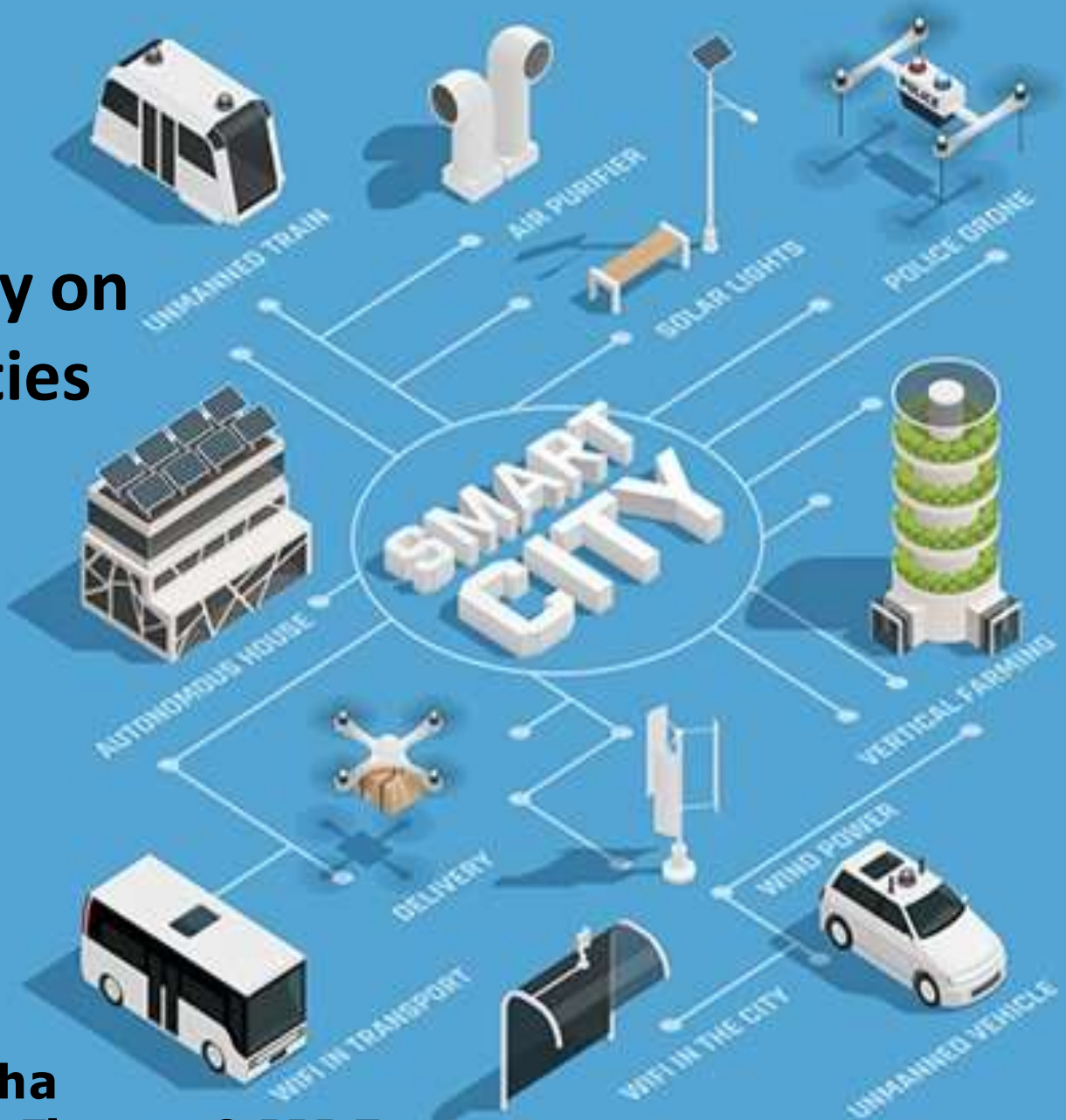
Case study on Smart Cities



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Case Study

See how Big Data is changing the lives of farmers in Hyderabad

At a time of widespread agricultural distress caused by successive droughts, unremunerative farming and debt-trapped rural economies, a young man with his mobile app is showing how change can be brought in the life of farmers at the grass-root level.

As reported by IANS in 2016, V. Naveen Kumar, who had no personal knowledge of agriculture, was so moved by the suicide of a farmer in a village in his native Warangal district of Telangana that for the next three months he ran around like a man possessed, meeting farmers to understand their problems. He interacted with agri-entrepreneurs and other stakeholders to find if there is a way he can bring some change in the lives of the financially-besieged farmers.

Today, over 1.24 lakh farmers in Telugu-speaking States of Telangana and Andhra Pradesh use his mobile app NaPanta to avail a host of services, all free of cost. And this MBA degree holder is satisfied that he is contributing his mite to bring some change in the way they practise agriculture. NaPanta, which was started in June 2017, saw, surprisingly, thousands of farmers download the app. The launch of the pocket-friendly Reliance Jio and the boom in use of WhatsApp brought more people on the platform.

The app, which provides all farming-related information and communication in Telugu on a single platform, is significantly reducing the time and cost of cultivation for a farmer in real time.

While the country has many apps to help farmers, there is no single app covering the entire gamut of agriculture activity ranging from selection of crops to locate the market offering highest price for their produce. From advisory services and weather information to market prices and e-commerce, the digital platform offers the comprehensive agri eco-system. The app has tools like crop expenditure (which helps farmers track their expenses in an organized manner), crop protection, weekly agro advisory, agri forum, market price, agri e-commerce, crop insurance, weather, food processing technologies, and soil testing information. A farmer can also buy or rent an agri-equipment as per the requirements of his crop cycle and can also sell his produce for the highest price without any middleman.

The app also allows farmers to access real-time and dynamic information pertaining to daily market prices of 300 agri-commodities across over 3,500 markets, along with three-year price trend. Currently available in Telugu and English, NaPanta App provides complete pest and disease management details, covering 90 crops and with suggestions about 3,000 pesticide products. Meanwhile, states including Maharashtra and Tamil Nadu were showing interest in the platform. The app will be available in Hindi and Tamil in June-July this year.

NaPanta, an incubatee of International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), also gets the institute’s help in business activity, reaching the farmers and engagement with agri-input companies.

Tata treatment plant in Jamshedpur reduces intake of fresh water

Tata Steel is committed to play a leading role in conservation of water and significantly reduce its impact on water. The steel company, which has setup a 30,000 cubic meters a day (m3/d) tertiary-level treatment plant in 2018, has now resulted in a 16 per cent cut in the intake of fresh water from the Subarnarekha River. The award-winning tertiary-level treatment plant was built to reclaim effluent from the Bara wastewater treatment plant in Jamshedpur for reuse by Tata Steel. The plant, implemented by Tata Steel's civil utility wing JUSCO (Jamshedpur Utilities and Services Company), will benefit Tata Steel and the adjoining industries in Jamshedpur.

According to Sanjiv Paul, Vice President, Safety, Health & Sustainability, Tata Steel, the success of the Bara project is a great example of how industrial units and civic utilities can work together for the greater good that ensures long-term sustainability of all the stakeholders.

The Ultra-Filtration treatment plant is part of Tata Steel's ambition to make Jamshedpur the first zero liquid discharge city in India. Since the completion of the facility, the entire city's collected sewage effluent, from both domestic and industrial sources, is gathered and reused by the city's extensive industrial complex. To improve city's rate of collection of untreated industrial and domestic waste, JUSCO laid a 500-km sewer pipeline and built ten automated sewage pumping stations and control centres, thus transforming the sewerage service coverage for the city.

The Jamshedpur plant has doubled its annual capacity over the last 10 years from 5 MnT to 10 MnT (million tons). Tata Steel is committed to reduce its freshwater consumption by 50%.

IoT utilities market to witness double-digit growth rate

A leading industry report predicts that utility firms are forecast to reduce their expenditure by nearly $157 billion by 2035 through smart meter applications, thereby stimulating Internet of Things (IoT) utilities market trends in the years ahead.

The last half a decade has remarkably witnessed IoT penetrating the utilities domain, effectively commercializing IoT utilities market, a realm which is of late, being characterized by intense competition among tech behemoths. Having earned the tag of being one of most dynamically transformative technologies brainstormed in recent times, IoT has successfully been exploited to a massive extent in the utilities sector.

The deployment of this technology has helped utility companies monitor real time power consumption by effectively promoting connectivity, operational efficacy, and communication between smart meters, edge equipment, and sensors. Furthermore, IoT has necessitated the conception of contemporary business models in the utility sector, the mass acceptance of which has been forecast to have a profound impact on the overall IoT utilities industry size, pegged at a valuation of USD 4 billion in 2016.

One of the most profitable avenues for the expansion of IoT utilities industry is the United States. Mass awareness regarding the benefits of IoT technology in sync with the presence of oil and gas production units across the country demanding the deployment of connected solutions are expected to drive the US market.

Across the APAC zone however, the escalating need for smart meters coupled with the development of smart cities and construction activities in China and India will help transform the regional IoT utilities market outlook. Furthermore, the huge presence of numerous power generating units and high government funding for the power sector will also provide a boost to the Asia Pacific IoT utilities industry trends.

IoT applications assist utilities in interpreting the power consumption patterns and problem recognition, facilitating the effective allocation of resources. The evolution of IoT has made it viable for smart meters to connect with consumer electrical equipment through wireless connections and provide them with real time information about power consumption.

On these grounds, over the last few years, the deployment of smart meters has gained intense popularity across the utility sector. The concept of smart cities has further helped promote the application of IoT devices across the construction sector, for the reason that IoT helps upgrade building and smart energy grid connectivity, which would eventually augment the profitability landscape of IoT utilities market.

Leading technocrats predict that utility firms would exploit IoT extensively in the ensuing years to reduce power consumption across the oil & gas, water, transportation, and electric sectors. For instance, the ability of the smart sensors to check the quality, pressure, temperature, and consumption of water has led to smart water management gaining renewed traction lately.

The competitive spectrum of IoT utilities market comprises the big shots such as Cisco Systems, Huawei Technologies Company Limited, Intel Corporation, and Honeywell International Incorporation, striving to bring about up-to-the-minute technological advancements that would have a commendable impact on the revenue of this business space. In the years to come, IoT utilities market is likely to have firmly established itself amidst the realm of IoT influenced business spheres.

Aided by extensive R&D investments, IoT utilities industry will, in all probability, carve out a profitable growth path over the forthcoming seven years, with a target valuation of USD 15 billion by 2024.

NamamiGange: Paving the way for modern integrated wastewater management

NamamiGange is the Indian government's ambitious programme to restore water quality in the Ganga and its tributaries. The main objective of NamamiGange is to prevent the flow of untreated sewage into Ganga and its tributaries. The Prayagraj project lays the foundation for the creation of new sewerage and wastewater treatment infrastructure, enhancement of existing sewers and treatment plant, and the long-term operation of the city's wastewater system.

The venture will be delivered by public-private partnership (PPP) concession known as the Hybrid Annuity Model, awarded by the state public health engineering department Uttar Pradesh Jal Nigam (UPJN), with the support of National Mission for Clean Ganga.

The role of the consortium has been to establish what the PPP concession will need to deliver to meet new wastewater treatment standards. This encompassed creation of new assets, enhancement of existing assets, and operation and management of the new wastewater system after the construction and refurbishment work is complete.

As a result of the consortium's work, it has been possible to prepare the PPP contract for a programme to increase the city's ability to convey and treat 328 million liters per day (MLD) of wastewater by an additional 74 MLD.

Waste management opportunity in India worth $14 bn

The growing economies across the globe are observing an increase in urban population, rise in per capita income level and increasing consumption level. With India growing on similar grounds, increase in purchasing power has led to more affordability and accessibility of the resources that increased the levels of municipal as well as industrial wastes across the Indian States. Having said, close to 62 MT waste is generated on an annual basis that will increase by two times by 2030.

That said, the Indian garbage, by 2025, is likely to offer a business opportunity of $14 billion, unlocking new business avenues in the waste treatment industry.

The increase in municipal solid waste (MSW) and industrial waste has led to a rise in public health concerns and environmental impacts due to the production of greenhouse gases. Of the total generated municipal solid waste, close to 45 per cent is actually treated with rest is thrown on the designated landfills, sewage and water bodies.

