30503
6	JAITARAN	22634	24875	UIDSSMT (T)	0%	100%	0%	100%	0	22634	0	22634	24875
7	BHADRA	42983	47238	UIDSSMT (T)	0%	82%	0%	82%	0	35246	0	35246	38735
8	BADI SADRI	15723	17280	UIDSSMT (T)	0%	100%	0%	100%	0	15723	0	15723	17280

9	FATEHNAGAR	19648	21593	UIDSSMT (T)	0%	37%	0%	37%	0	7270	0	7270	7989
10	KUSHALGARH	10681	11738	UIDSSMT (T)	0%	100%	0%	100%	0	10681	0	10681	11738
11	RAMGARH SHEKHAWATI	19648	21593	UIDSSMT (T)	0%	100%	0%	100%	0	19648	0	19648	21593
12	SIROHI	44070	48433	RUIDP Ph IV*	0%	0%	100%	100%	0	0	44070	44070	48433
13	PRATAPGARH	41993	46150	RUIDP Ph IV*	0%	0%	100%	100%	0	0	41993	41993	46150
14	JOBNER	12769	14033	RUIDP Ph IV* (Heritage)	0%	0%	100%	100%	0	0	12769	12769	14033
15	KHETRI	20953	23027	RUIDP Ph IV* (Heritage)	0%	0%	100%	100%	0	0	20953	20953	23027
16	KAMAN	36039	39607	RUIDP Ph IV* (Heritage), NCRPB*	0%	0%	100%	100%	0	0	36039	36039	39607
17	MANDAWA	24419	26836	RUIDP Ph IV* (Heritage)	0%	0%	100%	100%	0	0	24419	24419	26836
18	PILIBANGA	43258	47541	RUIDP Ph IV* (Heritage)	0%	0%	100%	100%	0	0	43258	43258	47541
19	SAMBHAR	24734	27183	RUIDP Ph IV* (Heritage)	0%	0%	100%	100%	0	0	24734	24734	27183
20	BANDIKUI	44664	49086	RUIDP Ph IV* (Heritage)	0%	0%	100%	100%	0	0	44664	44664	49086
21	DEEG	44999	49454	RUIDP Ph IV* (Heritage), NCRPB*	0%	0%	100%	100%	0	0	44999	44999	49454
22	DUNGARPUR	50000	54950	RUIDP Ph IV* (Heritage)	0%	0%	100%	100%	0	0	50000	50000	54950
23	BEHRORE	29531	32455	NCRPB*	0%	0%	100%	100%	0	0	29531	29531	32455
24	KHAIRTHAL	38298	42090	NCRPB*	0%	0%	100%	100%	0	0	38298	38298	42090
25	KHERLI	19848	21813	NCRPB*	0%	0%	100%	100%	0	0	19848	19848	21813
26	TIJARA	24747	27197	NCRPB*	0%	0%	100%	100%	0	0	24747	24747	27197

27	BAYANA	44368	48760	NCRPB*	0%	0%	100%	100%	0	0	44368	44368	48760
28	BHUSAWAR	19946	21921	NCRPB*	0%	0%	100%	100%	0	0	19946	19946	21921
29	KUMHER	23540	25870	NCRPB*	0%	0%	100%	100%	0	0	23540	23540	25870
30	NADBAI	26411	29026	NCRPB*	0%	0%	100%	100%	0	0	26411	26411	29026
31	NAGAR	25572	28104	NCRPB*	0%	0%	100%	100%	0	0	25572	25572	28104
32	WARE	21327	23438	NCRPB*	0%	0%	100%	100%	0	0	21327	21327	23438
33	RAJGARH (ALWAR)	30732	33774	NCRPB*	0%	0%	100%	100%	0	0	30732	30732	33774
34	KISHANGARH BAS	12429	13659	NCRPB*	0%	0%	0%	0%	0	0	0	0	0
35	RAWATBHATA	25721	28267	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
36	PRATAPGARH	41993	46150	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
37	BHAWANIMAN DI	42772	47006	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
38	PHALODI	49941	54885	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
39	SOJATCITY	4503	4949	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
40	KEKRI	40627	44649	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
41	BHINMAL	49179	54048	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
42	BILADA	45741	50269	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
43	PIPADCITY	37982	41742	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
44	NIWAI	38564	42382	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
45	VIJAINAGAR	33856	37208	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
46	MALPURA	35568	39089	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
47	GULABPURA	29717	32659	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
48	TODARASINGH	25572	28104	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
49	MANDALGARH	14947	16427	HUDCO*	0%	0%	0%	0%	0	0	0	0	0

50	DEOLI	23726	26075	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
51	KUCHERA	23606	25943	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
52	JAHAJPUR	21982	24158	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
53	GANGAPUR	29717	32659	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
54	SARWAD	19850	21815	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
55	MUNDAWA	19513	21445	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
56	PUSHKAR	17541	19278	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
57	AASIND	17215	18919	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
58	PARBATSAR	17004	18687	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
59	UNIARA	13995	15381	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
60	SHAHPURA	32540	35761	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
61	CHAKSU	23671	26014	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
62	KHERTHAL	41164	45239	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
63	SRIMADHOPUR	32886	36142	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
64	PHULERA	26792	29444	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
65	BAGRU	28675	31514	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
66	KISHANGARHR ENWAL	35176	38658	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
67	PILANI	30336	33339	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
68	VIDHYAVIHAR	17764	19523	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
69	KHANDELA	32050	35223	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
70	NEEM KA THANA	35023	38490	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
71	REENGUS	30851	33905	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
72	LOSAL	32050	35223	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
73	UDAIPURWATI	33830	37179	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
74	BISSAU	25495	28019	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
75	LALSOT	36158	39738	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
76	BAGGAD	17184	18885	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
77	MUKUNDGARH	21802	23960	HUDCO*	0%	0%	0%	0%	0	0	0	0	0

78	RAJAKHEDA	33301	36598	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
79	TODABHEEM	25038	27517	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
80	RAISIGNHAGAR	35501	39016	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
81	ANUPGARH	37849	41596	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
82	SADULSAHAR	29232	32126	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
83	SRIKARANPUR	25620	28156	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
84	GAJSINGHPUR A	11764	12929	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
85	PADAMPUR	21307	23416	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
86	KESRISIGHPUR	15223	16730	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
87	SRIVIJAINAGAR	22022	24202	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
88	DESHNOK	18319	20133	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
89	CHHAPAR	22177	24373	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
90	BIDASAR	35896	39450	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
91	RAJLDESAR	25939	28507	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
92	TARANAGAR	31806	34955	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
93	RAWATSAR	36421	40027	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
94	ANTA	35376	38878	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
95	LAKHERI	30724	33766	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
96	KESHAVRAI PATAN	27461	30180	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
97	SANGOD	21433	23555	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
98	KAITHOON	24828	27286	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
99	NAINWA	18364	20182	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
100	KAPREN	21354	23468	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
101	INDARGARH	5861	6441	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
102	PIDAWA	12902	14179	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
103	AKLERA	22006	24185	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
104	CHHABRA	29040	31915	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
105	MANGROL	27790	30541	HUDCO*	0%	0%	0%	0%	0	0	0	0	0

