With tags like ‘Oxford of the East’ and an enviable legacy to live up to, Pune has been continuously able to push the bounds and emerge as a frontrunner among major Indian cities. The foundation of this lies in its commitment to enhance human capital, a participative citizenry and a committed administration (evident from the AA Fitch rating to the Municipal body and best in class urban services like water supply, electricity coverage and waste management). An amalgamation of all these factors has helped Pune cement its place among the top 5 FDI destination in India and emerge as the 2nd biggest software hub in the country.

Leveraging its rich cultural and natural heritage, strong human capital and strong business environment as key strengths, Pune aspires to become one of most livable cities in India by solving its core infrastructure issues in a “Future Proof” way, and by making its neighbourhoods beautiful, clean, green, and livable.
Pan City - Solve the Mobility Problem of Pune

Pune’s lack of public transportation, along with an un-stemmed rise of private vehicles has resulted in massive congestions and very low average speeds (18 km/h against norm of 30 km/h). Further, the gaps are intensified with a limited traffic adherence and dilapidated walking and cycling infrastructure. The condition is exacerbated by infrastructural gaps such as ring roads, metro and BRT.

Pune plans to attack problem on two fronts. Firstly by strengthening infrastructural gaps through long and medium term interventions (bicycle sharing, road redesign, completion of BRT) and secondly by ensuring higher utilization of existing infrastructure through ICT solutions. The gamut of such solutions include adaptive traffic control (which aim to increase average speed by 10-15%), ITMS solutions for public transport to increase ridership by improving quality of service through improved dissemination of information and management.

Despite sufficient water at aggregate level and an average per capita water supply that is 1.5 times the benchmark (with other major Indian Cities), 14% of Punekars still struggle to get an access to the benchmark 150 LPCD levels. The next milestone is to ensure 24*7 water supply to 100% of citizens (with all of them having access to 150 lpcd of water). This will involve initiatives to ensure lower share of non-revenue by reduction of leakages and improved water-metering. Major components of the smart city solution suite outlined to achieve this mission include smart bulk metering at 8 WTPs across 161 elevated reservoirs and 328 DMAs with SCADA, helium like identification system, 100% smart metering for commercial sections, web, app and call center based grievance redressal system along with a separate ICT-enabled billing and recovery department.

Pan City - Equitable distribution of Water
With a budget of Rs. 2200 Crores (across 5 years) and a self-sufficient funding plan, Pune aims to transform this area across all dimensions to livability so that it matches the best global cities. The transformation aims to sustain quadrupling of population in next 15 years through investments in the following areas:

- Mobility improvement through e-Buses & e-rickshaws, BRT, bus stop overhauling, bicycle tracks and redesign of streets to improve safety, average speed and public transport usage
- Reduce water deficient areas from 65% to zero through reservoir construction, water recycling and smart metering
- Increased share of open spaces (upto 10%) through riverfront and park development
- Improved citizen services/e-governance suite which will include (single window desk, integrated citizen desk, Punetel card)
- Increasing jobs by 3.5x (10,000 to 40,000) through start up zones and commercial hubs to propagate walk-to-work and mixed use in truest sense
The projects have been packaged in various modules based on its nature, functioning, technological features etc. For the implementation of these projects under different modules, the consortium approach, where in a formal, time-bound arrangement, systematically linking diverse competencies of a group of actors to better reach shared objectives, will be adopted.

Given the wide range of technical and sector specific expertise required to implement the Smart City projects, PSCDCL shall be supported by a team of consultants for strategic, technical and project management, thus PSCDCL intends to have the General Consultants (GC), which will work in alignment with the CEO.

Each of HoD’s within PSDCL will also be supported by the Domain consultant. We are looking for closed loop, integrated end to end solutions for each of the module designed.

Total project cost is Rs. 2932 crores with Rs. 2196 crores for Local Area development and Rs. 671 crores for Pan City initiatives along with Rs. 65 crores for A&OE.
**Module 1: Physical Infrastructure**

Infrastructure is about establishing new technologies, reuse or optimization of existing infrastructure, which is consistent with the principles of urban sustainability and global sustainable development. The Physical Infrastructure module mainly comprise hard infrastructure projects of Transport & Water sector with one component of livability.

**Module Cost (Rs. Crores)**
- Capex: 959
- Opex: 111
- Total Lifetime Cost: 1070

**Module 2: Affordable Housing**

Urban poor constitute around 40% of the population of Pune city. They contribute through their work, largely in the informal sector, to city’s economic growth. Also they pay local taxes for goods and services purchased in the city. Thus their basic need of a shelter becomes a prime subject and hence under the affordable housing module 20,000 houses will be built in next 10 years.

**Module Cost (Rs. Crores)**
- Capex: 40
- Total Lifetime Cost: 40

**Module 3: Customer Care**

The successful functioning of any organization is dependent upon efficient, Transparent & multi directional flows of information. Thus for efficient working a complete mapping & survey of customer is proposed along with a centralized customer centre where the citizens would be able to register their grievances, enquiries, billing information and payment etc.

**Module Cost (Rs. Crores)**
- Capex: 25
- Opex: 1
- Total Lifetime Cost: 26

**Module 4: River Water Cleaning**

The city of Pune is situated on the confluence of river Mula, Mutha & Mula-Mutha. Discharge of untreated domestic and industrial waste water, garbage dumping and open defecation on the banks have been the main causes of pollution in the rivers. Understanding the acute need of cleaning the river and its beautification, the project has been envisaged.