More than 50 per cent of the total solid waste generated remains untreated and dumped on the landfills due to the lack of efficient waste management system in India. As municipal solid waste (MSW) holds close to 75 per cent of the total waste generated in India, there lies an investment opportunity for the private players to convert a pile of garbage into the income streams.

Business Case

- NTPC to set up about 100 waste-to-energy pollution free plants across the country India has the potential to generate approximately 3 GW of electricity from waste by 2050. The government allows 100 per cent FDI under the automatic route for urban infrastructure areas including waste management subject to relevant rules and regulations.
- The central government has been implementing Swachh Bharat Abhiyan , emphasizing waste management at different stages of generation, collection and disposal.
- Municipal solid waste management sector in India is projected to see capital and O&M requirement of close to USD 65 Billion by 2032India has the potential to generate approximately 90 million tonnes per annum of waste by 2030-2032.

See how cities deploying smart solutions to mitigate urban challenges

Deployment of wireless smart sensors to monitor the integrity of bridges and identify leakages in water distribution pipelines helps the city authorities to prioritise their limited investments. Early this year, AT&T launched a service in the USA to monitor the condition of ageing infrastructure assets such as bridges, roadways and railways for cracks, tilts etc. This will help the authorities to make the repair or replace decisions with accurate real-time data.

Telecom operators are especially better positioned to scale up their pilot projects and create a compelling business case, due to their national or even international presence. For such smart solutions to work, the city needs to have certain basic infrastructure in place, which may not be the case with many fast-developing Asian cities.

However, there are applications where cities in Asia, could efficiently incorporate smart solutions. Examples include the following: A crowd sourced mobile app called Safetipin was initially launched in New Delhi and later expanded to other Asian cities like Manila. The objective is to make the cities safer, by involving users to perform audits and rank various locations.

Chiayi City in South-central Taiwan, which was listed as having the worst air-quality in Taiwan, transformed itself within four years, using technology and community engagement. The success was due to an integrated approach of a) setting up Air Box for particulate matter monitoring and display; b) developing a network of smart e-bikes to reduce traffic congestion; and c) creating awareness in schools and communities.

Indonesia has kicked off several smart street lighting projects especially in Jakarta and other cities in Java. Smart street lighting is increasingly recognised as the first step toward the development of a smart city, with multiple benefits like energy savings, public safety etc. New business models such as Lighting-as-a-service are exploited in Jakarta, Surabaya, Bandung and Makassar. The business opportunity for smart street lighting in Indonesia is four times that of a developed economy like Germany.

See what Indian cities can learn from global PPP examples

There are a variety of frameworks that city councils can pursue in order to realise their Smart Cities, all with differing extents of private sector involvement. The public sector can choose to deliver the project directly, but this is reliant on municipal expertise and acumen in relevant fields to pull off such a large-scale project. For instance, Singapore's smart nation approach to serving an ageing population through projects like TeleHealth and HealthHub that centralise healthcare databases and boost access to digital healthcare was developed by the Ministry of Health.

Alternatively, project teams can consider joint ventures or vendor financing which is usually short-term contracts on specific phases of the product development in which the private sector has significant expertise. This would bring in vendors like CISCO which announced a city infrastructure financing acceleration programme with funding of $1 billion, aimed at helping the city governing authorities deploy innovative technology with minimal capital outlay.

The most common framework would be the setting up of public-private partnerships (PPP). In a PPP model, the government establishes a long-term contract with the private sector for the provision of services. The PPP aims to increase the efficiency of an infrastructure project where the relationship provides the government not just funding, but also private sector know-how in managing the project. While this may involve the construction of an asset which is temporarily leased to the company, payment is contingent on the private sector's performance and the availability of the works or services acquired back by the city council, after a short period. A few examples of such partnerships are:

- IBM Command Centre in Bandung, Indonesia's 3rd largest city, operates a digital monitoring facility that collects street-level data in a variety of sectors (traffic monitoring and accidents, safety issues and emergency response, floods and natural disasters, and crime), with the intent of improving the city's management and governance.
- In partnership with the City of San Diego, General Electric (GE) upgraded the city's lighting with LED and deployed an intelligent platform with a likely cost of $30 million, financed by GE. City leaders have estimated that it will save the city about $2.5 million worth of electricity per year, reduce maintenance costs, and provide other benefits.

In a few select cases, smart cities are conceptualised, developed and operated solely by the private sector. All risks are borne and proceeds gathered by private companies and individuals. These also tend to be the projects which promise the most innovation due to the extraordinary leeway and opportunities presented to the technological sector.

Belmont, Arizona is a planned 24,000-acre smart city which will feature high-speed public Wi-Fi, self-driving cars, and high-tech manufacturing facilities which are being built from scratch by a partnership involving Bill Gates' investment firm; and local real estate investors promise a capacity of up to 80,000 residential units.

Shivamogga Smart City to get 100 E-Rickshaws

Karnataka's Shivamogga Smart City has come up with a tender to procure 100 electric rickshaws. The bid submission deadline is May 6, 2019.

To participate in the bidding process, the prospective bidder must be a manufacturer or an authorized dealer having manufactured, tested and supplied electric rickshaws before participating in this tender. An authorized representative of a manufacturer can also participate in this tender.

Following the footsteps of Gujarat, Karnataka is now in the process of introducing electric three-wheelers on its roads to arrest the growing pollution and fight climate change.

According to media reports, last year Gujarat Energy Development Agency (GEDA) had invited Expression of Interest (EoI) for the authorization of manufacturers for marketing and distribution of battery operated three wheelers under the state's Battery Operated three-wheeler (BOV) program. In March 2019, the Indian government notified the implementation of 'Faster Adoption and Manufacturing of Electric Vehicles in India Phase II (FAME India Phase II)' with a total budget outlay of Rs 100 billion. The program is aimed at promoting electric mobility in the country. The Transport Department of Delhi also issued a tender recently for the procurement of 385 electric buses. The NTPC Vidyut Vyapar Nigam (NVVN) has also invited bids for procuring 100 electric buses to operate in the state of Goa.

Drones to monitor construction projects

Kempegowda International Airport (KIA) will soon use drones for aerial site photography to monitor the progress of ongoing construction projects. The drones will take aerial photographs of the New South Parallel Runway (NSPR) project area (624 acres), the new terminal (T2) and apron project area (166 acres) and the forecourt project area (128 acres).

The aerial monitoring will be done on a fortnightly basis. Bangalore International Airport Ltd (BIAL), operator of KIA, has already issued tenders for the project. The unmanned aircraft will capture HD resolution images and videos of the progress of construction of the new runway, terminal and other infrastructure works being carried out at the airport currently.

India's smart city plan is at a nascent stage

Sean Chiao, President, Asia Pacific, Aecom said that when the smart cities mission of the country is implemented completely, Indian cities will have much to learn from each other's successes and failures.

What are the opportunities in India's smart cities mission (SCM) for an international company like Aecom?

We are quite positive about the concept of smart cities in India. As a multi-disciplinary company, Aecom provides not only design but also project management and operation, to name a few. So a smart city project encourages us to tap a lot of opportunities, especially for downstream works. We promote smart cities from varied perspectives, such as digital, infrastructure, environment, economy, socio–ecology etc. At present, we are working on Srinagar, Port Blair, Tirupati, and Vizag smart cities, where the first three city plans are based on tourism. In the case of Vizag, Aecom is providing the masterplan and sector-specific smart infrastructure project plans, since the city emphasises on flood mitigation. That being said, it is too early for us to talk about the success of smart cities or opportunities because the projects are in the nascent stage. The smart cities mission will take its own time because, right now, urban local bodies are focussing on area-based development (ABD). I think, when all the work related to ABD gets completed, other cities will learn from each other and opportunities would be created.

As you rightly said, the SCM is at its nascent stage. Considering the overall concept and your exposure globally, what role would Aecom's learning experiences play in India?

There are no global lessons because India is so unique. Each city has its own essence in terms of citizens, planning process, heritage etc. So we work with different agencies, such as Hitachi, IBM, and Schneider Electric, to name a few, as they have huge research and development activities under their belt. This helps us to understand the pain points of the cities. So, to answer your question, sometimes experience is required; however, the cities also need innovation and innovative ideas to implement. For instance, if we talk about the healthcare market, hospitals in India are way different from hospitals internationally. So, while we can use our learning experiences to make a city better, in some cases the city needs design creativity.

Are there any convincing studies being done to understand whether there is a need for smart cities?

Nowadays, we are talking about driver-less cars. Now, tell me, how many cities have driver-less cars? Not a single city in this world has it. But, car makers are developing this concept, aren't they? Similarly, though the concept is new to this country, what is the harm in developing it? I will give you another example. Five years ago, no one thought of using BIM software for construction and infrastructure projects. But now, most of the smart cities in India are using BIM software. In fact, in one of our projects in the Delhi–Mumbai Industrial Corridor, we are using BIM software for swift action. And now, BIM not only helps us design the structure, but also does cost management, operation, and management.

PHow do you see execution and revenue growth opportunities coming along in smart cities projects? Where is the ROI involved in it?

Since Aecom is a multi-disciplinary company, return on investment (ROI) for us was never an issue. All of our focus on operation, management, design, safety, compliance, and efficiencies, to name a few, lead to revenue and profitability. We make long-term investments; India

definitely has a market for us and we would like to expand in this country. As far as our Indian operations are concerned, I can say we are profitable. We are committed to the Indian market as we see high hopes here. We are quite optimistic about our business model in India because it is inching towards becoming a technologically-advanced country in the world.

All you need to know about Mumbai Metro's smart cards

The Mumbai Metro, run by Reliance has partnered with several private and public banks that offer their regular commuters with the Mumbai Metro smart card which incorporates dual purposes. Each of these banks has various benefits to offer the users, which includes cashback and loyalty points. Among the banks that have collaborated with Reliance Mumbai Metro is State Bank of India, Federal Banks and ICICI bank.

State Bank of India

SBI Metro smart card can be used for both the metro as well as purchases made at various retail stores, at an annual fee of Rs 499. SBI card has a preloaded value of Rs 50. An individual can then recharge according to their needs. Moreover, SBI offers reward points of 2000, on purchases made over Rs 2,000 within the first 60 days.

There is an automated top-up system available when the card balance reaches Rs 50. Further, one can avail 10 reward points per Rs 100 spent on auto top up.

Federal Bank

In collaboration with TMW Fintech, Federal Bank has launched two in one metro smart cards for commuters of the Mumbai Metro. A payment of Rs 50 is to be made to avail the card. Out of which, Rs 30 will be credited into the smart card. The card can be utilized as both the trip pass or stored value card, according to the consumer's requirement. A minimum of Rs 100 and a maximum of Rs 3,000 can be stored in the smart card. Moreover, this card can also be used in various retail stores.

ICICI Bank

ICICI offers a variety of smart metro cards, both debit and credit variants. The debit variants also include the coral and platinum versions, the latter offering auto recharge when the card balance falls to Rs 50, 20% discount on travel in the Mumbai metro and redeemable rewards. In the case of its credit card, ICICI bank gives the commuters the benefit of auto recharge, 12.5% discount on travel and 4 payback points every auto recharge.

Now GPS watches to keep a tab on lazy sanitary staff

The Global Positioning System (GPS)-enabled smart watches introduced by the Lucknow Municipal Corporation to keep track of the workers has caught red-handed 13 sanitary workers who skipped their duty.

Smart watches are being distributed to sanitary workers under the Smart City project. The decision to introduce smart watches was taken following numerous complaints of sanitary workers skipping work. Such a system is being followed in Pune with success, said officers.

Smart watches will be given to all 3,500 sanitary workers in the city within a week. LMC has purchased smart watches worth around Rs 3 crore from Indian Telephone Industries (ITI), a government subsidiary. The watch has a pulse detector and starts working only after it detects the pulse of the person wearing it.

As a part of the pilot project, around 70 sanitary workers were given smart watches, of these, 13 were deployed for cleaning work in Sarojininagar area. However, their watches showed that they were at a place near Unnao during working hours. When LMC officers asked them about the reason, they said that they had gone home after completing their work.