106	POKARAN	21605	23744	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
107	BALI	21050	23134	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
108	TAKHATGARH	19523	21456	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
109	RANI	21728	23879	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
110	SANCHOR	33926	37285	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
111	SADRI	28450	31267	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
112	FALNA	27311	30015	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
113	PINDWARA	26070	28651	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
114	AAMET	17335	19051	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
115	SALUMBAR	17975	19755	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
116	BHINDAR	18319	20133	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
117	KANOR	14431	15860	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
118	DEOGARH	18721	20574	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
119	SANGWARA	37744	41481	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
120	SURAJGARH	23106	25393	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
121	NOHAR	49835	54769	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
122	RATANNAGAR	12851	14123	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
123	CHOTI SADRI	18374	20193	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
124	NAWA	21328	23439	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
125	VIRAT NAGAR	21756	23910	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
126	SHIVGANJ	32520	35739	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
127	MERTA CITY	48785	53615	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
128	RAMGANJ MANDI	44336	48725	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
129	SANGARIA	43456	47758	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
130	KAPASAN	21306	23415	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
131	DEGANA	20035	22018	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
132	BEGUN	23921	26289	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
133	ITAWA	26741	29388	HUDCO*	0%	0%	0%	0%	0	0	0	0	0

134	ROOPWAS	15735	17293	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
135	MAHWA (DAUSA)	24846	27306	HUDCO*	0%	0%	0%	0%	0	0	0	0	0
		3761768	4134183						12367	185364	726536	924266	1015769
	Total	16927291	18603093						3803674	3621633	617844 2	13603749	14950521

4.11. List of Sub group Committees formed for Smart City Proposal preparedness under chairmanship of Divisional Commissioner, Ajmer in March 2015

राजस्थान सरकार
कार्यालय संभागीय आयुक्त, अजमेर।

क्रमांक: प-7/(204)सं.आ./सा./smart city/2014/2757-2867

दिनांक: 11 मार्च, 2015

—आज्ञा—

केन्द्र एवं राज्य सरकार द्वारा अत्यन्त प्राचीन एवं महत्वपूर्ण नगर अजमेर को हेरिटेज व स्मार्ट सिटी का दर्जा दिया गया और अपेक्षा की है कि अजमेर देश का अग्रणी नगर बन सकें। उक्त अनुक्रम में नगरीय विकास मंत्रालय, स्मार्ट सिटीज डिविजन, भारत सरकार के पत्र क्रमांक K-15016/41/SC-2014 दिनांक 15.12.2014 से राजस्थान के अजमेर शहर को स्मार्ट सिटी घोषित करते हुए, संभागीय आयुक्त, अजमेर की अध्यक्षता में कमेटी का गठन किया गया है। उक्त कमेटी का गठन शहर को आधुनिक तकनीकी विकास एवं प्रक्रिया से लाभान्वित करने के उद्देश्य से किया गया है। स्मार्ट सिटी विजन डोक्यूमेन्ट की कार्य योजना तैयार किये जाने हेतु एतद्वारा निम्न 22 सब ग्रुप (सिटी कॉन्टेक्ट ग्रुप) का गठन तत्काल प्रभाव से किया जाता है। उक्त सब ग्रुप के मुख्य संयोजक एवं संयोजक द्वारा आवश्यकतानुसार 5-7 विषय विशेषज्ञ/विभागीय अधिकारी नियुक्त किये जाने हेतु उनके के प्रस्ताव अलग से प्रस्तुत करेंगे।

- गठित सब ग्रुप (सिटी कॉन्टेक्ट ग्रुप) उसको आवंटित विषय पर स्मार्ट सिटी संबंधी प्रारम्भिक कार्यक्रमों एवं गतिविधियों की कार्य योजना आगामी एक वर्ष हेतु तैयार कर अध्यक्ष के समक्ष प्रस्तुत करेंगे। सभी सब ग्रुप (सिटी कॉन्टेक्ट ग्रुप) प्रत्येक बुधवार को प्रातः 11.00 बजे बैठक का आयोजन भी करेंगे।
- सभी गठित सब ग्रुप एक-एक समसामयिक कार्यक्रम यथा जल-संरक्षण/पर्यावरण/बेटी बचाओ/हरियाली/विद्यालय एवं चिकित्सालय स्वच्छता आदि की क्रियान्विती करवाने हेतु माह में कम से कम दो-दो गतिविधियां अवश्य करें।

सब ग्रुप (सिटी कॉन्टेक्ट ग्रुप)

क्र.सं.	पैरामीटर/ विषय	सब ग्रुप का नाम	सब ग्रुप के सदस्य
1	ट्रैफिक मैनेजमेंट	स्मार्ट सिटी ट्रैफिक मैनेजमेंट सलाहाकार उप समिति	1. अति० जिला कलेक्टर(शहर), अजमेर (मुख्य संयोजक) 2. जिला परिवहन अधिकारी अजमेर (संयोजक) 3. उप पुलिस अधीक्षक-यातायात, अजमेर 4. श्री जय सिंह राठौड़, सेवानिवृत्त, उप अधीक्षक, ट्रैफिक 5. श्री संजय पूनिया, अधीक्षण अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर (समन्वयक) 6. श्री कमलेन्द्र झा, अजमेर (सदस्य परामर्शदात्री समिति) 7. श्री प्रकाश जैन, अजमेर (सदस्य परामर्शदात्री समिति) 8. श्री जगदीश वच्छानी, अजमेर (सदस्य परामर्शदात्री समिति) 9. श्री डी. एल. त्रिपाठी, अजमेर (सदस्य परामर्शदात्री समिति)

27)