**Module Cost (Rs. Crores)**
- Capex: 8
- Opex: 1
- Total Lifetime Cost: 9
Rivers are the natural asset of the city’s. Pune city is blessed with a 44.43 km of river length. These river banks when developed will not only be adding an attractive feature to the community/citizens but will also act as an economic booster for the city. A 3.5 km riverfront development project is proposed within the local area development plan for ABB.

The key priority for the administrative authorities is, is to ensure that a good basic standard of services is available to the citizens. Number of factors such as delivery, timeliness, information provision, reliability, accessibility, professionalism, etc bring satisfaction across public services. Thus to bring in the customer/citizen satisfaction numerous projects have been identified. Under the module

Module Cost (Rs. Crores)
Capex: 100
Opex: 5
Total Lifetime Cost: 105

The collaboration between human and technological resources results in improved physical, social and economic growth. To enable transformative change through Information & Communication Technologies (ICT) across various sectors of the city as well as in safety and transparency in the system, an enabling environment needs to be established through this initiative.

Module Cost (Rs. Crores)
Capex: 195
Opex: 25
Total Lifetime Cost: 220

Information and Communication Technologies (ICTs) are increasingly recognized as an integral part of city’s development. With the concept of “more is less” various ICT projects such as smart parking, metering, traffic modelling to name few, related to transport, water and governance sectors have been identified to be implemented in the city.

Module Cost (Rs. Crores)
Capex: 487
Opex: 128
Total Lifetime Cost: 615
The implementation of LED street lighting is rapidly being recognized because of the promises, like financial benefits, reduced carbon emissions and improved safety and security. LEDs are more readily controlled and programmed. The project aims to save energy and thus will replace 3,070 street lights by LED lamps with wireless control.

**Module Cost (Rs. Crores)**
- **Capex**: 4
- **Opex**: 1
- **Total Lifetime Cost**: 5

The project will be based on PPP model.

A high-quality public environment can have a significant impact on the social & economic life of urban habitats big or small, and is therefore an essential part of any successful regeneration strategy. Like natural ecosystems, open space provides a variety of functions that satisfy human needs, making it self sustainable. The project envisages to create such ecosystem which has social as well as economical benefits.

**Module Cost (Rs. Crores)**
- **Opex**: 20
- **Total Lifetime Cost**: 20

Skills development and health care facilities to urban poor ensures a safe & secure livelihood & can live a dignified life. The project envisages to motivate, prepare and support urban poor to opt for a course, take training in that course and finally sustain a career or a micro-enterprise, which would ensure their livelihood.

**Module Cost (Rs. Crores)**
- **Opex**: 20
- **Total Lifetime Cost**: 20

The Smart Grid technology integrates renewable generation, storage, increased consumer participation, sensors, communications, with qualities such as computational ability thus designed to meet the increased demands with security, quality, reliability, and availability of electric power. The project envisages to bring in the above features to city’s power system.

The project will be based on IPDS scheme.
Module 13: Solar

The sun is a renewable source of clean energy and that’s an increasingly valued benefit. Solar photovoltaic (PV) systems produce electricity without polluting the environment. Rooftop solar power creates a system of distributed generation (many small-scale power plants) that helps meet area power needs. Thus the ABB area is proposed to install solar roof top system.

The project will be based on RESCO model

Module 14: Startup Zone

A fundamental shift is happening towards startup, friendly policies and a business friendly environment. The need is to nurture the entrepreneurial ecosystem to create more start-ups as well as opportunities for the vast young population of the city. Pune has large technical talent available due to its many universities, along with cost-effective real estate and good infrastructure.

The project will be based on PPP model

Module 15: Transit Hub

In the passenger system, poor modal connectivity is a significant barrier to the use of public transport. Pune city will soon be functional with Metro, BRTS, Feeder system etc. The transit hub will provide the public transportation services a smoother intermodal interfaces and travel route connection opportunities that tend to promote higher ridership along with economic benefits.

The project will be based on PPP model
MODULE 1: Physical Infrastructure

1. Road & Road Widening

To ensure ABB is able to match the globally best-in-class standards of living, seamless smooth transportation and interconnectivity is paramount. A critical factor for urbanization is mobility to which wide, well-designed road network is critical. A smooth, uniform RoW across the locality will ensure not only easier transit for vehicles, but also enhance the inclusivity of streets so as to include pedestrians and cyclists.

2. Redesign of Streets

A critical component of smart mobility is safer, inclusive infrastructure for pedestrians, cyclists and differently abled. A considerable chunk of Indian roads have historically given preference to motorized vehicles in street design. However, smart streets ensure safety of non-motorized stakeholders. By redesigning 27 km of streets with RoW > 18 m, it will be ensured that adequate footpath space and demarcated bicycle lanes are present. The street will have demarcated zones: for commercial activities, pedestrians, bicycles and vehicles, to ensure a sustainable mobile ecosystem is created. This will be complemented by initiatives such as place making (elaborated below), thereby contributing to the urban form. Together with bicycle systems and improved footpaths, it is expected that ABB will be able to match benchmark 50% (from 30% currently) NMT trip share. Continuous footpaths, bicycle tracks will lead to increased adoption leading to improvement in air quality as well.