However, spot inspection revealed that the work was not done. Later, LMC issued them a warning and deducted a day's wage. If caught again, officers said, they would be suspended for a month from duty and sacked if found absent again

Diu Smart City to "bridge the gap" between 2 major tourist attractions

To improve connectivity between Diu (Old City) and Ghoghla Beach and to leverage the waterfront location and the beach destinations in order to improve the tourism potential of Diu, the Diu Smart City has proposed to build a 300 meters Diu Ghoghla Bridge Park. The bridge will be for pedestrians and cyclists that connects the old city of Diu and Ghoghla Beach. The bridge will act as a mediator between urban and ecological spaces and improve pedestrian connectivity to the city's heritage (Fort) and waterfronts. The project design aims at activating the beaches with promenades, water sports, night lighting, and art installations.

The project would act as a public open space offering multiple seating options with appropriate landscape along with active and passive recreational facilities. The design and aesthetics of the project is envisaged to be a landmark structure in accordance with the culture of Diu, which would create a unique identity for Diu.

The bridge would promote walkability for tourists and locals as well as would connect the different communities in old city Diu and Ghoghla. The project would strongly contribute to the city's strategy for Area based Development whose objectives include-leveraging the waterfront location and the beach destinations to improve the tourism potential of Diu and supporting the economy, in addition to improving the quality of life of the local residents.

In order to achieve the city's vision effectively, the project shall help in addressing the following challenges:
- Identity and Culture: Image building and landmark creation
- Transportation and Mobility: Connectivity
- Open Spaces: Vibrant public space creation
- Place Making: Exclusive and unique experience
- Mixed Use and Compactness: Walkability and safety
- Indirect Impact: Economy and employment

Relevance
The project is envisaged as an economic generator that will attract more visitors to the old city area. There is a heritage fort that would become a landmark once access to it is built through this intervention. The project will ensure that tourists have a spread of round-the-clock offerings, food courts, night markets, amphitheatres and events spaces, complete with sanitation, and convenience facilities. The beaches will be activated with promenades, water sports, convenience, night lighting, and art installations. The Diu-Ghoghla Bridge Park would be one of its kind project, which has not been executed in India thus the CITIIS expertise would be an important guiding factor to take the project forward.
Sustainability
The bridge is planned for pedestrian/NMT access to a park with multipurpose areas. The design and aesthetics are planned to improve the visual character of the surrounding infrastructure. An

intensive landscaping and a planting program will help mitigate the harsh humid climate of Diu and aid in experiencing the cityscape in a comfortable environment.

Innovation

The project innovation is in designing the bridge for pedestrians and cyclists only. The space around the bridge is planned for public space, recreation, and urban greenery. The project is envisaged to be a unique destination. Thus, the design, construction, and execution of the project would be most important for which consultancy services of the field experts would be utilized. The innovation in relation to existing best practices for similar projects will be explored, especially the projects that are being implemented by various developed cities across the globe with the intention to expand the public space, urban greenery and to create unique experiences and destinations for the people.

Bhubaneswar's B-Active project to improve public open spaces

To empower citizens to co-create and manage their neighborhoods and open spaces, the Bhubaneswar Smart City Ltd (BSCL) is developing B-Active project. The project aims at improving the quality of life of citizens by developing public open spaces. It includes development of parks and playgrounds, streets, non-motorized transit, smart PODs, youth engagement programs and heritage area development among others.

At the micro-level, the B-Active project intends to bridge gaps and overcome challenges observed during implementation of several of Bhubaneswar's Smart City Proposal components related to public open spaces, listed as under:
- Lack of an enabling framework to maximize use of public open spaces;
- Local capacity building constraints in programming and activation of formal public open spaces;
- Use of technology to better monitor these valuable city assets and improve citizen participation;
- Tools for co-creating and co-managing the public infrastructure investments; and
- Inequitable spatial distribution of parks at the city scale.

Objectives
• To revitalize waterways, tanks, streets that would act as sponges for capturing, storing, and cleaning its water systems
• To reuse the landscapes as productive spaces offering opportunities for interaction with nature through urban agriculture
• To reclaim public spaces for cultural, arts, and social activities
• To raise the profile of organized sport and active recreation in Bhubaneswar

Relevance
The project aims at addressing the challenges faced in prioritizing public health as an integral component of the smart city transformation. The B-Active project addresses the challenges created by the lack of access to sports facilities and active recreation in Bhubaneswar, including the lack of a supporting institutional framework to manage recreational, cultural, and open spaces assets and activities associated with it.
As per the existing inventory of parks and open spaces prepared by the Bhubaneswar Development Authority (BDA), there are no parks in 19 of 67 wards in the BMC area. Nearly 60 per cent of the city area is under extreme to moderate urban flood risk. The B-Active project has been proposed to address this urgent issue. The SPV has a strong team already in place for deploying smart solutions with a technology Program Management Consultant (PMC), engineering PMC, and a Master System Integrator. Working together, these agencies will be able to provide the necessary skills and expertise required to implement the B-Active project.

Sustainability
The B-Active project intends to promote universal accessibility not only through its physical infrastructure investments, but also through participatory activities and ICT initiatives for persons with disabilities, through collaboration with local, national, and international NGOs. The project

incorporates the concepts of resiliency based planning in its five city assets, viz. streets, water, parks and open spaces, playgrounds, and heritage.

Innovation

The project shall include social innovations like living classrooms, youth leadership programs, technical innovations parks, open space master plan etc. The projects will be bundled to ensure efficiency and effectiveness.

Puducherry to empower its citizens through an innovative & integrated financing mechanism

To improve a shared community infrastructure as well as augmenting social and technological capacity to achieve the goal of a 'slumfree' Puducherry, the Puducherry Smart City Corporation Ltd (PSCCL) has launched "Our Neighbourhood is Your Neighbourhood Too – A Participatory Planning Approach for Improvement of Low-income Settlements" project in Puducherry. The project focuses on empowerment of stakeholders through an innovative and integrated financing mechanism.

The project addresses the following challenges:
- Absence of direct and effective communication between communities and government
- Unequal representation in neighbourhood-level development
- Inadequate access to professional expertise, especially housing, infrastructure, and finance
- Exclusion from economic opportunities
- Limited ability of slum improvement lead agencies

It does so by solutions oriented towards citizen participation, ICT-enabled provision of government services, promotion of economic activity and employment, upgradation of public spaces in low-income settlements, and a dedicated knowledge and design centre.

Objectives

Amplifying Community Voices: To empower community stakeholders to voice their needs, and utilization of funds where they are needed the most.

Catalyzing Community Resources: To innovate an integrated financing mechanism to streamline deployment of multiple funding streams strategically towards social housing, community initiatives, and projects.

Leveraging Community Environments: To improve shared community infrastructure and public open spaces as needed assets.

Capacity Building – Bottom-up + Top-down: To augment the existing technological and social capacity, and inter-departmental coordination of lead delivery agencies to achieve the goal of a slum-free Puducherry.

Relevance

The project components include:
- MakkalMandram (People's forum)
- Puducherry SMART Enterprise Resource Platform (ERP)
- Pondy Urban Lab
- Housing Fix Project (HFP)
- Housing Build Project (HBP)
- Community Fix Set of Projects
- Physical infrastructure projects

All these are consistent with the project objectives identified under the CITIIS program.

Sustainability aspects

The project focuses on establishing equal representation of women, at the minimum 50 per

cent. The project's primary target is low-income groups residing in slums. At a later phase of the project, once the site experiments and the first upscaling are established, many of the built-in tools developed in the projects could be expanded to address the whole population of Puducherry. Community Fix and Housing Fix projects will be carried out using the 'urban acupuncture' methodology in order to bridge gaps of minor infrastructure, resolving problems, and upgrading living conditions at the level of individual home as well as in common public spaces. This will improve the overall living conditions, including garbage collection and water management. It would contribute to better quality of environment and climate resilience. This specific issue is a priority as many of the low-income settlements are located in particularly vulnerable sites - the seashore and next to natural sites such as mangroves or protected areas.

Innovation

The project proposes a holistic convergence of the material and social aspects which are often addressed separately. The project proposes partnership between public bodies and related agencies such as PSCDL, Slum Clearance Board, other government departments; private sector (YES Bank), researchers and experts skilled in participative planning and community engagement in urban areas, from both public (IFP) and private institutions (UDC). The project also emphasizes on technological solutions to be materialized by the digital platform ERP, their inter-linkage with GIS, geospatial systems and mapping. It also includes techno-legal solutions, required during the realization of the housing project, involving construction of 448 new housing units for beneficiaries from low-income communities. The socio-cultural innovation will be reflected in the ways in-situ regeneration is addressed while integrating a vision to enhance different forms of heritage.

See how geospatial data can add resilience to infrastructure

In the wake of growing geopolitical tensions, population explosion and ever-changing climatic conditions, nations, and the big companies instrumental in driving their economies cannot afford to ignore the need to develop resilient infrastructure. On the opening day of the three-day Geo Smart India Forum 2019, almost all speakers, during a series of plenary sessions, agreed that while there is a broad consensus among governments and businesses about the need to develop high-quality infrastructure to boost the global economy, the world continues to under-invest in it.

“In 2017, the world lost a whopping 370 billion dollars due to natural disasters. 2017 was second only to 2011, when a series of calamities caused widespread destruction in several nations. These figures highlight the need for resilient infrastructure,” said Kamal Kishore, member, National Disaster Management Authority.

Citing an Asian Development Bank report, Kishore, who was one of the speakers at the forum, said, “Asia will be spending 1.7 trillion dollars every year in building infrastructure. Of this amount, 200 billion dollars will have to be spent on making this infrastructure resilient. To successfully achieve this target, we need to focus on four key aspects: risk assessment, standards and regulations, long term finance and swift recovery of infrastructure in case of a disaster.”

In simple terms, infrastructure resilience means the ability to reduce the magnitude or duration of disruptive events. The effectiveness of a resilient infrastructure depends upon its ability to anticipate, absorb, adapt to, or rapidly recover from potentially disruptive events. “Infrastructure is not only what we can or will build. We have to view it in terms of the existing land, sources of water and other natural resources available to us. For me, an infrastructure’s resilience depends on its ability to be functional at the time of a calamity,” said RajanAiyer, Managing Director, Trimble India. Emphasizing on the importance of geospatial technology in this regard, Iyer, who was addressing a large gathering at the forum, said, “It’s now time to move from e-governance to g-governance.”

Kaushik Chakraborty, Vice President & Regional Executive SE Asia and India, Bentley Systems, Singapore, said that in order to build resilient infrastructure, proper information sharing between the concerned parties will have to be started from the time of finalization of the concept. “This will have to go on all the way to construction and then maintenance. That is why integration of geospatial and engineering has to be there,” he said.

Meanwhile, presenting the government’s point of view on the issue, another speaker, Shambhu Singh, Additional Secretary and Financial Adviser, Ministry of Road Transport and Highways, said that the ministry has decided to use geospatial technology in construction, operation and maintenance of all national highways. “Geofencing of all national highways is also on our list of priorities. We are trying to bring all stakeholders to the table to ensure convergence of all modern technologies for better execution of our policies,” he said.

In the aftermath of devastating floods in India's southern state of Kerala last year, the state's governor, P Sathasivam, said that post-disaster, reconstruction should be viewed as an opportunity to rebuild the state offering better standards of living to all sections of society. Recently, Fijian Minister for Lands and Mineral Resources Ashneel Sudhakar also acknowledged that quality materials are extremely important to build resilient infrastructure that will have a long-lasting impact on the country.

While the idea of resilient infrastructure is simple, its overall execution may require a dynamic approach through the use of modern technologies such as geospatial. Information on location is clearly the key service which geospatial technology can provide. It can easily address the most pressing issue of site selection for facilities like power plants and hospitals. In fact, the geospatial technology, through its vast range of modern tools, can contribute at every stage of infrastructure building such as planning, building, operations and maintenance.

Meanwhile, highlighting the importance of geospatial technology in building information infrastructure for Digital India, Rajendra Jagtap, CEO, Pune Smart City, said, "We stared an e-governance app for the citizens to address their day-to-day grievances. We realized that using geospatial technology, which helped us in tracking the exact location of the complainant and the kind of problems faced by residents in a particular area helped us in addressing the issues faced by the public."

Echoing similar views, Rajesh Mathur, Advisor, Esri India, said that GIS not only helps in managing high-velocity data systems but also contributes to monitoring and alerting. "We have to start looking at the convergence of all modern day technologies such as AI, machine learning, GIS and others to build a Digital India. Geospatial tools can help us in achieving this target," he said.