Memorandum → 9414009780

→ Meenal Kherani

क्र.सं.	पैरामीटर	सब ग्रुप का नाम	सब ग्रुप के सदस्य
2	पेयजल एवं स्टार्म वाटर मैनेजमेंट	स्मार्ट सिटी पेयजल एवं स्टार्म वाटर मैनेजमेंट सलाहाकार उप समिति	<ol style="list-style-type: none"> 1. श्री अनिल जैन, अधिशाषी अभियन्ता, जन स्वा. अभि. विभाग, अजमेर (मुख्य संयोजक) 2. श्री सुधीर मिश्रा, अधिशाषी अभियन्ता, जन स्वा. अभि. विभाग अजमेर (संयोजक) 3. अधिशाषी अभियन्ता, जल संसाधन विभाग, अजमेर 4. श्री एम.के. माथुर, अधीक्षण अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर (समन्वयक) 5. श्री जे.एन. गोलानी, अजमेर (सदस्य परामर्शदात्री समिति)
3.	सीवरेज, सैनिटेशन सॉल्लिड वेस्ट मैनेजमेन्ट	स्मार्ट सिटी सीवरेज, सैनिटेशन सॉल्लिड वेस्ट मैनेजमेन्ट सलाहाकार उप समिति	<ol style="list-style-type: none"> 1. मुख्य कार्यकारी अधिकारी / आयुक्त, नगर निगम अजमेर (मुख्य संयोजक) 2. उप निदेशक, स्थानीय निकाय विभाग, अजमेर 3. श्री भुवनेश्वर अग्निहोत्री, अधिशाषी अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर (समन्वयक) 4. श्री. कर्मलेन्द्र झा, अजमेर (सदस्य परामर्शदात्री समिति) 5. श्री के.सी. टेलर, अजमेर (सदस्य परामर्शदात्री समिति)
4	बिजली	स्मार्ट सिटी बिजली सलाहाकार उप समिति	<ol style="list-style-type: none"> 1. अधीक्षण अभियन्ता - शहर, अजमेर विद्युत वितरण निगम लि० अजमेर (मुख्य संयोजक) 2. प्रभारी सौर ऊर्जा विकास प्राधिकरण, अजमेर (संयोजक) 3. श्री रमेश चन्द माथुर, अधिशाषी अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर (समन्वयक) 4. श्री बोगावत, अजमेर
5	वाई-फाई कनेक्टिविटी, टेलीफोन कनेक्शन्स	स्मार्ट सिटी वाई-फाई कनेक्टिविटी, टेलीफोन कनेक्शन्स सलाहाकार उप समिति	<ol style="list-style-type: none"> 1. श्री अंकुर गोयल, जिला सूचना विज्ञान अधिकारी, एन.आई.सी., अजमेर (मुख्य संयोजक) 2. श्री आशुतोष गोतम, प्रणाली विश्लेषक कम प्रोग्रामर, जिला सूचना एवं प्रौद्योगिक संचार विभाग, अजमेर (संयोजक) 3. श्री अनूप टण्डन, अधिशाषी अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर (समन्वयक) 4. श्री नीरज भार्गव, अजमेर 5. श्री गौतम चतुर्वेदी, अजमेर
6	हैल्थ केयर	स्मार्ट सिटी हैल्थ केयर सलाहाकार उप समिति	<ol style="list-style-type: none"> 1. संयुक्त निदेशक चिकित्सा एवं स्वास्थ्य सेवाएं, अजमेर (मुख्य संयोजक) 2. मुख्य चिकित्सा एवं स्वास्थ्य अधिकारी, अजमेर (संयोजक) 3. श्री एम.एल. मीणा, अधिशाषी अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर (समन्वयक) 4. डा० ब्रीजेश माथुर, अजमेर (सदस्य परामर्शदात्री समिति) 5. श्री जगदीश वच्छानी, अजमेर (सदस्य परामर्शदात्री समिति)

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कसं	पैरामीटर	सब ग्रुप का नाम	सब ग्रुप के सदस्य
7.	प्राथमिक, माध्यमिक एवं उच्च शिक्षा	स्मार्ट सिटी प्राथमिक, माध्यमिक एवं उच्च शिक्षा सलाहाकार उप समिति	1 सहायक निदेशक, उच्च शिक्षा (कॉलेज), अजमेर (मुख्य संयोजक)
			2. श्री दीपक जोहरी, जिला शिक्षा अधिकारी अजमेर (संयोजक)
			3. श्री राधेश्याम शर्मा, सहायक अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर (समन्वयक)
			4. श्री प्रो. टी. के. माथुर, अजमेर (सदस्य परामर्शदात्री समिति)
			5 डा0 प्रताप पिंजानी, विभागाध्यक्ष, समाजशास्त्र, सम्राट पृथ्वीराज महाविद्यालय, अजमेर (सदस्य परामर्शदात्री समिति)
			6 डा0 दिनेश चन्द्र शर्मा, अजमेर
			7. श्री प्रकाश जैन, अजमेर (सदस्य परामर्शदात्री समिति)
8	डिजास्टर मैनेजमेन्ट	स्मार्ट सिटी डिजास्टर मैनेजमेन्ट सलाहाकार उप समिति	1. श्री रवि सिंह, डिप्टी कन्ट्रोलर, सिविल डिफेन्स, अजमेर (मुख्य संयोजक)
			2. जिला सैनिक कल्याण अधिकारी, अजमेर (संयोजक)
			3. श्री आनन्द त्रिपाठी, सहायक अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर (समन्वयक)
			4 डा0 सुब्रतो दत्ता, म0 द0 स0 वि0वि0, अजमेर
9	स्थानीय योजना (Spatial Planning)	स्मार्ट सिटी स्थानीय योजना (Spatial Planning) सलाहाकार उप समिति	1. वरिष्ठ नगर नियोजक/जिला नगर नियोजक, अजमेर (मुख्य संयोजक)
			2. अधीक्षण अभियन्ता-शहर, सा0 नि0 विभाग, अजमेर (संयोजक)
			3. श्री सुर्यकान्त वर्मा, सहायक नगर नियोजक, अजमेर विकास प्राधिकरण, अजमेर (समन्वयक)
			4 डा0 पी.आर. राठी, अजमेर (सदस्य परामर्शदात्री समिति)
10.	नवाचार (Innovation)	स्मार्ट सिटी नवाचार (Innovation Planning) सलाहाकार उप समिति	1. श्री सुनील सिंघल, अधीक्षण अभियन्ता, जन स्वास्थ्य अभियान्त्रिकी विभाग, अजमेर (मुख्य संयोजक)
			2. श्री संजय पूनिया, अधीक्षण अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर (संयोजक)
			3. श्री संदीप माथुर, अधिशाषी अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर (समन्वयक)
			4. श्री के.सी. टेलर, अजमेर (सदस्य परामर्शदात्री समिति)
11	महिला सशक्तिकरण (Women Empowerment)	स्मार्ट सिटी महिला सशक्तिकरण (Women Empowerment) सलाहाकार उप समिति	1. उप निदेशक क्षेत्रीय, महिला एवं बाल विकास विभाग, अजमेर (मुख्य संयोजक)
			2. श्री महावीर, कार्यक्रम अधिकारी, महिला विकास अधिकरण एवं जिला महिला अधिकारिता विभाग, अजमेर (संयोजक)
			3. अति. जिला पुलिस अधीक्षक-शहर, अजमेर
			4. श्रीमती दिप्ती शर्मा, उपायुक्त, अजमेर विकास प्राधिकरण, अजमेर (समन्वयक)
			5 प्रो0 लक्ष्मी ठाकुर, म0द0स0 वि0वि0, अजमेर (सदस्य परामर्शदात्री समिति)