3. Footpath’s Retrofit

Footpaths form an integral part of any urban settlement. An ideal footpath should be demarcated, safe, accessible to all (differently abled, elderly etc) and without obstructions. Equipping with ramps and constructing with easy to traverse material will be further benefits. The footpath should not have utility supports like electric poles etc hindering the thoroughfare, at least so far as the pedestrian thorough fare is concerned. Additionally, they must be accessible from any part of the road, through a combination of zebra crossings (which will be catered through the initiatives targeting street redesign and place making. 60 km of footpaths will be redesigned/retrofitted to achieve the above mentioned aims.
4. Place Making

Place making is both a process and tool, by which we collectively design and manage elements of the public realm to create places that are appealing, accessible, comfortable, and support social activity. Place making helps to define the pattern and use of the built environment and the manner and ease in which people are able to access, connect and move around in it. Such spaces will be created to achieve the objective of social development, inclusion and develop a smart urban form.

5. Bus Stops

Bus stops form an integral part of any public transit system based on buses. Functionally bus stops are a primary source of information for passengers, apart from serving as waiting points. Often the conditions of bus stops are a close proxy to the conditions of bus transit systems. This imperative has 2 primary objectives: firstly, making the wait comfortable/less arduous for citizens and secondly ensuring complete availability of information at the bus stop. Improving the infrastructure of bus stops to make them accessible, comfortable and friendlier towards differently abled and equipping bus stops with Passenger Information Screens and QR codes to update bus arrivals in real time will be a big stride towards fulfilling the above mentioned objective.

6. Junction Redesign

Redesigning of 14 junctions in Aundh-Baner-Balewadi will serve as a pilot for roll out of similar imperatives across the Pune City. Intelligently designed junctions reduce congestion by improving traffic flow and improve pedestrian and NMT safety. Additionally, place making will ensure that junctions, along with the streets and open spaces will contribute to the urban character of ABB.

7. Non – Motorized Transport

Non-motorized streets, or pedestrian only zones have been very successful as concepts across several cities globally (e.g. Istanbul, Copenhagen etc). With pedestrian plazas, street vendors, mom & pop stores, such zones can become big time tourist attractions, offering the citizens an avenue for engagement and enjoyment. Further they can fuel the prospects of local small and medium business owners. The benefits are further complemented by improvements in air quality (Reduction in pollution levels).
8. BRTS
One of the most common forms of mass rapid transit globally, BRT corridor is an integral component of Pune’s strategy to tackle long term mobility problems. An additional corridor of 8 km is planned along the riverfront as a part of Local Area Development. Connecting BRT corridor on Baner and University Chowk - Aundh Roads, this corridor will perform 2 critical functions:
(i) Aid in ensuring last mile connectivity across ABB for the incoming working population.
(ii) Serve as a critical route connecting rest of the city to the transit hub; improving travel times for passengers from Mumbai, disembarking at the Transit Hub.

9. Adequate Water Supply
While 5 pilot DMAs that will be provided with 24X7 water supply has been included in local area development projects, the ultimate goal is to scale up 24X7 water supply for the entire city in a phase-wise manner. This will be done over a 10-year period and new DMAs will be included in each phase.

10. Waste Water Recycling
Lack of waste water capacity is leading to discharge of untreated sewage in the water bodies of Pune and polluting the rivers. A ~990 cr project to revamp existing STPs and build 10 new STPs has been sanctioned under JNNURM and JICA will provide the funding.

11. Storm water use
Storm water drainage is an essential feature under the ambit of smart cities. It is especially essential in urban areas where run-off cannot infiltrate because the surfaces are impermeable. It is used mainly to drain high peak flows away. Further, the city of Pune is prone to flooding when rainfall is >50mm per day. As a part of Phase 1 of the Storm water Drainage project, the Baner basin has already been created. Additional storm water drainage infrastructure is required to cover the entire area.

12. Rain Water Harvesting
In most urban areas, population is increasing rapidly and the issue of supplying adequate water to meet societal needs and to ensure equity in access to water is one of the most urgent and significant challenge. Rainwater harvesting is a decentralized, environmentally sound solution, which can avoid many environmental problems. So to ease the water crisis rainwater harvesting project is envisaged in the local area development proposal.
13. Fire Stations

Fire stations constitute of the key elements of emergency services in a city. The two key success factors for good fire protection are accessibility and readiness. Two fire stations in the area will ensure quick accessibility in case of fire accidents, and 1,372 sq m of amenity space is allocated for this. Efforts will be made to ensure that these fire stations are equipped with optimum equipment and adequately manned.

14. Helium leak detection

As of today in Pune, invisible leaks cannot be identified as there is no information on where the leakage is occurring and in what magnitude. In order to be able to take corrective action accurate data is required on leakage and its source. Pilots and engagements in other parts of India's/other geographies have shown the efficacy of Helium Based Leak Detection technology in identifying leaks - an average of 2 leakages per kilometer were found. In neighboring PCMC, 268 Km were inspected and 269 leaks were found, In Malviya Nagar, Delhi, 84 Km were inspected and 303 leaks were found, In MCGM, Maharashtra, 80 Km were inspected and 135 leaks were found. Using this technology we can successfully identify invisible leaks throughout the water system and fix the piping as required.

15. Naidu STP – Energy Generation

While Sewage treatment is a significant user of energy. Operation of pumps, blowers and other equipment at a typical sewage treatment plant per person, an annual electrical energy consumption requirement is in the range of 12-19 KWh. Thus, substantial input of energy is required to treat sewage and sewage treatment often comprises the largest use of electricity by local governments. The anaerobic treatment in the STP’s can generate electrical energy and be used in the STP itself. Also the treated water can be used in the construction sector, thus reducing burden on the ground water.