Delhi gets IoT-driven garbage bins that informs authorities when full

The Steel Authority of India (SAIL) has launched Internet of Things (IoT)-driven garbage bins across South and North Delhi Municipal Corporation area, which automatically sends a signal to the waste collection authority once the bins are full.

One of the key problems the Smart Garbage Bin solves is that it pre-informs the authorities, preventing bins from overflowing. Improperly disposed-off garbage is one of the main causes of the spread of various diseases as well as bad odors.

These waste bins are made up of SAIL SALEM stainless steel and will be set up in underground Reinforced Cement Concrete (RCC) pits at the corporation's smart garbage station.

"There will be separate bins for recyclable and non-recyclable wastes. The RCC pits will be covered with a pit-cover fabricated out of stainless steel slip-free sheets. Suitable openings on the pit cover will allow the sanitation crew to dump the collected garbage into the bins placed underground," SAIL said in a statement.

The IoT-driven initiative is fitted with a a real-time indicator of the garbage level in the waste bin at any given time. The data is useful in scheduling waste pick-up accordingly and also for optimizing routes for waste collection vehicles. The bins use ultrasonic sensors for detecting the level of trash in the bin.

Furthermore, SAIL is reportedly planning to set up such bins in other municipalities, and may even consider taking up the production on a commercial scale too.

According to the 2015 report by the Central Pollution Control Board of India (CPCB), Delhi alone generated 689.52 metric tonnes (MT) of waste, followed by Chennai with 429.39 MT, Mumbai with 408.27 MT, Bengaluru with 313.87 MT and Hyderabad with 199.33 MT.

As of 2015-16, Delhi had one compost plant processing 150 tonnes of waste per day and an integrated waste processing plant that processed 1,250 tonnes of waste per day, according to Delhi Pollution Control Committee's 2015 report.

While the waste generated at home is collected by the garbage collector who then dumps it at the community bin. The urban local bodies (ULB) then collect the waste from these bins.

A similar smart bins project were earlier initiated by the Bengaluru state government. In January last year, the Bruhat Bengaluru MahanagaraPalike (BBMP) had initiated a smart bins pilot at the VidhanaSoudha and Cubbon Park in the city and said to expand the scheme with the project's success.

Even the government has recognized the similar Smart Trash Can project, which is aided by the ultrasonic sensor interfaced with Arduino UNO to check the level of garbage filled in the dustbin and sends the alert to the municipal web server once if garbage is filled.

See how Surat plans to create digitally-inclusive urban space

The Surat Smart City Development (SSCDL) has developed that will create a digitally-inclusive urban space through interactive service delivery points. The project targets space creation in public open spaces, the creation of additional service delivery points, for various civic and administrative services, and creation of a participatory environment, in addition to addressing safety concerns. It includes the creation of seating space for waiting, rest or evening recreation for senior citizens, children, adults, females etc., at major locations like gardens/parks, street footpath, major bus stations etc. The project will also encourage self-service through smart kiosks like banking, along with space creation rather than personal visit at civic centres.

It is expected that the digitally-proven the project will provide citizens with information related to weather, air pollution, bus timing, important announcements etc. at any time during morning walk or while in transit. Enabling real-time feedback from citizens to civic administration on various services and needs through this project. Provisioning with CCTV surveillance to ensure the security of the infrastructure, as well as citizens within the vicinity of the urban space, created. Introduction of Surat Money card, with an additional channel whereby citizens can pay their fees and payments for civic services.

The major physical infrastructural components of the project will include Smart Connect, smart kiosk, environmental sensors, smart eye, smart billboards and public announcement systems, smart space creation with USB charging sockets, integration with City Command Control Centre, solar panels, and smart LED lights.

The project aims at improving the quality and user experience of public service delivery by providing one-stop smart solution, providing information access on the fly, ensuring additional service delivery points for the convenience of citizens, and, providing an integrated view of all services to ULBs and hence, facilitating the decision-making.

The project is proposed to meet the expectations of citizens and provide digitally inclusive services across the city. Through the creation of digitally inclusive urban space, Surat Smart City will enhance the quality of life for citizens by means of real-time information about important announcements, weather conditions, air pollution level, etc.

The project will utilize state-of-the-art technology comprising of solar panels, sensors, interactive screens etc., which will be integrated with the state of art Integrated City Command Control Centre for monitoring and real-time update. The city has undertaken multiple projects in the field of space creation and ICT including Internet of Things (IoT) devices.

Sustainability

- The proposed project is a digitally inclusive plan.
- The project will promote digital inclusion by providing public Wi-Fi services at each digitally inclusive space and hence, bridging the digital gap between different strata of society.
- The project will help to achieve the cashless culture within Surat city by simplifying their payment of fees, property tax, water bill etc.

- The project is eco-friendly as it uses solar panels to power all IOT devices.
- The air quality and weather sensors at each digitally inclusive space will facilitate real-time information on air quality.
- The integration of these sensors with Integrated Command Control Centre would enable civic administration to take innovative corrective actions.

Innovation

- The project uniquely bundles together space creation and digital services
- The IT components will be integrated with the Smart Poles as well as the transactional kiosks proposed
- The project bundles together various citizen-centric services in terms of scalability, reliability, and usability with real-time information
- The project envisages various innovative revenue generation avenues such as: smart billboards, kiosks, and paid premium Wi-Fi, etc.

Bhopal to turn buses into modern classrooms!

To impact as many school students as possible with education support, improve student retention rate in schools by strengthening education systems, and to provide user-friendly mobile community development centre as a learning space, the Bhopal Smart City Development Cooperation (BCLL) has drawn a plan to refurbish the old public transport buses of Bhopal City Link (BCL) as modern classrooms.

The project aims at refurbishing old BCLL buses as modern classrooms to provide classrooms at doorstep. It envisages, the refurbished, child-friendly and universally accessible buses that will act as a support to education for the slum habitants.

The mobile computer-enabled buses would be utilized to cater to the education needs of slum areas, during the day hours (8 am to 5 pm). The buses will provide basic primary and secondary education, IT skills, and access to latest skill development courses, and certification to the students.

The target population lacks access to basic primary and secondary education, information technology skills, and other advanced skill development courses. The project proposes to bring education to the slum communities using the Enabler (bus), Services (classroom infrastructure) and System/Processes (slum communities) approach. In the designed pilot phase, 15 buses, each with capacity of 35 students, are proposed to cater to more than 500 students in slums of Bhopal.

The project has incorporated awareness courses related to health issues, gender biases, education, sanitation, environment etc. The classroom infrastructure such as computers, projectors and other accessories will be solar powered inverters. The project will incorporate all the design principles to ensure that the bus infrastructure is universally accessible.

The project conceptualization has incorporated many innovative components such as, converting existing old buses to classrooms, using renewable energy for powering the mobile classrooms and labs, space utilization for community development and awareness generation activities, mobile library, the project has proposed diverse learning and training programs to be undertaken, such as computers, graphics, and animation.

The project envisions to partner with various skill-development bodies in public, private and non-government sector. The project envisions to partner with CSR programs for employment opportunities

See how Thane is moving towards smart development

In a quest to improve the overall mobility of the city, the Thane Smart City (TSCL), a special purpose vehicle, is developing a mobility improvement plant as a part of its area-based development plan. The project proposes station area improvement to benefit the daily commuter footfall of 6.5 lakh passengers at Thane station through promotion of Non-Motorized Transport (NMT), organization of station-related activities, and use of technology to organize vehicular movement.

The project involves infrastructural development along 23 streets around the station area. These streets have been categorized into following four themes and would be developed thematically:

- Gateway
- Retail
- Culture
- Waterfront

The project responds to the mobility and safety needs of pedestrians by the following proposed components: Construction of roads and wider footpaths with urban design components such as: ramps, tactile pavement road markings, bollards, interlocking pavers; landscaping, and street furniture; variable message signage and interactive message boards. What's more, the project willadopt smart traffic management technologies such as sensor based traffic lights along with the Integrated Command and Control Centre (ICCC)

The project is proposed around Thane station, which is one of the most heavily used stations in region and hence, will have huge impact for the daily commuter footfall of 6.5 lakh passengers. The project addresses outstanding issues of the station area such as, heavy vehicular and pedestrian traffic, narrow footpath force pedestrians to walk on the road, haphazard parking spaces, encroachment by hawkers and vendors, conflict of multi-modal traffic at intersections. The city has experience in implementing projects for streetscape design, Non-Motorized Transport and multi-modal integration and is seeking expertise for aesthetics and traffic calming.

The project acknowledges the need to include physically challenged, seniors and children in designing infrastructure around the train station. The street signage with Braille and place route maps for easy understanding have been proposed. The security will be ensured in station precinct by installing CCTV cameras and the vendor stalls will be functional the entire day. The project also proposes arrangement for ground water recharge at permeable areas, sufficient planting, installation of solar-powered lights and use of locally sourced building materials.

The project borrows from the principles of train station design in Japan, where train stations have historically been public places. The project is focused on the pedestrians and passengers using the train station and nearby area. The project is replicable at all railway stations in Mumbai and largely India since principles of station area design and development are universally applicable

Last mile connectivity model for Ahmedabad! (dockless bikes to be integrated with BRTS)

The Smart City Ahmedabad Development has developed a last mile connectivity model using dockless bikes for Bus Rapid Transit System (BRTS) and along with Ahmedabad Municipal Transport Services (AMTS).

The project aims to ease last mile connectivity through dockless bikes for Bus Rapid Transit System (BRTS) and Ahmedabad Municipal Transport Services (AMTS). The project includes: dockless and smart bikes, functional and unisex bikes, installation of multiple bicycle stations at several different key locations, development of application to reserve/book a ride, sustainable and low-cost transport infrastructure, IT integration of bicycles, users, stations and terminals.

The objective of the SPV is to convert around 250,000 potential passengers into public transportation users. That said, the project will also see an integration with 1,000 buses (250 BRTS + 850 AMTS buses) to provide connected travel experience.

The project focuses on reducing air and noise pollution, reducing greenhouse-gases emission, ensuring economical and convenient last-mile connectivity, reducing congestion on streets, and promoting healthier lifestyle. The station sizing would be according to the demand of the vicinity and station placement in visible areas like BRTS/AMTS stops, near upcoming metro stations, riverfront, parks and gardens, heritage locations. The municipal corporation has previous experience with Smart Bike initiative called, MYBYK at riverfront and experienced human resources include specialized urban planners, civil engineers and mobility experts.

The project would leverage existing IT solutions such automatic fare collection systems, open loop common city payment system, city surveillance and Integrated Command and Control Centre (ICCC).

The dockless bike system will delimit the BRTS and AMTS geographical reach in the city. The project is environmental friendly as the gradual reduction in number of motor vehicles would reduce fuel consumption and greenhouse gas emission. The financial sustainability will be ensured through user charges paid by the commuters. The dockless bike will be a highly cost-effective and time-saving mobility option for local and tourists alike.

Nagpur to digitally integrate its municipal services

The Nagpur Smart and Sustainable City Development Corporation (NSSCDCL) has envisaged to implement a integrated digital governance system to effectively deliver the applicable municipal services to anyone, anywhere, anytime irrespective of their education, caste, gender, age, and income.

The scope of the software and applications include all associated processes, functions and activities including but not limited to:

- Citizen-centric operations such as property tax transactions, trade licenses, marriage certificate, water billing
- Back-end operations such as accounting, solid waste management, DAK management system
- (DARPG/ similar guidelines of Government of Maharashtra Compliant), HRMS including pension and payroll
- Workflow management consisting of all workflow of ULB departments with integrated Document Management System
- Enterprise level SMS and email solution
- Payment gateway
- Service-level agreement monitoring
- Designing and developing necessary interfaces as required for seamless integration with other systems to get required information

Objectives

- To develop an Enterprise Resource Planning (ERP) solution for web-based integration of all municipal services
- To enable a 360-degree view of all the property, assets, offices, and utilities in different layers using 3D GIS Map
- To improve decision making in planning processes-traffic management, asset management, and services provision

Relevance

The portal would be a single point of entry for entire range of G to C, G to G, G to B, and B to C services (G-Government, B-Business, C-Consumer). The project already has in place a project management unit for design, implementation and monitoring of the project. The City Operation Centre (COC) comprising of a 1,045 km network provides the backbone for integration of services.