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क्र.सं.	पैरामीटर	सब ग्रुप का नाम	सब ग्रुप के सदस्य
12	पर्यावरण संरक्षण	स्मार्ट सिटी पर्यावरण संरक्षण सलाहाकार उप समिति	1. मण्डल वन अधिकारी, अजमेर (मुख्य संयोजक) 2. खनिज अभियन्ता, अजमेर (संयोजक) 3. श्री राजेन्द्र कुडी, सहायक अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर (समन्वयक) 4. प्रो० के.सी. शर्मा, अजमेर (सदस्य परामर्शदात्री समिति) 5. डॉ० प्रवीण माथुर, अजमेर 6. डॉ० सुब्रतो दत्ता, अजमेर 7. डॉ० मनोज माथुर, अजमेर 8. डॉ० जगदीश जादव, अजमेर
13	हेरिटेज विकास	स्मार्ट सिटी हेरिटेज विकास (Heritage Devp.) सलाहाकार उप समिति	1. अतिरिक्त रजिस्ट्रार, सहकारिता विभाग अजमेर (परामर्शदाता) 2. सहा. आयुक्त, देवस्थान विभाग, अजमेर (मुख्य संयोजक) 3. आयुक्त, प्रशा०-नगर निगम, अजमेर (संयोजक) 4. सहायक नाजिम, दरगाह, अजमेर 5. श्री नवनीत, सहायक नगर नियोजक, अजमेर विकास प्राधिकरण, अजमेर (समन्वयक) 6. श्री मुबारक हुसैन, अधीक्षक, पुरातत्व एवं संग्रहालय विभाग, अकबर किला, अजमेर। 7. मेजर एन. के. मारफतिया, अजमेर (सद० परामर्श० समिति) 8. श्री टी. के. माथुर, अजमेर (सदस्य परामर्शदात्री समिति) 9. डा० प्रताप पिंजानी, अजमेर (सदस्य परामर्शदात्री समिति) 10. डा० दिनेश चन्द्र शर्मा, अजमेर 11. श्री सुभाष चन्द्र नवल, अजमेर 12. डॉ० संदीप अवस्थी, अजमेर 13. प्रो० ओमप्रकाश शर्मा, अजमेर
14	सिटी हॉल्टिकल्चर (Holticulture)	स्मार्ट सिटी हॉल्टिकल्चर विकास सलाहाकार उप समिति	1. श्री वी.के.शर्मा, उपनिदेशक कृषि, अजमेर (मुख्य संयोजक) 2. श्री संजय तनेजा, सहायक निदेशक, कृषि अजमेर (संयोजक) 3. श्रीमती मेघना, सहा. नगर नियोजक, अजमेर विकास प्राधिकरण, अजमेर (समन्वयक)
15	प्रचार प्रसार	स्मार्ट सिटी प्रचार प्रसार (IEC Devp.) सलाहाकार उप समिति	1. श्री प्यारे मोहन त्रिपाठी, उप निदेशक, जन सर्मक विभाग, अजमेर (मुख्य संयोजक) 2. श्री भानु प्रताप सिंह गुर्जर, सहायक जन सर्मक अधिकारी, अजमेर (संयोजक) 3. श्री राठी, सहा. लेखाधिकारी, अ०वि०प्रा०, अजमेर (समन्वयक)
16	युवा मामले एवं खेल (Youth Devp.)	स्मार्ट सिटी युवा मामले एवं खेल सलाहाकार उप समिति	1. श्री अभिमन्यु, जिला खेल अधिकारी, अजमेर (मुख्य संयोजक) 2. श्री धर्मपाल, समन्वयक, नेहरू युवा केन्द्र, अजमेर (संयोजक) 3. श्री हजारारामसिरवी, सहा. वि.परा., अविप्रा, अजमेर (समन्वयक) 4. श्री सोमरत्न आर्य, अजमेर (सदस्य परामर्शदात्री समिति)

क्रसं	पैरामीटर	सब ग्रुप का नाम	सब ग्रुप के सदस्य
17	पर्यटन विकास	स्मार्ट सिटी पर्यटन विकास (Tourism Devp.) सलाहाकार उप समिति	1. उप निदेशक, पर्यटन विभाग, अजमेर (मुख्य संयोजक) 2. प्रबन्धक, आरटीडीसी, अजमेर (संयोजक) 3. प्रिंसीपल, फुड एवं काफ्ट ईस्टीमेट, अजमेर 4. कोषाधिकारी, अजमेर 5. श्री कृष्णावतार त्रिवेदी, सचिव, अविप्रा, अजमेर (समन्वयक) 6. डॉ० डी. सी. शर्मा, अजमेर (सदस्य परामर्शदात्री समिति)
18	पुलिस सुरक्षा	स्मार्ट सिटी पुलिस सुरक्षा (Policing safety & security) सलाहाकार उप समिति	1. अति. जिला पुलिस अधीक्षक-शहर, अजमेर (मुख्य संयोजक) 2. श्री के०के० गोयल, उपायुक्त, अ.वि.प्रा, अजमेर (समन्वयक) 3. मेजर एन. के. मारफतिया, अजमेर (सदस्य परामर्शदात्री)
19	उद्योग, व्यापार एवं बैंकिंग	स्मार्ट सिटी उद्योग, व्यापार एवं बैंकिंग (Industry, business & banking) सलाहाकार उप समिति	1. महाप्रबंधक, जिला उद्योग केन्द्र, अजमेर (मुख्य संयोजक) 2. वाणिज्य कर अधिकारी, अजमेर (संयोजक) 3. अग्रेणी बैंक प्रबंधक, बैंक ऑफ बडोदा, अजमेर 4. श्रीमती रश्मि बिस्वा, लेखाधिकारी, अ.वि.प्रा. अजमेर (समन्वयक) 5. श्री रवि कुमार वर्मा, अजमेर
20	सामाजिक सुरक्षा	स्मार्ट सिटी सामाजिक सुरक्षा सलाहाकार उप समिति	1. उप निदेशक, सामाजिक न्याय एवं अधिकारिता विभाग, अजमेर (मुख्य संयोजक) 2. प्रो. लक्ष्मी ठाकुर म०द०स० वि०वि०, अजमेर (सद.परा.समिति) 3. श्री सुभाष चन्द्र नवल, अजमेर 4. श्री सोमरत्न आर्य, अजमेर 5. श्री ओम मुनि, अजमेर 6. श्री डी. एल. त्रिपाठी, अजमेर (सदस्य परामर्शदात्री समिति)
21	लोक संस्कृति, साहित्य एवं कला	स्मार्ट सिटी लोक संस्कृति, साहित्य एवं कला सलाहाकार उप समिति	1. उप निदेशक, पर्यटन विभाग, अजमेर (मुख्य संयोजक) 2. डॉ० संदीप अवस्थी, अजमेर 3. श्री उमेश कुमार चौरसिया, अजमेर 4. संजय सेठी, अजमेर 5. प्रो० ओम प्रकाश शर्मा, अजमेर
22	स्वच्छता एवं सौन्दर्यकरण	स्मार्ट सिटी स्वच्छता एवं सौन्दर्यकरण सलाहाकार उप समिति	1. आयुक्त, नगर निगम, अजमेर (मुख्य संयोजक) 2. श्री राजेश महावर, अजमेर - 9887750940 3. श्री सुभाष चांदना, अजमेर - 9983334560 4. श्री मुकेश मिश्रा, अजमेर - 9352004269

उक्त समिति जनआंकाक्षाओं को मध्यनजर रखते हुए संबंधित विभाग से विचार विमर्श कर, सम्भावित परियोजना का चिन्हिकरण करते हुए उनकी विस्तृत कार्य योजना तैयार करेगी ताकि उनका सफल क्रियान्वयन किया जा सके।