In view of this, the project focuses on making Naidu STP with 115 MLD treatment capacity into a energy neutral plant. Electricity generation annually is targeted to be 1.92 million units.
MODULE 2: Affordable Housing

Building Affordable Housing

The Smart City Plan proposes to make Pune slum-free by 2025 by constructing 20,000 affordable houses every year, for the next 10 years. This will ensure that the development of the city is inclusive and does not render the poor homeless. As the first step to this, in the ABB area, 300-400 affordable houses will be built at the cost of INR40Cr by December, 2020.

1. Creation of world class consumer centre

All the services proposed for water consumers in the smart city proposal – online billing, website, IVR, smart metering etc will come together in the consumer center which be the single point of contact for grievances, enquiries, billing information and payment.

2. Customer Mapping & Survey

Currently, 110,000 residential connections and 42,650 commercial connections are recorded. This is potentially less than 50% of all connections in the PMC area – much lower than benchmark of 100% recorded connections in other cities. A full-fledged customer survey is essential and will enable us to:

• Accurately define number and type of consumer meters to be installed in the city and to accurately know the people distribution on the territory, and basic information for hydraulic modelling and database creation

• Classify each connection appropriately (domestic, commercial, education, industrial etc.) and consequently identify the water connections that have not registered and paid new connection fee.

MODULE 3: Customer Care

1. Creation of world class consumer centre

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Riverfront Development

There exist Pune has a vast riverfront which now lies wasted due to high pollution in the river, dumping of garbage in the river and banks and lastly no of public spaces along the river. All major cities across the globe (and a few in India) that are based by rivers have development scenic riverfronts which act as a major source of recreation for their citizens. ABB’s 3.5-km stretch of riverfront will be developed into a world-class recreation hub. This will increase community engagement from local activities, tourism, improve liveability and also create additional job opportunities for local slum-dwellers. This concept can be replicated across the 40 km of riverfront in Pune.

River Water Cleaning

Rivers of Pune suffer from sever pollution, dumping of garbage, release of untreated sewage and effluents and several other sources of pollution. A three pronged approach will be required to beautify the river –

a) Massive cleaning effort to remove weeds and garbage
b) Building sufficient sewage treatment capacity so that untreated sewage is not discharge and
c) Use of river cleaning technologies (such as root-zonetecchnology). While points b and c are covered in other modules, point a must be taken up separately.
2. 100 Electrical buses

The Smart City Plan also proposes to ply 100 electric buses in ABB region, which will help inhabitants transit from their residence to surrounding commercial and industrial such as Hinjewadi. The bus service will reduce congestion on the Aundh to Hinjewadi stretch by providing a clean, comfortable alternative to the residents. The buses could also be used to commute within the ABB region (from BRT stations, transit hub etc). The buses will be AC, equipped with GPS and infotainment systems. Apps and portals for tracking their positions and routes will further boost ridership.

3. Express Airport Services

To truly transform ABB into a world class locality, the administration will have to ensure seamless connectivity to and from ABB. The express elite airport bus service will serve to accomplish exactly the same. Through high end buses, with ITS and infotainment systems, these buses will provide a hassle free transit to ABB from the Pune airport. The express airport service will have 10 buses running between ABB and airport.

4. E - Rickshaws

100 e-rickshaws will further help ensure last mile connectivity within ABB, particularly for tourists, visitors they will serve as an affordable, clean and convenient mode of transport to traverse within ABB. The 100 e-rickshaws, will also boost bicycle sharing and walkability by ensuring last mile connectivity.
5. Smart Metering (Water)

100% of connections in the ABB region will be fitted with smart meters. This will have three benefits – it will reduce the consumption of water, it will reduce the wastage of water and lastly it will increase revenue accrued which can use then ploughed in to improve the quality of service to customers.

6. Solid Waste Management

‘Zero Garbage’ is one of the major essential criteria for a Smart Locality, which primarily means that close to all the waste generated by the locality is consumed within, with only a miniscule percentage finding its way to the landfills. The solutions deployed will target 100% collection, segregation and disposal. A Sanitation & Waste Action Team (SWAT) will be formulated which will have at its disposal 3 modern road sweeping machines, 3 garbage collection trucks for transportation, 100% enclosed transfer stations with charging points for e-rickshaws engaged in door to door collection. This door to door collection through e-rickshaws will generate employment for nearly 500 people. The organic waste so collected will be segregated at the transfer station and transferred to a bio-methanation plant in Baner. The O&M of the system will be handled by a third party. However, the local body will operate one garbage collection truck, to act on complaints received at the control center.

7. Sanitation

The sanitation plan for ABB involves creating 74 world-class public toilets, refurbishment of existing 10 toilets so as to cater to the entire floating population in ABB (estimated to be about 5% of the 1.5 lakh by 2030), in line with cities like Melbourne & Singapore. Refurbishment of existing toilet spaces in public schools, including adding more WC s (76 in toto) to cater to ~4000 students and 120 teachers will help ABB match the international benchmark of 1 WC per 50 people. Each toilet space will have separate facilities for males, females and differently abled. All sanitation facilities will use smart features like solar panels to generate uninterrupted electricity and bring down O&M costs, be located close to accessible car parks with most cubicles directly facing the open areas. 30 drinking water fountains and 357 “smart dustbins”, to match the global bench marks of 8 drinking water fountains and 89 dustbins per sq.km.
MODULE 7: ICT with RoW