Sustainability

The portal will be integrated with environmental ICT devices at different locations in the city to provide climate information like temperature, humidity, wind, air quality/pollution level to the citizens. Historical pattern analysis via 3D environment dashboards to the local administration. The portal will facilitate analysis of Dengue and other diseases and facilitate further decision making to prevent the spread of these diseases.

Innovation

The project provides a common platform for integrating various data streams and analyse the impact across urban socio-technology system comprising of, urban infrastructure layer (infrastructure/jurisdiction components), urban data/digital layer, services layer (services by government agencies, business companies, etc.,). The portal will facilitate development of

digital assets (illustrations and animations) based on the municipal services. The project has tremendous replication potential within the city as well as across Urban Local Bodies, including replicability of digital assets.

Transforming wasteland to public space in Surat!

Surat has a few natural drains running across from east to west. Most of the areas along the drains were misused for dumping waste and illegal activities like animal slaughtering. Crime, nuisance and illegal activities started developing as a result of lack of accessibility and creation of unsafe zones. Some stretches along the drain also became the hubs of unwanted mosquito breeding.

To curb such activities, the Surat Smart City is creating a 'Wild Valley Bio-Diversity Park' by rejuvenating existing wasteland along the creek. Meanwhile, digital elevation modelling is proposed for the planning of the project. The innovative and already experimented (elsewhere) technique – Miyawakiu will be implemented. In this technique, different species are planted together and nearby like an actual forest that enhances and accelerates plant growth. The project aims to rejuvenate the existing wasteland along the creek by proposing varied range of activities through the following components:

- Public Park with a special focus on children and the elderly;
- plantation of natural species of flora to maintain good air quality;
- walking trails, and cycle tracks;
- maintaining the natural storm water course;
- interconnection of water retention ponds; and compound walls, fencing, gates, and railings, etc.

In addition to developing a bio-diversity park for preserving flora and fauna, the project envisages to make the wasteland accessible for public use by developing it into a usable public space. Through the City Investments to Innovate, Integrate and Sustain (CITIIS) grant, the project intends to mobilize the city ecosystem to facilitate partnerships between stakeholders to define common goals and road maps.

Objectives

- Rejuvenation of existing wasteland along the creek into wild valley Bio-Diversity Park and creating large chunks of city greens.
- Reducing foul smell from the creek, prevention of water pollution by phytoremediation, and improving air quality through plantation of natural species.
- To increase overall green cover by providing non-conventional recreational spaces like children's play area, senior citizens corner, parks with facilities for disabled people, etc. To reduce impact of heavy rainfall by creating water retention ponds and creating spaces with favourable areas for birds and other species.

Sustainability

The bio diversity park will be developed with minimum intervention to the natural terrain. The project proposes extensive plantation of natural species that will help to control urban temperature and mitigate the extreme effects of heat and cold. Financial sustainability of the project will be ensured through user charges, advertisements, parking charges, shared bicycles and solar vehicle sharing system.

Participatory approach

A participatory approach will be adopted that involves local citizens, people's representatives, and experts from varied fields. Environmental activists, nature clubs, and NGOs would be associated with the project during conception, designing and implementation. Local leaders

have already been informed in detail and their suggestions are incorporated as per the needs of the area.

Amritsar takes bold steps to tackle air pollution & reduce carbon footprint

Amritsar has an existing bus network (BRTS) and city bus network, but the current system is not sufficient to cater to the public transportation requirements of all citizens. This has led Amritsar Smart City (ASCL) to develop a last-mile connectivity project for all citizens through feeder service. The present modal share for public transport is 1.5 per cent. The proposal aims at increasing it to 20 per cent through simultaneous reduction of private vehicles. The project also aims at an overall improvement of air quality and reduction in carbon footprint.

Objectives

- To provide an e-mobility experience to all residents and visitors in the holy city of Amritsar,
- to improve modal share of public transport in Amritsar and increase it to 20 per cent,
- to reduce air pollution caused by diesel powered public transport (PT) and intermediate public transport (IPT) services,
- to provide a comprehensive system of charging infrastructure for electric vehicles,
- to ensure eco-friendly and convenient mode of last mile connectivity, and
- to reduce operational expenditure of city bus service fleet by introduction of e-mini buses.

Relevance & feasibility

There is lack of adequate public transport infrastructure and poor last mile connectivity in Amritsar. The project proposals integration of e-rickshaws and e-mini buses for increasing the modal share of public transport. Current BRTS in Amritsar has a fleet of 93 buses alongwith an integrated command control centre. Building on this, ASCL intends to extend it to sustainable modes of transport in the city. ASCL and Amritsar City Transport Services (ACTSL) shall be responsible for planning and implementation of the project. The upcoming integrated command and control centre facility is state-of-the-art ICT-enabled platform from where various smart components shall be operated and monitored such as city surveillance, emergency call box, environment monitoring systems, information dissemination systems, etc. The SPV envisages to capture funds through monetizing land banks, improvisation of property taxes, betterment costs for improved service delivery, betterment cess for improved service delivery.

Sustainability aspects

A key element of this project is equitable access of the public transport system to all the city residents. The envisioned e-bus services will enable cost-effective and friendly. Convergence of the project with other IT-related initiatives (e.g. ICCC project) launched under Smart City Project, will help in creating a safe and secured environment specially for women. ACTSL shall select a suitable private operator who shall be responsible for running the buses on the defined routes based upon the predefined rules, regulations and associated covenants.

Innovation & Integration

The proposed central command and ITS-based intervention will help in real-time tracking of e-Buses and adherence to the schedules. Interactive mobile application developed during the project would help the citizens in planning the journey in advance and minimize wait time. Public information system will be provided on all the bus station as well as IPT stops to alert the passenger and facilitate seamless transfers.

Common smart card for all the PT modes will be developed that avoid the inconvenience of buying ticket every time of travel. The cost of the operation and maintenance shall be borne by

the private operator selected through transparent bidding process. The private operator would recover the O&M cost through pre-decided fare system.

Kochi's cloud-based e-Health solution incorporates all govt hospitals into one integrated system

To provide affordable and quality healthcare services to the citizens, the Cochin Smart Mission Limited has adopted e-Health solution, being developed and implemented by the Kerala State Health Department (KSHD). This solution integrates all departments and government hospitals into an efficient Hospital Information and Management System.

The cloud-based e-health solution will rely on high-speed multi-protocol label switching (MPLS) connectivity as every transaction is stored in cloud-based State Data Centre. The success of this project will contribute enormously in improving the lives of common people who depend on the public healthcare institutions for availing health-related services.

Relevance & feasibility

Cochin has already a large number of advanced healthcare facilities, but most of them are in the private sector. The existing network and the computer hardware infrastructure is very old and inadequate to implement an e-Health solution. The project aims at building a digital database of individual medical records that are easily accessible to medical practitioners. It includes unique patient identification in different settings and exchange of data between different health care delivery units at primary, secondary, and tertiary-level across State.

Sustainability

The key objective of this project is to facilitate availability, accessibility, and affordability of health services for all categories of people through the use of ICT. Scientific supply chain management will be made possible through the framework. It will optimize inventory management and ensure timely availability of medicines, equipment, etc. Handholding and training to the doctors and other healthcare professional will be provided as part of this project. PMU for e-Health at State level will be responsible for the operation of this project. ICT-based health solution will lower the cost in operation of the project over time as doctors will be able to issue medical prescriptions digitally.

Innovation & Integration

Demographic data will be dynamically updated. This will provide accurate and complete information of the population. Since the software solution is already developed by the State, the implementation of E-health Kochi will be cost effective.

Participatory approach

The State Government has already developed an e-Health website: https://ehealth.kerala.gov.in. Consultations with hospital and the State e-health team have been conducted to understand the requirement of the project. SPV plans to conduct a hand holding by SeMT to the doctors and healthcare professionals for the seamless operation of the e-health solution.

Vizag to develop its futuristic learning environment by modernizing public schools

As a part of City Investments to Innovate, Integrate and Sustain (CITIIS) initiative, the Greater Visakhapatnam Municipal Corporation (GVMC) has submitted a proposal to upgrade existing 149 schools by adopting smart ways to develop futuristic learning environment is necessary. The project aims at modernizing public schools as smart campuses by retrofitting GVMC schools. It would transform the schools as 'Smart Campus' and create a 21st century education infrastructure for every strata of the society. It includes upgradation of basic infrastructure facilities, encouraging outdoor play and physical activities amongst students, the rebranding of the GVMC schools, and, investment in schools to provide technology-based learning.

Objectives

To rebrand GVMC schools through uniform identity in terms of facade improvements and signage. To provide clean and green education campus to enhance learning and teaching environments and to provide more outdoor activity areas for students to increase opportunities for greater physical activity.

To optimize the use of underutilized land within school premises by the creation of functional spaces, and universally accessible design through the creation of ramps for access to schools and classrooms.

To equip schools with technology-based digital learning zones for students and teachers, future classrooms, other teaching/learning resources, in addition to the capacity building of teachers. The project aims at leveraging IT infrastructure for the improvement of the quality of education in schools and encouraging the medium of digital literacy amongst students.

Kakinada to get ICT-enabled real-time public transport system

The absence of public transportation system in Kakinada city has resulted in increased vehicular emissions, traffic congestion, absence of last mile connectivity and expensive commute choices for the citizens. This growing concern has led Kakinada Smart City Corporation Limited (KSCCL) to prepare a proposal for Electric Public Transportation System in the city.

The key components proposed in this project are, electric buses for transportation, charging stations, and ICT enabled real time passenger information system. With introduction of cleaner modes of intermediate mode of public transport, the project also aims to improve livelihood of cycle rickshaw peddlers by operationalizing e-rickshaws. The electric public transportation will be integrated with 200 new bi-cycles proposed as a part of the project.

The city has been demarcated into various zones and in the first phase, every zone will have 20 bicycles with 5 docking stations, which may be expanded in later phases as per the response of the citizens.

Sustainability aspect

The buses proposed in the project will be procured under the Faster Adoption and Manufacturing of (Hybrid) Electric Vehicles (FAME-India) scheme that provides subsidy on E-buses. The initial route planning has been done for the operation of the buses. Importantly, the Electrical Public Transportation Project at KSCCL will develop gender friendly mobility plan for women commuters. The project envisages increased women participation in operational functions of transport systems like drivers, station attendees, and supervisors. That said, the electric public transport will be charged using electricity generated by renewable energy.

Innovation and integration

The integrated land use and transportation planning for project will be done through convergence of e-rickshaws and bicycle sharing with e-public transportation. The Kakinada Smart City App will be used for tracking live status of public transport modes. The project proposes integration of a smart card with electric public transport for transport services. Command and communication centre would conduct traffic and transport data analytic.

Participatory approach

KSCCL will collaborate with APSRTC, traffic police, Aarthi (NGO) and utilize the existing Public Announcement System, hoardings, and government offices participation mechanisms. APSRTC will participate in the project on the operational level. KSCCL and Kakinada Municipal Corporation will be the implementing agencies for the project.

Dehradun sketches plan to curb traffic woes

Dehradun is one of the premier tourist destinations of the country. Around 33 per cent of the total trips to the city is for tourism purposes. Work trips and education trips constitute 34 per cent and 10 per cent respectively. Buses function as the main public transport system with mini buses and Vikrams/tempos plying as feeder routes to public transport. Around 250 buses ply on the existing routes of the city, with an average frequency of 15 minutes against the fixed operational average of 7 minutes as prescribed by the RTO. However, there are many issues associated with the operation of buses in the city.

This includes:

- Unorganized bus routing and patterns;
- lack of basic facilities like bus queue shelter and designated stop along the routes;
- due to disorganized bus services, people rely more on pollution-causing Vikrams for commute;
- lack of quality of public transport system in the city, overloading during peak hours, inconsistent fares, too less boarding and alighting time, poor frequency during non-peak hours are some more issues associated with bus services in the city;
- non-inclusion of child-friendly design and socio-economic aspect in city-wide interventions in ease of access and mobility consideration;
- lack of passenger information system to make public transit seamless; and lack of pedestrian infrastructure that disrupts first and last mile connectivity in the city.