27
(रमेश चन्द सोलंकी)
अतिरिक्त सम्भागीय आयुक्त,
अजमेर

प्रतिलिपी निम्न को सूचनार्थ एवं आवश्यक कार्यवाही हेतु:-

1. श्री नीरज मण्डलोई, संयुक्त सचिव, शहरी विकास मंत्रालय, स्मार्ट सिटी डिविजन, निर्माण भवन, नई-दिल्ली।
2. शासन सचिव, नगरीय विकास विभाग, राजस्थान जयपुर।
3. जिला कलेक्टर, अजमेर।
4. जिला पुलिस अधीक्षक, अजमेर।
5. आयुक्त, अजमेर विकास प्राधिकरण, अजमेर।
6. मुख्य कार्यकारी अधिकारी, नगर निगम, अजमेर।
7. अति० जिला कलेक्टर (शहर), अजमेर।
8. जिला परिवहन अधिकारी, अजमेर।
9. उप पुलिस अधीक्षक-यातायात, अजमेर।
10. श्री संजय पुनिया, अधीक्षण अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर।
11. श्री अनिल जैन, अधिशाषी अभियन्ता, जन स्वा. अभि. विभाग, अजमेर।
12. श्री सुधीर मिश्रा, अधिशाषी अभियन्ता, जन स्वा. अभि. विभाग, अजमेर।
13. अधिशाषी अभियन्ता, जल. संसाधन विभाग, अजमेर।
14. श्री एन.के. माथुर, अधिशाषी अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर।
15. उप निदेशक, स्थानीय निकाय विभाग, अजमेर।
16. श्री भुवनेश्वर अग्निहोत्री, अधिशाषी अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर।
17. अधीक्षण अभियन्ता -शहर, अजमेर विद्युत वितरण निगम लि० अजमेर।
18. प्रभारी अधिकारी सौर ऊर्जा विकास प्राधिकरण, अजमेर।
19. श्री रमेश चन्द माथुर, अधिशाषी अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर।
20. श्री अंकुर गोयल, जिला सूचना विज्ञान अधिकारी, एन.आई.सी., अजमेर।
21. श्री आशुतोष गोतम, प्रणाली विश्लेषक कम प्रोग्रामर, जिला सूचना एवं प्रौद्योगिक संचार विभाग, अजमेर।
22. श्री अनूप टण्डन, अधिशाषी अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर।
23. संयुक्त निदेशक, चिकित्सा एवं स्वास्थ्य सेवाएं, अजमेर।
24. मुख्य चिकित्सा एवं स्वास्थ्य अधिकारी, अजमेर।
25. श्री एम.एल. मीणा, अधिशाषी अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर।
26. सहायक निदेशक, उच्च शिक्षा (कॉलेज), अजमेर।
27. श्री दीपक जोहरी, जिला शिक्षा अधिकारी-मा., अजमेर।
28. श्री राधेश्याम शर्मा, सहायक अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर।
29. श्री रवि सिंह, डिप्टी कन्ट्रोलर, सिविल डिफेन्स, अजमेर।
30. जिला सैनिक कल्याण अधिकारी, अजमेर।
31. श्री आर.एस.शर्मा, लेखाधिकारी, अजमेर विकास प्राधिकरण, अजमेर।
32. वरिष्ठ नगर नियोजक/जिला नगर नियोजक, अजमेर।
33. अधीक्षण अभियन्ता-शहर, सा० नि० विभाग, अजमेर।
34. श्री सुनील सिंघल, अधीक्षण अभियन्ता, जन स्वास्थ्य अभियान्त्रिकी विभाग, अजमेर।
35. श्री संजय पुनिया, अधिशाषी अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर।
36. उप निदेशक क्षेत्रीय, महिला एवं बाल विकास विभाग, अजमेर।
37. उप निदेशक, समाजिक न्याय एवं अधिकारिता विभाग, अजमेर।
38. मण्डल वन अधिकारी, अजमेर।
39. खनिज अभियन्ता, अजमेर।
40. अतिरिक्त रजिस्ट्रार, सहकारिता विभाग अजमेर।

- 41 सहायक आयुक्त, देवस्थान विभाग, अजमेर।
- 42 आयुक्त, प्रशा0-नगर निगम, अजमेर।
- 43 सहायक नाजिम, दरगाह, अजमेर।
- 44 श्री वी.के.शर्मा, उपनिदेशक कृषि, अजमेर।
- 45 श्री संजय तनेजा, सहायक निदेशक, कृषि, अजमेर।
- 46 उप निदेशक, जन सर्म्पक विभाग, अजमेर।
- 47 सहायक जन सर्म्पक अधिकारी, अजमेर।
48. श्री अभिमन्यु, जिला खेल अधिकारी, अजमेर।
- 49 श्री धर्मपाल, समन्वयक, नेहरू युवा केन्द्र, अजमेर।
- 50 उप निदेशक, पर्यटन विभाग, अजमेर।
- 51 प्रबन्धक, आरटीडीसी, अजमेर।
- 52 प्रिंसीपल, फुड एवं काफट ईस्टट्यूट, अजमेर।
- 53 कोषाधिकारी, अजमेर।
- 54 अति. जिला पुलिस अधीक्षक, शहर, अजमेर।
- 55 महाप्रबन्धक, जिला उद्योग केन्द्र, अजमेर।
- 56 वाणिज्य कर अधिकारी, अजमेर।
- 57 अग्रणी बैंक प्रबन्धक, बैंक ऑफ बडोदा, अजमेर।
- 58 श्री जयसिंह राठोड, सेवानिवृत्त उप अधीक्षक-यातायात, अजमेर।
- 59 श्री कमलेन्द्र झा, अजमेर।
60. श्री प्रकाश जैन, अजमेर।
61. श्री जे.एन. गोलानी, अजमेर।
62. श्री जगदीश वच्छानी, अजमेर।
63. श्री के.सी. टेलर, अजमेर।
64. श्री बोगावत, अजमेर।
65. श्री नीरज भार्गव, अजमेर।
66. श्री गौतम चतुर्वेदी, अजमेर।
67. डा0 ब्रीजेश माथुर, अजमेर।
68. श्री. टी. के. माथुर, अजमेर।
69. डा0 प्रताप पिंजानी, विभागाध्यक्ष, समाजशास्त्र, सम्राट पृथ्वीराज महाविद्यालय, अजमेर।
70. डा0 दिनेश चन्द्र शर्मा, अजमेर।
71. श्री सुर्यकान्त वर्मा, सहायक नगर नियोजक, अजमेर विकास प्राधिकरण, अजमेर।
72. डा0 सुब्रोतो दत्ता, म0 द0 स0 वि0वि0, अजमेर।
73. डा0 पी.आर. राठी, अजमेर।
74. प्रो0 लक्ष्मी ठाकुर, म0द0स0 वि0वि0, अजमेर।
75. प्रो0 के.सी. शर्मा, अजमेर।
76. डॉ0 प्रवीण माथुर, अजमेर।
77. डॉ0 मनोज माथुर, अजमेर।
78. डॉ0 जगदीश जादव, अजमेर।
79. मेजर एन. के. मारफतिया, अजमेर।
80. श्री सुभाष चन्द्र नवल, अजमेर।
81. डॉ0 संदीप अवस्थी, अजमेर।
82. प्रो0 ओमप्रकाश शर्मा, अजमेर।
83. डॉ0 डी. सी. शर्मा, अजमेर।
84. श्री सोमरत्न आर्य, अजमेर।