1. Security

Developing a ‘safe city’ is an essential element of making a smart city. In order to ensure this a centralized emergency response system is to be developed. This will be an advanced surveillance solution with 100% CCTV coverage integrated with a 911 dispatch call center to ensure maximum safety. The solution will consist of:

1. 75 PTZ and 16 ANPR cameras to achieve 100% surveillance
2. A dedicated Public Safety Command and Control Center (PSCCC) running high-end video analytics such as Search and Retrieval, facial recognition, PA announcement etc.
3. A “Central 911 call and dispatch center which receive CCTV surveillance feeds, relevant feeds from the PSCCC and emergency calls from citizens. The dispatch center will then dispatch the relevant response team such as Police Station, Fire Station, Hospital and K-9 units.
4. Gun Shot sensors, cyber patrolling and GPS on patrol cars will be placed and act as sensor feeding back information to the PSCCC

2. IT Connectivity

IT connectivity is key to a smart city as it improves quality of citizen services by improving communication and coordination between services and provides a seamless interface for citizens to access municipal services. Access to high-speed internet is one of the cornerstone of Pune’s smart city plan which will be first piloted in the ABB area and if successful, rolled-out to the entire city in phases. This will involve laying down of fiber optic cables throughout the area which to serve two functions – first, provide wireless internet throughout the area and second, integrate all services in the area (e.g. CCTV cameras, smart meters etc) to the integrated command and control center.

3. 5 Pilot DMA for 24x7 Water

Pune faces severe shortage of water despite having sufficient supply. The major reason for this uneven distribution and which leads to intermittent water supply. Intermittent water supply is responsible for a host of problems including meter burning, excess river pollution, customer dissatisfaction etc. Making Pune a 24x7 water supplied area is time consuming and expensive and hence needs to be done phase wise. This has been observed in multiple cities such as Nagpur which started with 10,000 connections and then gradually covered the entire city. 5 DMA’s have been carefully selected to represent housing typologies and will ensure 24X7 water supply can be achieved without large amounts of hard infrastructure (piping, reservoirs etc). These DMA’s account for 2.2% of Pune’s population i.e. approx. ~72000 inhabitants and ~44,500 floating population, and comprise of ~5200 residential units and ~220 commercial units. The transformation of these DMA’s into 24x7 water supply zones is a detailed 11 step process which includes: Bulk and consumer metering, erection of communication systems, study of pressure and flows, conduction water balance, fixing visible leaks, consumer awareness, invisible leak detection and repairs, replacement of broken pipes with MDPE pipes, increasing hours of supply and operation and maintenance of 24x7 water supply.
1. Smart Parking (LAD)

The Smart Parking solution for ABB area involves setting up of a smart multi-level car Parks across in the transit hub area. The parking solution plans to use a CCTV based solution coupled with sensors to monitor the utilization of parking spaces. The smart parking solution will be accompanied with parking apps which allow for real time monitoring of number spots. This will also reduce the time spent by vehicles in looking for parking, thereby helping the environment and congestion as well.

2. Adaptive Traffic control system

Adoption of Adaptive Traffic Control System across all 319 signals in Pune (with solar powered and UPS backups), will address the citizens’ woes of congestions. The system adjusts signal timings dynamically using vehicle density, thereby resulting in decrease in travel times and increased average speed (e.g. a Greater Mumbai Case Study reveals a potential reduction of travel times by 30% and increase in average speed by 10-15%). The suggested traffic system includes pedestrian buttons so as to customize timings according to pedestrian volumes (improve safety of pedestrians), central command control room with capability of creating green corridors in event of contingencies. The system suite will also include apps and portals for live alerts and forecasted traffic.

3. Bus ITMS

Improving the public transportation adoption on Pune will primarily by driven by two levers, first being the quality of the service and second managing the public perception. The first part centers around improving the availability (25 to 30% of the fleet down at any time) and improving reliability and visibility for passengers. Initiatives such as Vehicle Health Monitoring Systems which have provisions for diagnosing harsh braking, acceleration, engine transmission and braking failure and a back-end maintenance management system can potentially reduce the downtime of buses by 5-7%, thereby improving the availability. Reliability and visibility of the service can be improve through implementation of Vehicle Tracking Systems, PIS comprising GPS and ETA algorithms, LED, LCD screens on eligible buses and 190 major BRT and bus stops to improve reliability and provide visibility of arrival. This will further be complemented by continuous route optimization exercises and creation of open data sources, which will allow for crowd sourcing of innovations and ideas. To improve public perception, buses will be equipped with services like in-bus Wi-Fi (with pre-loaded information in 510 buses), surveillance systems with panic buttons and monitoring of violations such as over-speeding and harsh-braking. This will further be boosted by refurbishment of 100% of buses to improve “look and feel” and increase adoption with the higher income group.
4. Command Control Centre

Integral to the suite of traffic management smart solutions is a central command control center, which will be used to integrate and drive the adaptive traffic control and bus ITMS systems. Further, this control center will be used to implement green corridors and serve as back-end for citizen traffic apps and portals.

5. Total Smart parking (Pan city)

The Smart Parking solution in Pune involves setting up of 7 smart multi-level car Parks across the city. The parking solution plans to use a CCTV based solution coupled with sensors to monitor the utilization of parking spaces. The smart parking solution will be accompanied with parking apps which allow for real time monitoring of number spots. This will also reduce the time spent by vehicles in looking for parking, thereby helping the environment and congestion as well.