To overcome challenges, the Dehradun Smart City has developed a plan that will encourage a modal shift to public transportation systems with feeder services and Non-Motorized Transport (NMT) across the city to reduce air pollution, road accidents, congestion and wastage of time and money for residents, students and tourists. Through the project, ' Child-Friendly and Commuter Centric Dehradun Smart City Sustainable Mobility Plan', the SPV aims to integrate child friendliness in mobility-related improvements citywide.

Objectives

- To revamp the existing public transport and paratransit system through strategic utilization of existing network routes, ply of buses and IPTs. This would improve traffic congestion and increase the access for everyday commuters, school going children and incoming tourists. To develop public transport boarding and alighting infrastructure to ensure safety and ease of access for users and particularly for the school children.
- To encourage modal shift to public transport and paratransit by easing journey planning via. Information on real-time vehicle arrival, boarding, alighting nodes, fares, frequency, journey time etc. The e-app will include different profile features to aid tourist, children, and other commuters alike.
- To improve the regulatory system of public and para transport by formulating a unified authority that can regulate and monitor the operation of private buses and IPTs with a fixed fare, route, and frequency.

Relevance

At present, the ICT infrastructure for the proposed project is not well structured. However, the proposed Intelligent Traffic Management System linked to the Integrated Command and Control Centre proposed to be established at the Information Technology Development Agency (ITDA) will serve as the base for all ICT mobility proposals.

Sustainability aspects

A universal design principle will be applied for designing the streets and affiliated infrastructure.

The ICT-Passenger Information App will have a separate feature for children enabled with the privacy of user data and SOS system for safety. Security of passengers will be ensured through well-lit bus stops and footpaths. The kiosks at bus shelter will be solar powered and they will also generate revenue through advertising space. The passenger information application shall also include advertisements for revenue generation.

Innovation

Pre-fabricated bus shelters and kiosks will be assembled using recycled material. The design includes retrofitting of rear-end of the shelter with greenery and the rooftop with solar panels to convert the kiosk as a self-sufficient structure for energy and lighting. Web/mobile app public information system maybe be adopted to understand everyday traffic behaviour and the traffic management system.

Pilot projects show positive outcome for smart grids

Smart grids have long since been one of the biggest future advancements city planners have looked forward to. The ability to harness big data coming from a multitude of sensors in the electric grid proves to be very useful for managing resources. This is useful especially in the utility sector, where resources such as electricity cannot be stored dependably, but cannot be under-produced as well, resources must be managed very well.

Pilots have begun to take place across the Indian subcontinent, aimed squarely at removing issues faced by the population regarding electricity. The eventual rollout of smart grids will also reduce the price of electricity for the population due to better management. This, in turn, will make it more accessible to less financially privileged and raise the standard of living.

One of the pilots that took place was in Mysore, under the purview of the Chamundeswari Electricity Supply Corporation. This state-owned company manages electricity distribution to five districts in Karnataka, with Mysore being one of them. The project was undertaken with the goal of integrating new technology with legacy applications.

The pilot was conducted with the help of a company known as Enzen providing the technicals for the smart grid. They managed to deploy an end-to-end solution for the grid, which covered about 10 per cent of the city during the pilot. This comprised of 14 feeders on the grid, with power coming from five substations.

The operation resulted in better overall planning by CESC, which has reduced their peak load consumption. This was done through automated meter reading and billing, along with improved load forecasting and remote connection and disconnection of meters. Transformers' failure rate has also been decreased by 4 per cent due to proactive maintenance.

One Nation One Card: PM launches common mobility card for all transport facilities

Prime Minister Narendra Modi inaugurated a payment card, which can be used to pay transport charges across the country. Called the National Common Mobility Card (NCMC), it is the country's first indigenously developed payment system for transport. The National Common Mobility Card (NCMC) is a bank-issued debit, credit or prepaid card, which can be used for payments for all transport facilities including metro, bus, suburban railways, toll, parking, smart city and retail.

The stored value on card supports offline transaction across all travel needs with minimal financial risk to involved stakeholders. The service area feature of this card supports operator specific applications e.g. monthly passes, season tickets, etc.

“This card runs on RuPay card and it will eliminate all your travel related problems. Many a time, we do not have a change to pay in cash while travelling in the metro, bus or train, or for toll and parking. To overcome this issue, an automatic fare collection system was introduced,” said the Prime Minister. He said India used to import this system from foreign countries.

“Since systems were made by different players, a card issued in one city did not work in another city. Thus, we asked various ministries, departments and even banks to resolve this issue,” he said.

“Now, our dream of ‘One Nation One Card’ has been realized. People can also withdraw money using this Common Mobility Card. This RuPay card can be used for travelling in metros in any part of the country. In simple terms, we have merged the RuPay card with the mobility card,” the prime minister added.

The card will address the challenges associated with the cash payment – like cash handling, revenue leakages, cash reconciliation etc.

Small cities drive big on waste management

Small and mid-sized cities and towns of India are showing the way on how to manage solid waste by getting communities to segregate waste and keeping the waste streams separate. Experiences from the visits to some of these cities are shared, in particular, Suryapet and Karjat. Effective leadership in these cities and towns has found simple and sustainable solutions to the problems of solid waste management which still elude our metropolitan cities.

The earliest, and the best, success story was that of Suryapet, a city in Telangana, 136 km east of Hyderabad, with population of a little over one lakh. In 2003-2004, there was no external funding, no NGO and no Resident Welfare Associations. A single individual, SA Khadar, the Commissioner of Suryapet Municipal Corporation, demonstrated personal leadership that made a big difference. He managed all of the city's wet and dry wastes (32 tons daily at that time) on a half-acre site within the city, earning a gross income of Rs 1 lakh per month from vermi-composting and recycling. There was no need for a landfill.

A second inspiring example of what able leadership can do can be found in Karjat, a small town in Maharashtra with a population of close to 30,000. Ramdas Kokare was appointed commissioner of the Municipal Council of Karjat in end-2017, arriving with a fine reputation for making tiny Vengurla (population of 13,000 and floating population 5,000) a dump-free town. Public expectations of him must have been high. Within two days of joining, Kokare strictly enforced Maharashtra's ban on plastic carry bags. These are now replaced by sari-cloth bags costing Rs 6 per bag. Handcart vendors use bags made out of newspapers. What is amazing is how he persuaded Karjat residents, already enjoying doorstep waste collection, to cooperate in giving 36 kinds of waste separately on different days of the week! This is probably a global first.

Many progressive cities abroad have different bins for wet-dry-garden waste and rejects, and separate days of the month or year to collect e-waste or discarded household furniture and appliances. But Karjat is the first town where we have seen regular weekly collection of so many separate items!

There are other cities with innovative approaches to solid waste management. In Namakkal (population of 55,000) in Tamil Nadu, pushcart collection workers have been manually separating mixed waste into wet and dry, daily at the doorstep of each household, rather than attempt behavior change. Years later, Raichur (2.3 lakh population), Warangal (6.15 lakh population), and Kolar (15.3 lakh population) have redesigned their pushcarts to enable them to carry half a dozen bags on the cart so that dry waste can be sorted at source for easy sale without the need for a sorting centre. Alappuzha in Kerala was recently recognised by the United Nations Environment Program (UNEP) for its decentralised system of waste management.

In these, and many more small towns, the secret of success is meticulous micro-planning, committed leadership at the administrative level and receptive and engaged communities. The objective is clear—a litter-free, bin-free and dump-free city.

Now, rail passengers can monitor meals prepared in trains

To put an end to all speculations about hygiene and quality of food in the railway kitchens, Indian Railways is planning to install a transparent system that will allow passengers to access live feed online directly from the kitchens on how their food is being cooked and packed!

Railway Minister Piyush Goyal launched a website, Rail Drishti Dashboard. The portal will give out information about various trains, stations, and tickets sold. It will enable the public to watch live feed from IRCTC kitchens across the country.

The railway minister said that to ensure easy accountability, passengers can log in to the user-friendly website and closely observe the condition of every facility, and in case of any discrepancy, also lodge a complaint at the portal.

The dashboard offers information about services under 15 different categories including a 360-degree virtual tour of train routes, tracking of trains, freight earnings, expenditure incurred by the railways, etc. It will also display the entire income generated per day, week, month and year, in addition to the various achievements of the railways.

Surat to complete 70 smart projects worth Rs 26 bn

The Surat Municipal Corporation (SMC) will be among the few civic bodies in the country to complete the projects under Smart Cities Mission within the stipulated time. SMC, which has launched 70 projects worth Rs 26.90 billion in June 2015, is expected to complete them by 2020. The civic body has already completed 28 projects worth Rs 3.65 billion, whereas work is under progress for 31 projects worth Rs 18.82 billion. Around 11 projects worth Rs 4.43 billion is under tender process.\

Among various projects, the corporation is building 3,094 houses for poor and middle class under Pradhan Mantri AwasYojna (PMAY). Work to set up Integrated Traffic Control System (ITCS) is in full swing and it is likely to be completed by December 2019. SMC has already issued Surat Money Card and completed Intelligent Transit Management System (ITMS).

SMC is first civic body in the country to set up two more tertiary water treatment plants under SCM. Work is on to visually improve the look of 16 city roads. At present, the corporation has installed one lakh LED streetlight. The first phase of innovation and incubation centre has been completed

Smart Cities Hackathon on March 2 & 3

Sri Krishna College of Engineering and Technology and Kumaraguru College of Technology are the two nodal centers in Coimbatore for the finals of the “Smart India Hackathon 2019” to be held on March 2 and 3. Sri Krishna College has been selected for the third consecutive year to host the event.

The Smart India Hackathon has software and hardware versions. The software version will be held in March and the hardware competition in May this year. As many as 1,373 teams have been short-listed for the finals.This includes 10 teams from Sri Krishna College of Engineering and Technology.

Prime Minister Narendra Modi is expected to address and interact with the participants at Sri Krishna College through video conferencing.

The College has partnered with Apollo Hospitals, India Health Link, TVS Motors, and Greefi Technologies for the hackathon and seven problem statements given by them will be solved by 28 teams comprising over 200 students from different parts of the country.

The All India Council for Technical Education had invited the college to share its experience in organizing the hackathon at a programme held in Tiruchi in January this year, a release from Sri Krishna College of Engineering and Technology stated.

Kumaraguru College of Technology has been chosen as a nodal center for the hackathon for challenges related to maternal healthcare and child malnutrition, biometric encryption, automation, and predictive analysis.

Twenty seven teams comprising 162 students will take part in the hackathon to be held at Kumaraguru College.

Five-point action plan for smarter, safer cities

A FICCI-KPMG Smart City Knowledge Report on 'Cybersecurity in Smart Cities' has suggested a five-point action plan to enable smart cities to keep pace with the cybersecurity needs and build a cyber-resilient and trusted environment across the entire value chain.

Key measures suggested by the report are:

- Formal guidance based on well-defined cybersecurity policy and a structured security organisation with clearly defined roles and responsibilities will be important for governing the cybersecurity posture and reducing the cyber risks.
- Stakeholders and users in smart cities ecosystem will expect security to be built into the system; technology architects should follow an 'always-on' principle that provides high levels of control with appropriate fail-safes.
- Smart cities should carefully evaluate their third-party suppliers, identify qualified partners, and invest in integrating security, privacy and trust across the ecosystem.
- Resilience and trust will be established through validation of cyber practices, ensuring compliance and consistent engagement with smart city stakeholders and citizens. This will enhance cyber confidence of citizens and stakeholders on smart city functioning.
- The collaboration will reduce ambiguity and accelerate the ability to implement secure products and services within a sustainable smart cities ecosystem.
- Commenting on the report, Shankar Aggarwal, Former Secretary, Urban Development, Ministry of Housing and Urban Affairs, said, "there was a need for establishing a mechanism, both at the government and private sector, to take decisions in time pertaining to the development of smart cities." In order to develop smart cities, it was imperative that the latest technology should be used not only in the development of infrastructure but also in social sectors like healthcare, education and culture, he added.

  Highlighting the value of data in smart city context, Elias George, Chairman - Infrastructure, Government and Healthcare, KPMG in India, said, "India needs to be cognizant of the challenges that smart cities across the world have faced in terms of the deluge of cyber-attacks affecting the availability of smart city infrastructure, continuity of services and misuse of personal data."

Pune to monitor and manage water network (adopts smart water technology)

Sensus, a Xylem brand, has been selected as Larsen & Toubro's (L&T) technology partner to ensure the successful implementation of Pune Municipal Corporation's (PMC) innovative 24×7 water distribution project. Aiming to supply continuous water supply and significantly reduce water loss, PMC has invested in over 275,000 SensusiPERL smart water meters to monitor, measure and manage activity across its network.