- 86 श्री ओम मुनि, अजमेर।
 87 श्री उमेश कुमार चौरसिया, अजमेर।
 88 श्री संजय सेठी, अजमेर।
 89 श्री राजेश महावर, अजमेर।
 90 श्री सुभाष चांदना, अजमेर।
 91 श्री मुकेश मिश्रा, अजमेर।
 92 श्री डी.एल. त्रिपाठी, अजमेर।
 93 श्री आनन्द त्रिपाठी, सहायक अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर।
 94 श्री संदीप माथुर, अधिशाषी अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर।
 95 श्री महावीर, कार्यक्रम अधिकारी, महिला विकास अधिकरण एवं जिला महिला अधिकारिता विभाग, अजमेर।
 96 श्रीमती दिप्ती शर्मा, उपायुक्त, अजमेर विकास प्राधिकरण, अजमेर।
 97 श्री राजेन्द्र कुडी, सहायक अभियन्ता, अजमेर विकास प्राधिकरण, अजमेर।
 98 श्री नवनीत, सहायक नगर नियोजक, अजमेर विकास प्राधिकरण, अजमेर।
 99 श्रीमती मेघना, सहा. नगर नियोजक, अजमेर विकास प्राधिकरण, अजमेर।
 100 श्री राठी, सहा० लेखाधिकारी, अजमेर विकास प्राधिकरण, अजमेर।
 101 श्री हजारीराम सिरवी, सहा० वि० परा०, अजमेर विकास प्राधिकरण, अजमेर।
 102 श्री कृष्णावतार त्रिवेदी, सचिव, अजमेर विकास प्राधिकरण, अजमेर।
 103 श्री के० के० गोयल, उपायुक्त, अजमेर विकास प्राधिकरण, अजमेर।
 104 श्रीमती रश्मि बिस्वा, लेखाधिकारी, अजमेर विकास प्राधिकरण, अजमेर।
 105 श्री मुबारक हुसैन, अधीक्षक,, पुरातत्व एवं संग्रहालय विभाग, अकबर किला, अजमेर।
 106 संबंधित अधिकारी.....
 107 निजी सहायक, अध्यक्ष, अजमेर विकास प्राधिकरण अजमेर।
 108 निजी सचिव/निजी सहायक सम्भागीय आयुक्त कार्यालय, अजमेर।

27
 (रमेश चन्द्र सोलंकी)
 अतिरिक्त संभागीय आयुक्त,
 अजमेर।



कार्यालय मुख्य अभियन्ता (मुख्यालय) जन स्वास्थ्य अभियांत्रिकी विभाग, राजस्थान
"जल भवन", 2, सिविल लाईन्स, जैकब रोड, जयपुर

दूरभाष: 2222053

फैक्स: 2222585

WebSite: www.rajwater.gov.in

Email: rj_cchq@nic.in

दिनांक:- 24.11.2015

विषय:- ड्राफ्ट अरबन वाटर पोलिसी पर सुझाव बाबत।

राजस्थान सरकार के आर.यू.आई.डी.पी. विभाग द्वारा राजस्थान प्रदेश हेतु ड्राफ्ट "अरबन वाटर पोलिसी" बनाई गई है। प्रदेश के आमजन से निवेदन है कि ड्राफ्ट पोलिसी पर अपने सुझाव 28 फरवरी 2016 तक निम्न ई-मेल पते पर भेज सकते हैं:-

1. mail.ruidp@rajasthan.gov.in
2. mailruidp@gmail.com

आप अपने सुझाव कार्यालय मुख्य अभियन्ता (मुख्यालय) जन स्वास्थ्य अभि० विभाग में हार्ड कॉपी द्वारा भी प्रस्तुत कर सकते हैं।


24/11/15

(सी०एम० चौहान)
मुख्य अभियन्ता (मुख्यालय)
जन स्वास्थ्य अभियांत्रिकी विभाग
राजस्थान जयपुर



4.12. Detailed Project list of SCP

Sl.no.	Themes	Sub Themes		Sectors/Features		Projects	Costs (Rs. Crore)
I	Area Based Development						
A	Theme 1: Heritage, Art & Culture	Identity and culture	1	Identity & Culture	i)	Jaipur Road Precinct upgradation	5.00
					ii)	Cultural Park at Subhash Udhyan	12.50
					iii)	Installation of public art and sculptures	20.00
					iv)	Street paintings & Heritage	15.00
					v)	Auditorium at Soochna Bhawan	5.00
					vi)	Promoting local crafts, folk dance, music etc.	5.00
						Subtotal (Identity & Culture)	62.50
B	Theme 2: Tourism-Pilgrimage & Leisure	Tourist infrastructure	2	Tourist infrastructure	i)	Tourist information centre at public places, kiosks, Public conveniences	5.00
					ii)	Pedestrian friendly walkways to connecting Dargah area to railway station through sky walks	10.00
						Subtotal (Tourism)	15.00
C	Theme 3: Pristine environment and Eco-Friendly Living	Green and blue gird	3	Anasagar Promenades	i)	Lake Restoration	
					a)	De-silting, De-weeding, Bund strengthening	30.00
					b)	Drains Treatment and allied facilities	6.00
					ii)	Lake Front Development	
					a)	Open Air Amphitheatre, Promenades/ Plaza	6.75
					b)	Park pathways with cycling/walking tracks	8.25
					c)	Solar panelled roofs, LED Lighting and Light posts	0.69
					d)	Choreographed Musical Fountain with Laser show	8.00
					e)	Boating and water sports facilities	3.00
					f)	Development of Heritage Museum at Island	20.00
					g)	Enhancement of walkability from neighbourhood of ABD to eco-mobility corridor with the focus on Differently abled and elderly	3.00
					iii)	Mega Amusement Park	25.00
						Subtotal	110.69
			4	Innovative use of Public Open spaces	i)	Park Development including fencing, green development, water sprinklers, jogging / cycle tracks, children play equipment, and park furniture with focus on elderly and differently abled people etc.	15.00
					ii)	Development of Open gym in existing Parks	10.00
					iii)	Select Parks are to be developed as theme based parks for children and elderly with focus on differently abled	10.00
						Subtotal	35.00
			5	Green Buildings	i)	Conversion of Public Building in to Green Building (LEED/ GRIHA)	16.00
						Subtotal	16.00
						Sub Total (Pristine environment and Eco-Friendly Living)	161.69
D	Theme 4: World class infrastructure and public Conveniences	Transportation & Mobility	6	Smart Centralised Bus stand	i)	Multilevel modern centralised bus stand	50.00
						Subtotal	50.00
			7	Modernisation of Railway Station	i)	Upgradation of Passenger facilities	10.00
					ii)	Development of Multi-storeyed (10 Nos.) commercial property	300.00
						Subtotal	310.00
			8	NMT-Footpath and cycle track	i)	NMT - Foot path and Cycle Tracks	15.51
					ii)	Cycle sharing system	5.00
					iii)	FOBs with escalators	5.00
						Subtotal	25.51
			9	Smart Parking	i)	Multi-level Car parking - 2 locations	100.00
					ii)	Open Car Parking at 3 locations	15.00
						Subtotal	115.00
			10	Road Up gradation and multi level flyover	i)	Plantation & Landscaping	5.17