6. Intelligent Road asset Management

The intelligent road asset management system aims to optimize the spending on road maintenance. With a GIS based mapping and an object roughness indicator to measure the road roughness, this tool will help provide an objective criteria for utilization of funds in a domain, where spends usually are largely discretionary. This tool will complement our initiatives of improving traffic conditions through other ICT solutions by ensuring the quality of road infrastructure.

7. Traffic Modelling

This innovative solution involves understand demand related patterns of traffic movement in Pune. The solution involves modeling of people movement by leveraging the mobile phone network infrastructure in the city. The models so generated can be used by the city administration to understand and plan better the investments in transportation. This will provide better context for policy formulation as well as help generate significant amount of data for predictive analysis.
8. E - Challan

Encouraging adherence to traffic rules emerged as a major theme in citizen engagement exercise in Pune. A frugal innovation undertaken here involves equipping traffic police with tabs loaded with 3G/4G sim cards. These tabs will leverage the databases of ‘Vaahan’ and ‘Saarthi’ and use the Driver’s License (rather than number plates) to impose chalaans. The chalaans generated could be paid off by electronic transfers and would be traceable through individual accounts. Further, the police will be able to see/check the status of past chalaans as well.

9. Smart Commercial Meter

Metering of water consumption is already in place in commercial establishments in Pune. However, it is highly flawed as a large proportion of meters are faulty and are in “Reading not available” status. This is much below the world-class smart cities benchmark of 100% functional smart meters. Pilots and engagements in other parts of India indicate an average 30% increase in revenue collection. E.g.: 200 GPRS Smart meters have been placed in Hyderabad and 2500 in Delhi. Smart Meters will significantly improve accuracy of measurement, and also increase PMC’s revenues dramatically. Additionally, it will help in reducing water consumption and wastage as real time consumption information being given to consumers.

10. Smart Domestic Meters

Taking inspiration from the “Give up your LPG subsidy” scheme, the citizens of Pune will be offered an opportunity to adopt smart metering in their households. Pune currently has a flat rate for ~90% of the domestic connections in since March 2000. This has led to excessive wastage of water and widespread overconsumption throughout the and consequently low revenues. Other cities have much higher rates of water charges which are based on actual consumption by citizens. Delhi has an average water bill of Rs.6000 which is a consumption based tariff using mechanical and smart meters. Nanded City (neighboring Pune) has an average water bill of Rs. 5000 which is based on prepaid meters.

11. Bulk Meter

One of the major challenges that PMC faces is limited or no information about how much water is going and hence cannot conduct a water audit or leak repairs. Bulk metering is a critical first step towards 24 x7 water supply as well as reducing NRW and UFW through water audit and consequently leak identification and repair. Pilots and engagements in other parts of India’s indicate successful water Audit’s and leakage reduction. E.g.: In Nagpur Unaccounted for Water fell from 52% to 32%). By installing bulk meters we will be able to collect real time data on flow & direction of water and view everything on a comprehensive dashboard, develop a suitable future course of action on the basis of actual consumption of citizens, lay the network and pipeline correctly and according to needs of the city and assign lpcd consumption across the city with >80% accuracy.
12. E - Governance

E-governance is an essential element of transforming Pune into a smart city. The E-Governance solution is a comprehensive integrated solution which has multiple initiatives:

Establishment of an Intelligent Operations Center (IOC) and Mobile App:

As the general public go about their daily lives and encounter issues in the city E.g.: broken roads, potholes, lack of water, vandalism etc. they can use IOC - Citizen Collaboration App to report these issues for resolution. The App also allows citizens to: (1) See the location of all various smart service available such as Wi-Fi Hotspots etc. (2) Request for emergency services such as Hospitals, Fire, and Police etc. This app as well as all the other smart city solutions deployed across the city E.g.: Sensors at traffic lights, smart bulk water meters will integrate and talk to the centralized Intelligent Operations Center (IOC). This center integrates data collected from multiple smart solutions deployed and prevents them from operating in silos. It integrates data, analysis and coordination across city systems and multiple agencies and transforms city operations from reactive to proactive and becomes integration hub for domain systems – utilities, transportation, public safety etc.

Connected Communities: Pune Smart “DigiTel” Card:

The Pune “Digi-Tel” card is a personalized, interest and location based communication network centered on citizens. This is administered to the residents (above the age of 13) through a smart card. The registration is done at the ABB citizen desk where citizens give information about their interest and how to communicate with them (email, phone, SMS) Based on the demographic information, citizens will receive customized information such as updates on cultural events, school registration, major blockages on routes etc. Upon using the card at certain partner locations, citizens can win loyalty points to spend at restaurants, cinema halls etc. This will facilitate communication between Municipality and Citizens as well as amongst Citizens.