As the first city in India to implement a programme aligned to the country's Smart City Mission, PMC was motivated by the exponential growth in its population over the last decade and subsequent strain on its water supply. In order to meet the growing demand and future-proof against a potential water crisis, PMC launched its water distribution project to ensure it could deliver continuous water supply to its inhabitants.

Pune plans to install more than 275,000 iPERL meters over a three year period, and aim to reduce its non-revenue water by half during this time. "The investment in smart technology presents a tremendous opportunity for PMC to gain an in-depth understanding of the network and respond accordingly to improve its performance," said Tom Mills, Vice President, Strategic Solutions at Sensus

Now a tool for better water management in India

Water scarcity is an urgent risk in the country. The 2018 report by India's policy think-tank NITI Aayog highlights that the country is facing the worst water crisis in history which can lead to an eventual 6% loss in the country's GDP by 2030. Businesses face significant risks from water scarcity and have real opportunities to gain from addressing the challenge.

The World Business Council for Sustainable Development (WBCSD) and its partners launched the third version of India Water Tool (IWT), a water-related data compiled from information provided by the government and other organisations. IWT3.0 is a comprehensive and user-friendly application that makes water data from government and other organizations available on a publicly accessible platform. The goal is to assist key stakeholders to identify water risks and plan for better water management in India.

Water can only be sustainably managed if data with an appropriate level of granularity is made available publicly in a format usable to all stakeholders. IWT3.0 does all of this while encouraging stakeholders to take action, whether at national, watershed or facility level. It will be a critical element of strengthening water management in India both now and in the future.

It includes:

- Over 20 datasets from key Indian government authorities and other organizations
- A dataset on real-time satellite capture of surface water availability from NASA and U.S. Geological Survey (USGS)
- Water stress models developed by the World Resources Institute (WRI) and Columbia Water Center (CWC).

It also brings results from two local watershed-level water-balance studies to give a complete picture of the watershed health and determine the potential for water recharge and demand-side management. All water users and stakeholders can openly access this data and use it to plan management interventions in that watershed.

Tom Williams, Director for Water, World Business Council for Sustainable Development, says, "The India Water Tool has been developed by 20 companies and three knowledge partners over its three successive versions. The tool is a unique example of collaboration between actors across sectors to create a sustainable future through responsible water management and demonstrates what can be achieved in a water-scarce environment when business, government and knowledge partners work together."

K C Naik, Chairman, Central Ground Water Board, says, "I'm delighted to see that through the India Water Tool, groundwater-related data collected by the Central Ground Water Board has been combined and made accessible to users so they can take an evidence-based approach to inform their water management strategies. Businesses must act responsibly with their water use and this tool is a good first step for them to understand where to focus their action, and how to go about planning management actions."

Thomas Varghese, Business Head – textiles, Acrylic Fibre and Overseas Spinning, Aditya Birla Group, says "The India Water Tool symbolizes collaboration and leadership on the part of all companies and partners that have come together to contribute to water sustainability in India.

Our intent is to make the application relevant for use by all stakeholders at large. Only when we are able to give access to water-data to all water users, planning agencies, communities, and investors, we can expect coordinated action and a movement for improved management. I see IWT3.0 a step in this direction."
The tool is an important milestone towards improved water management in India. The nationwide analysis it provides allows for a good understanding of local water situations and helps build a comprehensive corporate water management strategy and holistic stewardship approaches. It provides companies with a data-led approach in working with the other water-users for better water management in local geographies.

Follow-up activities will include prioritization of action for water-stressed sites, detailed site level assessments, internal environmental data-tracking and evaluation of new projects.

World Bank to address Himachal Pradesh's SWM challenge

Experts from Korea and World Bank will work closely with the Department of Environment, Science and Technology to find out a workable solution for solid waste problem and challenges in Himachal Pradesh.

The World Bank team led by Environment Specialist Pyush Dogra, Consultant to the World Bank Dr Sampat and experts from Korea Green Growth Trust Fund (KGGTF) led by Dr Lee Dong Hoon today held a meeting with senior government functionaries in this regard.

The team along with officers of the Department of Environment, Science and Technology visited the Municipal Corporation Shimla and waste to energy plant, NAC, Arki and identified local issues on municipal solid waste.

The team held discussions with all stakeholder organisations in a summit under the chairmanship of Additional Chief Secretary (Environment) R D Dhiman in order to identify important issues regarding management of solid waste, technology transfer and the challenges faced by the state government.

R.D. Dhiman, said that the areas of collaborations have been identified during the whole day discussions which include support in developing agro-climatic zone based Municipal Solid Waste Management strategy of Himachal Pradesh, support to identify climatic zone wise option for Integrated Solid Waste Management, support for technology transfer through successful models/ best practices - optimized models, development of training modules & manual for PRIs/ ULBs, training & capacity building on municipal solid waste in rural and urban areas and financial assistance for developing small/ micro model solid waste management facilities in the state.

The team also met Chief Secretary BK Aggarwal and briefed him about effective management strategy for solid wastes both for rural and urban areas. Director, Department of Environment, Science and Technology DC Rana said the experts would undertake technical analysis of solid waste management in three countries Pakistan, Nepal and India in South Asia and in India they will work with the Government of Himachal Pradesh.

Blockchain Summit India 2019 to bring together experts and stakeholders

The Department of Science and Technology (DST), Government of India, is all set to organise the "Blockchain Summit India" on 22nd and 23rd February 2019, to channel India's potential around blockchain and crypto economy. An initiative by Auxesis group, a Blockchain technology company working towards building technology infrastructure and protocols for mainstream enterprise adoption, the event has already created a buzz in the international blockchain front.

Connecting over 5,000 people including politicians, decision makers, knowledge tanks, and tech innovators, the event has already managed to create a buzz. To be hosted at the Noida campus of IIM, Lucknow, the summit aims at harnessing India's potential in blockchain and crypto. The event will see eminent speakers from the Union Ministry, entrepreneurs from across the globe and noteworthy faculties from the leading educational institutions of the nation come together to present their thoughts.

"Emerging fields, including artificial intelligence, machine learning, internet of things, the blockchain, and big data can take India to new heights of development, and improve the quality of life of its citizens", was recently mentioned by the Prime Minister of India, Narendra Modi. True to these words, India is steadily stepping ahead towards a digital future with blockchain emerging as the foundation of a new developmental era and widespread growth.

Nagpur to transform into the most liveable, eco-friendly and edu-city

Smart Cities Council India (SCCI) in association with Nagpur Smart and Sustainable City Development Corporation (NSSCDC) organised a Think Table meet on January 31, 2019, in Nagpur. Smart Cities Think Tables (SCTT) are a series of forum sessions organised by Smart Cities Council (SCC) in different cities of India where the biggest challenges facing the sector are detailed and discussed threadbare. As the Council's partners were in attendance to discuss the future requirements of Nagpur smart city, as well as address the urban challenges faced and solutions for the same, there was equal enthusiasm from the corporation too. As many as 40 officials—senior to mid-level—from the corporation alone were present, making the conference an instant success.

In his inaugural address, **Pratap Padode, Founder & Director, Smart Cities Council India**, welcomed the city officials and Council's partners. During his brief presentation, he appraised the gathering of the recent progress in India's smart cities mission. He also showcased how Nagpur is recycling 90 per cent of its sewage water and making it a profitable proposition.
Delving further into Nagpur, **Dr Ramnath Sonawane, Chief Executive Officer, NSSCDC,**explained that the city is focussing on the implementation of town planning based on the principle of retrofitting; rehabilitation and resettlement plan; smart infrastructure and utilities; and zero waste garbage city.
During the roundtable, **Devendra Mahajan, General Manager (Environment Division), NSSCDC,** informed the Council's members and audience in attendance about Nagpur's smart city plan. "A total of 20 projects are identified, of which two are completed," he said. "Work order is issued for four projects whereas one project is tendered out. The remaining 13 projects are under DPR preparation. The entire proposal has been divided into four zones: smart mobility, smart environment, smart governance, and smart living."
Mahajan showcased Nagpur's City Operation Centre in his presentation—the corporation has installed about 3,800 CCTV surveillance cameras covering 700 locations with advanced analytics. "Owing to our advanced analytics, we have managed to issue e-challans for more than 1 lakh traffic offenders and reported more than 500 criminal cases," he said.

Apart from an update on what has been achieved, the Think Table provided the opportunity to bring together city representatives and private stakeholders to discuss practical solutions and strategies for the way forward. It presented a platform for stakeholders to share relevant case studies on initiatives that could be useful to Nagpur Smart City, and the initiatives that need to be implemented to capitalise on innovations, smart technologies and best smart practices to help in the sustained growth of Nagpur. The event also provided networking opportunities by bringing together government and private stakeholders to deliberate on the opportunities, challenges and solutions for building sustainable, liveable and efficient cities in India.

Meanwhile, the CEO and his entire team of officials interacted with the SCCI members, including TomTom, SenRa, Anchor, Bajaj Electricals, Persistent Systems and Oracle, and conveyed their expectations from them.

During his interaction with the visiting Council partners, Dr Ramnath Sonawane made his intention very clear. “Those who have financially sustainable [pilot] projects can submit them directly with the corporation, without going through any tendering procedure,” he announced. “The city, through such initiatives, would like to transform India’s heart—Nagpur—into the most liveable, eco-friendly and edu-city that electronically connects people with the government to create an inclusive ecosystem.”

Financing smart cities in India

With the current funding structure or guidelines laid down by the Centre, each selected city, for the period of four to five years, will receive Rs 5 billion and an equally matching amount will be contributed by the State Governments. This means the State Governments and Centre are required to shell out or make an arrangement for Rs 1 trillion collectively towards the selected 100 cities. That apart, municipal corporations will contribute Rs 200 billion. Considering these huge numbers, the Centre and state governments may be in a much better position in terms of their revenue streams, but with an eye-popping Rs 1 trillion to contribute, the ULBs have a mammoth task ahead.

In this funding pattern, the Centre and State Governments, with 46 per cent of the contribution, remain the major shareholders in the Smart Cities Mission, followed by convergence from various Centre-driven schemes like AMRUT, Housing for All, etc, which comes to around 21 per cent, PPP with 20 per cent, equity funds with 4 per cent, ULBs 1 per cent and 8 per cent from other sources. Here, with 67 per cent, Central Government grants and schemes remain the top contributor. Thus, the dependence of selected smart cities on these grants can certainly jeopardize their envisaged plans if not released on time.

In the next five years, special purpose vehicle (SPVs) will spend Rs 1,642 billion on projects conceived under area-based development (ABD) and Rs 389 billion on pan-city development. The question is, though, how are these funds likely to be mobilized? For instance, the selected ULBs carrying out the SCM are solely dependent on revenue streams such as property tax, building licence fees and other land-based levies such as betterment levy, valorization, impact fee, exaction, stamp duty, hawker or vendor fee, PPP and advertisement fees. However, moving away from archaic ways of traditional funding, cities are now vying for credit ratings for mobilization of resources through municipal bonds, crowd and pooled funding, etc, reflecting on their keenness to think and act differently.

Let’s bond together

In India, the municipal bond market is largely untapped. Over the past 15 years, only a handful of municipal corporations have managed to raise funds from bond issues to the tune of a mere Rs 15 billion.

However, the game has changed with the advent of smart cities in India. In the past two years, Pune Municipal Corporation (PMC) and Greater Hyderabad Municipal Corporation (GHMC) have successfully raised Rs 4 billion. PMC will use its funds for a 24x7 water supply project, whereas GHMC will use the funds for a strategic road development project. In December 2018, the Greater Visakhapatnam Municipal Corporation (GVMC) successfully raised Rs 800 million to part-financing the development of sewerage system and supply of treated water to various industries in Visakhapatnam. It is also worth mentioning the recently issued municipal bonds by Ahmedabad Municipal Corporation (AMC). The Rs 1 billion bond was oversubscribed 10 times within minutes, creating history in the overall municipal bonds market in India.