Sl.no.	Themes	Sub Themes	Sectors/Features	Projects	Costs (Rs. Crore)
				ii) Road surfacing	25.85
				iii) Signage	1.29
				iv) Underground utility corridors	20.68
				v) Multi level Flyover (from Martindale bridge – Station Road – Agra Gate – Old RPSC to bus stand)	162.00
				Subtotal	215.00
			11	Remodelling Anasagar escape	
				i) Anasagar Escape Channel - Cover & Develop for Circulations	250.00
				Subtotal	250.00
				Sub Total (Transport & Mobility)	965.51
		Basic Amenities	12	Water, Waste Water and Rain Water Harvesting (RWH)	
				Water Supply	
				i) OHSR & Related works	1.58
				ii) Meters	0.95
				iii) Pipe line	2.21
				iv) Smart Metering	11.09
				v) Energy Efficient Water Pumps	1.00
				vi) SCADA for All Reservoirs and bulk supply pipe lines in the entire system	5.00
				Subtotal	21.83
			13	Rain Water Harvesting	
				Rain Water Harvesting	
				i) Install rain water harvesting system in all the public buildings and in open areas	0.33
				ii) Recharge Pits and Bios wales in open spaces, parking areas, parks, and Road median.	2.00
				Subtotal	2.33
			14	Sewerage cost under AMRUT	
				Sewerage cost under AMRUT	
				i) Property Chamber	5.57
				ii) Reuse of treated waste water for watering & open spaces	7.50
				Subtotal	13.07
				Subtotal (Water, Waste Water & RWH)	37.23
			15	Storm Water Drain	
				Storm Water Drain	
				i) Road side covered drains	11.70
				ii) Remodelling of Anasagar Escape channel under AMRUT	10.00
				Subtotal (Storm Water Drains)	21.70
			16	Sanitation and Waste Management	
				Solid Waste Management (SWM)	
				i) Technology based efficient waste collection & disposal activities in the city including a) 100% Door to Door Collection with GPS enabled vehicle tracking system, Dustbins with sensors, and Waste to Energy	9.15
			17	Sanitation	
				Sanitation	
				i) Public Conveniences	2.00
				Subtotal (Sanitation and Waste Management)	11.15
			18	Health	
				Mobile Health care centres and Hospital modernisation	
				i) Development of Multi-speciality hospital	30.00
				ii) Mobile Tele-health services, which connect hospitals to remote facilities for consultation, diagnosis, and sometimes training	10.00
				Subtotal (Health)	40.00
			19	Education	
				Education	
				i) Smart Classes in Govt. institutes and schools	20.00
				ii) Improve and develop city libraries, digital libraries for all schools and colleges	10.00
				iii) Regional Science Centre	5.00
				Subtotal (Education)	35.00
			20	Sports facilities	
				Sports facilities	
				i) Modernisation of Patel Stadium	20.00
				Subtotal (Sports facilities)	20.00
				Subtotal (Basic Amenities)	165.07
		Energy Security	21	Solar Power generation	
				Solar Power generation	
				i) Solar Power panels at public buildings, Open Parks, Anasagar Lake	48.58

Sl.no.	Themes	Sub Themes		Sectors/Features		Projects	Costs (Rs. Crore)
					ii)	Preparation of Solar Master Plan for Ajmer- creation of solar city cell, stakeholder committee	
					iii)	Establishment of Akshay Urja shop in the city.	
						Subtotal	48.58
			22	Power distribution strengthening		Power distribution strengthening	
					i)	Power Distribution - Substations and allied	26.60
					ii)	Prepaid electricity metering at residential level	1.00
					iii)	Installation of smart meters	16.42
					iv)	Power Distribution - Cabling	12.41
						Subtotal	56.42
						Subtotal (Energy Security)	105.00
		Integrated urban development	23	Compactness/ Mixed use	i)	Designated vending zone in the market area	10.00
					ii)	Frontage improvement of shop's frontage and footpath	10.00
						Subtotal (Integrated urban development)	20.00
						Subtotal (World Class Infrastructure & Basic Amenities)	1,255.58
E	Theme 5: Hotspot of technology, innovations and start-ups	Economy & Employment	24	Start-up Innovations and Economy	i)	Multi skill institute	5.00
					ii)	Incubation Centre for start ups	20.00
					iii)	Business Improvement District - Integrating commercial areas	4.00
						Subtotal (Start-up Innovations and Economy)	29.00
		IT Connectivity and Safety	25	Wi-Fi Services	i)	4G Wi-Fi & CCTV Cameras for preventing crime against children & women	41.70
			26	Citizen Participation	ii)	Location finder: A city guide app, with information about museums, parks, landmarks, public art, restaurants, Property number and real-time traffic data.	1.00
			27	Disaster Management response	i)	GIS mapping of entire city for disaster management	5.00
					ii)	Panic button system	1.00
					iii)	Centralised command and control centre	2.00
						Subtotal (IT Connectivity and Safety)	50.70
						Subtotal (Hotspot of technology, innovations and start-ups)	79.70
						Total Area Based Development	1,574.47
II	Pan City						
1	Integrated Traffic Management, Security & Surveillance system	City Bus Management	28	City Bus Management	i)	Development of Bus Q Shelters and Bus Stop Sign Board	
						BQS - Along with Passenger Information System	7.92
						Poles	0.14
					ii)	New Mini Buses for E-Buses (30 Nos.)	4.50
					iii)	IT system on Buses	
						on 35 number fully built 900mm Non AC buses	
						Infrastructure at Control centre	
						Hardware & Software at Control Centre	0.25
						In Bus Infrastructure	
						GPRS based Electronic Ticketing Machine (ETM)	0.07
						Bus Driver Console with GPS	0.14
						on 30 number standard size mini buses	
						Infrastructure at Control centre	
						Hardware & Software at Control Centre	0.12
						In Bus Infrastructure	
						GPRS based ETM	0.06
						Bus Driver Console with GPS	0.12

Sl.no.	Themes	Sub Themes		Sectors/Features		Projects	Costs (Rs. Crore)
						Subtotal (City Bus Management)	13.32
		Safety & Surveillance	29	CCTV Surveillance of Traffic, Vehicle tracking & Air Quality Monitoring	i)	CCTV points- cameras, poles, server, junction switch & Field component	50.00
					ii)	Command Control Room for traffic management and vehicle tracking	2.00
					iii)	Development of mobile based application which will include Public Information System (PIS)	2.00
						Subtotal (Safety & Surveillance)	54.00
		Air Quality	30	Air Quality	i)	Air Quality Monitoring - sensors equipment	1.00
						Subtotal (Air Quality)	1.00
		Intelligent Street lightings	31	Intelligent Street lightings	i)	In Progress/ Completed - Conversion of existing lamps to LED along with CCMS	33.00
					ii)	Installation of Solar Panels with battery, Autotimers, smart meters, GSM Module	66.00
					iii)	GIS Mapping of street lighting	0.75
					iv)	Wi-Fi, air pollution monitoring, mosquito monitoring, transportation support, and locate parking spaces for stressed-out motorists, reroute cars and trucks as necessary	5.00
						Subtotal (Intelligent Street Lighting)	104.75
						Subtotal (Integrated Traffic Management, Security & Surveillance system)	173.07
	Smart Governance	Smart Governance	32	Smart City Governance		City E-Governance	23.00
						Subtotal (Smart Governance)	23.00
						Total Pan City	196.07
						Total Cost for SCP (Area based + Pan City)	1,770.54
						SPV Staffing/PMU, Project Preparation, Advisory @5%	88.53
						Contingency @5%	88.53
						Sub-Total	177.05
						Total CAPEX - SCP PROPOSAL	1,947.60