“E- PSCDCL” – Comprehensive online portal:

This is a comprehensive online portal which provides citizens multiple services at a single location. This will be supported by a citizen desk located in the local region which will conduct physical verification of the documentation and will have best in class front line staff. This initiative can automate the entire functionality related to delivery of citizen services by ULBs, thereby ensuring easy, efficient and error-free transactions to citizens. The benefits include: (1) Easy tracking of information and cost saving from better utilization of resources. (2) The citizen desk will be strategically located and provide easy access to citizens, it will act as the nodal point for all citizen to government official interaction including signatures, verification, document submission etc. (3) The citizen desk will be manned by best in class front line staff (FLS) and ensure a seamless customer experience.
13. Mobile app and website

Currently there are limited mechanisms available to a citizen to register complaints, this primarily includes calling the Junior Executive of the concerned area. Many cities have digitized the entire grievance redressal process and have seen major success. E.g.: Cities in Karnataka have implemented a completed digitized solution. A comprehensive suite of automated grievance redressal solutions should be launched simultaneously including (1) A user friendly website where complaints can be filed, tracked and updated. (2) An IVR system to reduce wastage of time of PMC employees. (3) A mobile base app to improve accessibility in all locations and where citizens can click pictures and send across to the concerned parties. The data will all be collectively recorded on a centralized database and analyzed to improve future customer experience. This will ensure effective communication, reduction in delays in response and wastage of time etc. and most importantly ensure a timely record of all complaints made.

14. Online billing

In order to reduce effort from the customer side as well as make bill payment an easy process, a comprehensive online bill payment mechanism needs to be set up. PMC has launched an online bill payment mechanism in October 2015. However, this needs to be revamped and steps must be taken to identify existing loopholes and problems in the system and build a world class consumer interface which is extremely user friendly, can be integrated with other device (E.g.: mobile) and has additional features such as timely reminders of bill payment. This will reduce the cost of earning revenue and ensure a seamless experience for consumers.
Module 9: LED

Open Space

Open spaces is one of the key determinants of quality of life in a city. We plan to increase the % of open spaces from approx. 4% currently to benchmark number of 10%. This will be done through rivopen parks, gardens, open gyms and multipurpose halls – approximately 8,654 sq m area in ABB is planned to be utilized for creating 7 new gardens/parks/open gyms, taking total to 13. 2 community centres over an area of 1,878 sq m facilitating citizen engagement and skill development. 2 open vegetable markets over an area of approx. 2,282 sq m catering to 20% of ABB’s population.

Module 10: Open Spaces

Street Lighting

The energy saving potential of LEDs is widely used across top cities across the globe and in India. In Pune, the plan is to replace 3,070 street lights by LED lamps with wireless control(similar to Telensa Smart City IoT model) to increase the coverage from 7% to 83% and achieve energy savings of more than 30% at zero cost, under PPP model. Existing 1,000 70w sodium vapour lamps to be replaced by 45w LED fittings; 900 150w sodium vapour lamps by 90w LED fittings; 50 400w metal halide lamps by 200w LED fittings; and 1120 T5 fittings by 45w LED fittings. For the 700 250w sodium vapour lamps that cannot be replaced by LED, the plan is to put dimmers that would help to stabilize voltage at 230V in non-peak hours, thereby saving energy to the tune of 15–20%. Without incurring any cost, PMC could get LED lamps and dimmers installed through the PPP model, where the private player puts all the infrastructure required and maintains it for 7 years (typically). In return, the private player gets a percentage of savings (typically in the range of 75–85%) achieved by putting up LEDs. The PMC recently ran a bidding process to get 35,000 lamps replaced by LED fittings in Pune city (non-ABB area).
MODULE 11: Skill Development

Electricity distribution – smart grid and metering

There like any other Indian city, Pune too faces the problems of high electricity losses and consumption. To minimize distribution losses and to promote electricity savings, it is proposed to have a smart distribution system that includes elements of smart grid and smart metering. This will be piloted in the ABB area and if successful, can be rolled out to the entire city. The city plans to deploy smart grid technology in ABB to support the ambitious solar energy rollout and also to help with demand-side control. MoUs have already been signed with the India Smart Grid Forum, a PPP initiative of the Ministry of Power (MoP), Government of India. This is being built into a DPR to be submitted to the State government for approval.

A comprehensive 24x7 electricity plan consisting of smart grid, distribution and meters to make the system future-ready, reduce AT&C losses from 9% to 6%, and integrate solar-power supply to the grid. There is no load shedding in ABB at present, except for the distribution transformers tripping (1.8% per month). The DPR prepared for distribution system in ABB area, including smart grid and T&D network strengthening, takes care of infrastructure requirements till 2030. It projects the load to grow at 15% till 2020 and at 6% thereafter. MSEDCL would enter into a PPA as and when required to ensure 100% power supply to this area.

Low income skill development and healthcare

The Pune Smart City proposal emphasizes on socio-economic transformation of slums by focusing on sanitation, healthcare, education and skill building. We plan to coordinate with the government to take the Digital India mission to the slums by offering vocational and skills training to the ABB community by using the community halls and setting up National Digital Literacy Mission centers with the aim that by 2016, at least 1 person from each household in ABB area will be digitally literate. PMC would also run skilling initiatives and app-awareness drives in the ABB region. By June 2017, PMC targets to equip 800 individuals with vocational training to make them professionally skilled by investing INR 2Cr in slum related smart solutions.
Solar energy supply

The goal is to ensure that at least 10% of the Smart City’s energy requirement comes from solar - make ABB area maximum solar city, with solar power fulfilling 15–20% of energy needs at zero cost model. A feasibility analysis is being conducted for installation of solar panels on all PMC owned buildings (with help from Pune International Center (PIC) and Prayas). PMC plans to conduct a bidding process to shortlist 2–3 private agencies to install solar panels under a renewable energy service company (RESCO) model (capex and opex is borne by private agency, PMC would pay consumption charges as per the tariff defined in PPA signed between PMC and private agencies).

A preliminary survey depicts the availability of 176 acre of roof-top space in ABB area. At a reasonable estimate of 25% coverage of rooftops, 15% to 20% of energy supply will come from solar power. For ABB area, solar roof-top implementation would start with government buildings and then expand to commercial and residential establishments, all under the RESCO model. Net metering regulations in Maharashtra are already in effect, thereby providing incentive to consumers to install solar panels. PMC has entered into an MoU with Prayas energy group—a leading Indian NGO—and would be responsible for conducting the solar awareness programs in the ABB area. PMC has entered into an MoU with MSEDCL to streamline the smart metering process.
Start up Zone

The Besides the strong presence of the IT sector, Pune also boasts of being one of the favorite destinations for tech start-ups in the country. As per the 2015 NASSCOM report, Pune accounts for 6 percent of all start-ups in India. While Pune is one of the successful start-up destinations in India with more than 400 local start-ups, which is one of the largest numbers of start-ups in India, their success rate is relatively low due to lack of incubators, accelerators and early-stage venture capital (VC) funds.

It has large technical talent available due to its many universities, along with cost-effective real estate and good infrastructure. On these lines, PMC has identified an area to develop a start-up zone in ABB, which would help to create a culture of innovation and promote mixed-use development. An initial roadmap has already been drawn for the 8-acre Startup zone, to be created in the identified area in the ABB region. This would also create at least 40,000 to 45,000 jobs which will be the catalyst for mixed-use development across Pune and promote walk-to-work.

There is a risk that start-ups may not move to the area or that new start-ups may not come. To cover up the risk, PMC will ensure adequate incentives, such as free rentals for 18 to 24 months to start-ups to create initial attraction. In addition, PMC has collaborated with NASSCOM to help bring incubators and accelerators to the city, thereby creating a whole ecosystem around commercial development in ABB. PMC has also initiated collaboration with Microsoft and Future Cities Catapult for this.
There is no mass transit system in Pune. To facilitate long distance commute, a multi-modal transit hub will be created at the entry point to Pune in ABB. It will have a capacity to accommodate 100 buses. This will be developed by the SPV on a PPP model by November, 2018. The operating model for the same would include the MSRTC charting out the routes operating out of the transit hub and managing the operations of inter-state & inter-city buses, PMPML managing the operations of buses (BRT, feeder), while the SPV will be the umbrella body coordinating between PMC, PCMC & PMPML. A 10-acre Octroi Naka land has been identified which will be used to develop the transit hub, a start-up hub and a multi-level car parking besides the commercial complexes in the area.
Population now: ~40 thousand

Estimate 2030 population: ~1.5 Lakhs

LOCAL AREA DEVELOPMENT - ABB
**LOCAL AREA INITIATIVES**

**AUNDH-BANER-BALEWADI**

- Electric buses for local area connectivity
- Differently-abled friendly pathways
- Waste water recycling
- Bus Rapid Transit

**LOCAL AREA INITIATIVES**

**SOCIAL INFRASTRUCTURE**

- Additional Multi Speciality Hospitals
- Public Toilets with Global Standards
- Fire Stations for Compact Development
- International High Schools
- Multi level Smart Parking
LOCAL AREA INITIATIVES

Enhance liveability quotient considerably on top of FIXING INFRASTRUCTURE

Open-space innovation
Interconnected gardens 5 minutes away from each resident

8 acre start-up zone & 32 acre commercial space

100% Underground Wiring

3.5-km riverfront with Promenade, recreation & entertainment zone

SLUM FREE AREA by redeveloping 500 slum households

Local Area Initiatives

Improve Sustainability
Aundh Baner Balewadi

- Smart street lights with 85% LED lamps, saving 30% of the energy
- Lampposts with Air pollution sensors, Panic button, Wifi access point, CCTV

- Smart grid in ABB for 100% power supply
- Solar roof-tops to contribute 15% of energy requirements

ICT solutions for Citizen convenience & E Governance

- Seamless Wi-Fi connectivity at 1 Mbps through over 100 access points for 10,000 simultaneous logins.
- Citizen app to redress grievances and integrate multiple functions
- ABB Punetel Card for a connected community
- Digital SPV to improve functioning with geo-enabled city operations
Structure of PSCDCL

P U N E Smart City Development Corporation Ltd

A THIN COMPANY

Governing Board

- Committees of the Board
- Internal and External Audit

CEO

- Functional reporting
- Administrative reporting

Chief Vigilance Officer

- Ensuring propriety

Head of Transport
- Domain Expertise

Head of Water and Sewage
- Domain Expertise

Head of Operations and Services
- Domain Expertise

Chief Urban Planner
- Design Vision

Chief Knowledge Officer
- Institutionalising knowledge

Chief Financial Officer
- Domain Expertise

Public Relations Officer at Citizen Walk in Desk

Improve citizen interaction and procure support services
## Module’s Details (Annexure 2)
### Physical Infrastructure (1/2)

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**Sub Total**

| | | | | | | **696** | **83** | **779** |
## Module’s Details (Annexure 2)

### Physical Infrastructure (2/2)

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Module’s Details (Annexure 2)

ICT Without RoW
### Module’s Details (Annexure 2)

#### ICT With RoW

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### Affordable Housing

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# Module’s Details (Annexure 2)

## Goods & Services

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### LED

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## Module’s Details (Annexure 2)

### Open Spaces

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### River Water Cleaning

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### River Front

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## Module’s Details (Annexure 2)

### Skill Development

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### Smart Grid

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<th>HoD</th>
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### Solar, Start up & Transit Hub

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