4.13. SPV Revenue from Internal Sources and O&M Costs

SPV Revenue from Internal Sources and O&M Costs

Ajmer Smart city proposal

REVENUE ACCOUNT			2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
REVENUE ACCOUNT - RECEIPTS - FOR SPV													
Urban Development Tax													
Urban Development Tax assessments in City (Nos.)			15,358	15,562	15,769	15,978	16,190	16,405	16,623	16,844	17,068	17,295	17,525
YoY Increase - Assessments (%)	1.33%		1.33%	1.33%	1.33%	1.33%	1.33%	1.33%	1.33%	1.33%	1.33%	1.33%	1.33%
Increase in Rate (%)	10%	per year											
Urban Development Tax Demand (Rs. Lakh)			745	830	925	1,031	1,149	1,281	1,428	1,592	1,774	1,977	2,204
Tax per assessment per year (Rs.)			4,849	5,334	5,867	6,454	7,099	7,809	8,590	9,449	10,394	11,433	12,577
Urban Development Tax - Current demand in Area Selected (Rs. Lakh)			118	131	146	163	182	202	226	251	280	312	348
Collection Efficiency (%)	90%		70%	80%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Urban Development Tax - projections (Rs. Lakh)			82	105	132	147	163	182	203	226	252	281	313
Water and Sewerage connections													
Water connections (Nos.) in City	119,600												
Water connections (Nos.) in Area	18,891												
Sewerage Connections (Nos.) in Area	2,246												
Projected water connections (Nos.) in Area			19,142	19,397	19,655	19,916	20,181	20,449	20,721	20,996	21,275	21,558	21,844
Projected sewerage Connections (Nos.) in Area			10,569	18,892	19,655	19,916	20,181	20,449	20,721	20,996	21,275	21,558	21,844
Water and Sewerage User Charges													
Water user charges demand (2014-15) (Rs. Lakh)	453												
Monthly Water Charges (Rs. Per connection)	200												
Annual user fee increase increase (%)	15%	Every 3 year	15%			15%			15%			15%	
Average Realisation - existing and projected (Rs.)	2,400		2,760	2,760	2,760	3,174	3,650	3,650	4,198	4,198	4,198	4,827	4,827
Sewerage user charges demand (% of water charges)	33%		33%	33%	33%	75%	75%	75%	100%	100%	100%	100%	100%
Water user charges - projections in Area (Rs. Lakh)			528	535	542	632	737	746	870	881	893	1,041	1,054
Sewerage user charges - projections in Area (Rs. Lakh)			174	177	179	474	552	560	870	881	893	1,041	1,054
Income from Electricity connections - Mark up													
Electricity connections (Nos.) in Area	128,000												
Electricity Consumption (LU)	7,447												
Avg consumption per connection per annum (Units)	5,818												
Electricity connections - existing and projected (Nos.) in Area	20,218		20,622	21,035	21,791	22,227	22,671	23,125	23,587	24,059	24,540	25,031	25,532
Annual Mark-up (%) on revenue	10%												
Average Realisation - existing and projected (Rs.)		2,304	5,702	5,816	6,025	6,146	6,268	6,394	6,522	6,652	6,785	6,921	7,059
Electricity charges - projections			570	582	603	615	627	639	652	665	679	692	706
AMC - Income from other sources - Apportioned													
Other own income - Full City (Rs. Lakh)	9%		3,378	3,716	4,087	4,496	4,946	5,440	5,984	6,583	7,241	7,965	8,761
Other Tax Revenue - Full City (Rs. Lakh)			19	21	23	25	28	31	34	37	41	45	49
Non-Tax Revenue - Full City (Rs. Lakh)			3,359	3,695	4,064	4,471	4,918	5,409	5,950	6,545	7,200	7,920	8,712
Assigned Revenue (Octroi) - Full city (Rs. Lakhs)	10%		6,875	7,563	8,319	9,151	10,066	11,072	12,180	13,398	14,737	16,211	17,832
Devolution Income - Full City (Rs. Lakh)	14%		3,034	3,337	3,671	4,038	4,441	4,886	5,374	5,911	6,503	7,153	7,868
SFC - Full City (Rs. Lakh)			1,760	1,936	2,130	2,343	2,577	2,834	3,118	3,430	3,773	4,150	4,565
SFC Performance Grant - Full City (Rs. Lakhs) @5%			84	93	102	112	123	136	149	164	181	199	218
13/14 FC - Full City (Rs. Lakh)			957	1,053	1,158	1,274	1,401	1,541	1,695	1,865	2,051	2,257	2,482
14 FC Performance Grant - Full City (Rs. Lakhs)@20%			218	239	263	289	318	350	385	424	466	513	564
MP/MLA Fund - Full City (Rs. Lakh)			15	16	18	20	22	24	26	29	32	35	38
Total Income from other sources - Apportioned (Rs. Lakhs)	10.4%		13,287	14,615	16,077	17,684	19,453	21,398	23,538	25,892	28,481	31,329	34,462
Projections - other own income and devolution			2,364	2,601	2,861	3,147	3,462	3,808	4,189	4,608	5,068	5,575	6,133
SPV - New Revenue Streams in Project Area													
Area Based Development													
Water user charges - projections			528	535	542	632	737	746	870	881	893	1,041	1,054
Sewerage user charges - projections			174	177	179	474	552	560	870	881	893	1,041	1,054
Income from Mark-up on Electricity Charges to AVVNL			570	582	603	615	627	639	652	665	679	692	706
Revenue from Land Monetization along Anasagar Lake					3,525	5,875	5,875	5,875	2,350	-	-	-	-
Revenue from Proposed Projects	10%	Growth rate per Annum		30	1,225	1,535	1,704	1,926	2,114	2,320	2,547	2,797	3,071
Income from New Revenue Streams in Project Area			1,273	1,324	6,074	9,131	9,495	9,746	6,855	4,748	5,012	5,570	5,886
Revenue Expenditure - FOR SPV													
Revenue expenditure projections - Apportioned	5.0%		1,409	1,480	1,554	1,632	1,713	1,799	1,889	1,983	2,082	2,186	2,296
Escalation per annum on New O&M %	5.0%												
O&M - Area Based Development			628	1,877	3,299	3,949	4,373	4,592	4,821	5,063	5,316	5,581	5,860
O&M - Pan City			372	1,215	2,101	2,431	2,552	2,680	2,814	2,955	3,103	3,258	3,421
O&M due to Contingency			50	155	270	319	346	364	382	401	421	442	464
Subtotal - New O&M with escalation			1,050	3,247	5,670	6,699	7,272	7,636	8,017	8,418	8,839	9,281	9,745
Incremental O&M Cost			1,050	3,247	5,670	6,699	7,272	7,636	8,017	8,418	8,839	9,281	9,745