Meanwhile, to raise funds through municipal bonds, one needs capacity augmentation of ULBs. As **Prakash Gaur, CEO, Andhra Pradesh Urban Infrastructure Asset Management**

(APUIAML), explains,“The ratings span 20 levels from AAA to D, with BBB-being investment-grade rating; cities rated below BBB-have to get better ratings to attract investors.” He further adds: “Considering the long gestation period of urban projects, it is always beneficial to opt for bond funding than using one’s own resources as the duration is 10 years with a guaranteed return on investment for investors.”
Commenting on the recent success of municipal bonds, **Ashish Sable, Senior Vice-President & Group Head, Debt Capital Markets, SBI Capital Markets,** says, “I think the process of raising funds through municipal bonds will make ULBs accountable to be transparent. This will compel the ULBs to meet the investors’ requirement in terms of disclosure, discipline, etc.”
Although municipalities have tremendous potential for growth, except for a few large municipalities, the growth of smaller municipalities, ULBs and towns has been muted. According to reports, till now only 55 of the 94 cities had investment-grade ratings. Ratings are based on multiple criteria, like the cities’ social and economic profile, operating efficiency, policy framework, recent financial, etc.

So why is it necessary for ULBs to opt for municipal bonds? According to **M Hari Narayanan, Commissioner, Greater Visakhapatnam Municipal Corporation,** municipal bonds give a higher rate on investments compared to banks and bring in a lot of financial discipline in the ULB as it needs to get its account audited on a regular basis and has to show substantial cash flow or revenue streams to the rating agencies.
Around Rs 7,000 billion is required for urban development over a period of 20 years, i.e., around Rs 350 billion per year. But does India have enough instruments to fund this kind of capex? Let’s do a fact check. The Government of India borrows around Rs 6,500 billion from bond markets; however, India’s corporate bond market is equal to what the Government is borrowing. In fact, it is much bigger. To cite an example: Pune and Hyderabad have issued their bond at 7.57 per cent and 8.9 per cent, respectively, which is far better than the Central Government’s borrowing rate.

See how Police nabbed a serial killer in Kumbh Mela using ICCC

An Integrated Command and Control Centre (ICCC), as the name suggests, works as a brain for all smart solutions implemented across a city – be it a surveillance system, smart traffic management, waste management, utilities management, environmental sensors, public information system, (variable message boards, public address systems, kiosks, etc).

An ICCC collates information for collaborative monitoring to analyze data for quicker decision making. Intelligent operations capability helps to integrate data visualization, real-time collaboration and deep analytic that can help different stakeholders prepare for exigencies, coordinate and manage response efforts, and enhance the ongoing efficiency of city operations. The interface at ICCC gives a real-time and unified view of operations.

Last month, India witnessed millions of people flocking to Prayagraj for Kumbh Mela. However, to keep an eye on serial offenders is not an easy task considering millions gathering for a purpose. That said, India's largest conglomerate L&T was roped in to manage the situation involving the largest religious congregation of people in one place during the Kumbh Mela. The company developed and installed a whole range of smart solutions including an Intelligent Traffic Management System, Variable Message Displays, a surveillance system, a 24x7 call center and a Solid Waste Management System all connected to a dedicated 24x7 City Operations Center with integrated dashboard to sensitivity.

Going further, the company set up two state-of-the-art Command and Control Centers, one at the Kumbh specific area and another at Police Lines for overall city surveillance. The project was inaugurated by Prime Minster Narendra Modi during his visit to Prayagraj recently. The huge advantage of these smart systems was almost immediately experienced by the Prayagraj police when they were able to apprehend a person for whom they were on the lookout for at the Kumbh Mela who later confessed to be a serial killer having murdered as many as 10 people in the past year!

Here, L&T's solutions gave an eagle-eye view of municipal functions enabling real-time, data-driven decision-making and actionable insights. Multi-domain analytics through video analytics and a first-of-its-kind global crowd management system proactively interprets crowd dynamics to provide timely alerts by taking into consideration head count and people density at mega events.

See how UP plans to reduce carbon footprint

The UP Government has approved the two second-generation ethanol plants, which will incur an investment of Rs 4 billion each. The State Government will also offer the company with facilities including stamp duty waiver, capital subsidy as well as SGST rebate.

Each of the sanctioned biofuel facility is expected to utilize about 200 tonnes of agro-waste per day for the production of 50,000 litres of second-generation ethanol. The plants will be set up under technical collaboration with the Institute of Nuclear Energy Research (INER), Taiwan.

The facilities will be utilizing agro-waste including rice straw, wheat straw and bagasse as raw materials to produce second-generation ethanol. The benefits of the project include additional income for farmers, reduction in stubble burning, socio-economic upliftment of farmers, saving on foreign currency and lowering bills of crude. The two plants are also expected to reduce carbon footprint and increase employment generation.

India provides Rs 382 bn opportunities in Smart Cities Mission

Under the Smart Cities Mission (SCM), 100 Smart Cities have been selected in four rounds based on All India Competition. All 100 cities have incorporated Special Purpose Vehicles (SPVs).

Since the launch of the mission 5,151 projects identified by the cities worth more than Rs 2 lakh crore are in various stages of implementation in the 100 cities. Around 534 projects worth Rs 10,116 crore have been completed, implementation has commenced for 1,177 projects with a cost of Rs 43,493 crore and tendering have started for 677 projects with a cost of Rs 38,207 crore. The progress with respect to the implementation of projects pertaining to smart solutions, smart roads, smart water, solar rooftops is given below:

For Smart Command & Control Centers, projects worth Rs 1,558 crore in 11 cities have been completed; projects worth Rs 3,049 crore in 29 cities are under progress; further tenders have been issued for projects worth Rs 2,730 crore in 21 cities.

For Smart Roads, projects worth Rs 228 crore in four cities have been completed; projects worth Rs 3,819 crore in 34 cities are under progress. Further tenders have been issued for projects worth Rs 2,069 crore in 10 cities.

For Smart Water, projects worth Rs 902 crore in 18 cities have been completed; projects worth Rs 5,961 crore in 35 cities are under progress. Further tenders have been issued for projects worth Rs 921 crore in 17 cities.

For Solar, projects worth Rs 58 crore in eight cities have been completed; projects worth Rs 828 crore in 42 cities are under progress. Further tenders have been issued for projects worth Rs 300 crore in nine cities.

For Visible and impactful, projects worth Rs 179 crore in 16 cities have been completed; projects worth Rs 3,701 crore in 32 cities are under progress. Further tenders have been issued for projects worth Rs 2,828 crore in 20 cities.

Value Capture Finance (VCF) Policy Framework was released by the Ministry on February 28, 2017. It is an important tool for generating much needed additional finances required by the States / Cities for funding the infrastructural investments. So far 17 States have already engaged professional firms for preparing the VCF framework. This is expected to help the States generate additional revenue.

Other significant initiatives under the Smart Cities Mission The “Ease of Living” Index is an initiative of the Ministry of Housing and Urban Affairs (MoHUA) to help cities assess their livability vis-à-vis global and national benchmarks and encourage cities to move towards an ‘outcome-based’ approach to urban planning and management.

It was decided in June 2017 to rank 116 cities based on the livability parameters. The implementation of the assessment commenced formally on January 19, 2018. The Ministry has launched the outcome/rankings of 111 cities on the Ease of Living index on August 13, 2018.

The framework covers all the critical pillars of urban development (Physical, Institutional, Social and Economic) and uses 78 indicators across 15 categories (governance, identity and culture, education, health, safety and security, economy, affordable housing, land use planning, public open spaces, transportation and mobility, assured water supply, waste-water management, solid waste management, power, and quality of environment).

Ginjer is SenRa's new low-cost IoT analytics platform

With the current increase in Internet of Things (IoT) deployments taking place across the globe, IoT platforms have started to play a critical role in the successful roll-outs of IoT solutions. Real-time analytic provide customers the ability to get immediate insight on their business operations, cost savings, and overall return on investment (ROI).

In a recent report by IoT Analytics, the IoT Platform market is expected to reach $22.3 billion by 2023. Driving factor of the fairly new market segment is the need for scalable and reliable services that connect the virtual world with reality, where sensors and people can understand each other leveraging a common platform and provide benefit in this symbiotic relationship.

SenRa, a PAN India Low-Power Wide-Area Networks (LPWANs) provider for long range-based (LoRa-based) IoT applications, announced the release of their new low-cost IoT analytics platform, Ginjer. With the availability of Ginjer, SenRa is now able to provide customers with true end-to-end IoT solution offerings while still ensuring a very competitive price.

This move marks the beginning of SenRa's global market entry by extending their Software as a Service (SaaS) offerings outside of their current focused market, India. The Ginjer IoT Analytics Platform introduces a new low-cost approach in deploying IoT solutions while still keeping the quality, scalability, and reliability of SenRa services intact.

"We are really excited about the announcement of Ginjer. Our team has worked real hard to solve core problems companies face when selecting an IoT platform for their projects," said Ali Hosseini, Chief Executive Officer of SenRa. He says "Companies are looking for IoT platforms to be affordable and still have powerful reporting tools, data visualization capabilities, and device management capabilities. Ginjer does that and more."

Leveraging Ginjer, SenRa is able to provide end-to-end solutions to customers such as uPark, a LoRaWAN based smart parking solution, and CleanBin, the first of its kind LoRaWAN based smart bin solution in India. Both solutions have already been deployed in smart city and smart campus projects. Ginjer is also agnostic to the communication protocol providing customers the ability to leverage SenRa's IoT platform with or without SenRa's network services.

Happy Cities Summit to help Amaravati to be at the forefront of urban innovation

The Government of Andhra Pradesh is organizing the second edition of Happy Cities Summit 2019, Amaravati from February 13-15, 2019. The summit aims to build on the success and momentum of the inaugural Happy Cities Summit to establish Amaravati, the capital of Andhra Pradesh, at the forefront of urban innovation discourse, with a focus on citizen happiness. Experts from over 26 countries are attending the various panel discussions and workshops. The Happy Cities Summit will explore the key identified topics through panel discussions where city leaders, urban innovators, and thinkers will share best practices, trends, and principles on urban innovation and design.

Network with 50+ city leaders Mayors, municipal commissioners and city leaders from over 50 cities, including 17 greenfield cities, 15 international cities and 20 Indian cities will participate in this forum. Meet and understand top priorities and the changing demands of cities from the horse's mouth.

Varanasi: First 'zero discharge' city in the making

Varanasi is all set to become the first city with zero discharge of polluted water into river Ganga. By July this year, the sewage treatment capacity of Varanasi will exceed 400 million liters per day (MLD), checking the flow of sewer water in the river completely.

The government has hired a private concessionaire for cleaning Varanasi's 84 ghats for three years at the cost of Rs 5 crore per year. Similarly, the Government will spend Rs 13 crore for cleaning 94 ghats in four cities of Uttar Pradesh—Kanpur, Prayagraj, Bithoor and Mathura-Vrindavan.

Under the NamamiGange program, for Varanasi, the upcoming sewage treatment plant (STP) at Rammana with a capacity of 50 MLD will treat the polluted water coming from Assi river, which is a major source of pollution in the Ganga. The current sewage generation in Varanasi is estimated at 300 MLD, which is expected to increase to 400 MLD in the year 2035. At present, the three operational STPs in the city have 102 MLD treatment capacity. However, with the upcoming 3 STPs, the total sewage treatment capacity will go up to 412 MLD, which is adequate to meet the demand until 2035.

Similarly, the Ministry of Ganga Rejuvenation under Nitin Gadkari has put a thrust on Ganga cleaning activities at the ongoing Kumbh in Prayagraj. The government sanctioned projects for the treatment of sewage water coming from 53 drains in Prayagraj for six months in view of the Kumbh. Further, Rs 113 crore was sanctioned for over 47,000 toilets at the Kumbh.

This is in addition to the ongoing sewage treatment facilities at Prayagraj and its adjoining areas. Officials said three new STPs at Naini, Jhusi and Phaphamau in Prayagraj would treat 72 MLD of sewer water before being discharged into the Ganga. The NamamiGange project consists of 261 projects, 194 of which deal with constructing STPs, rural sanitation and bioremediation largely spanning Uttar Pradesh, Uttarakhand, West Bengal, Bihar and Jharkhand, which are responsible for most of the pollution. Most of the 221 projects under the NamamiGange Mission worth Rs 25,563 crore are at advanced stages of completion.

.**Vizag to be energy sufficient, plans a 15 MW floating solar plant**

As per the smart city plan (SCP), close to 70 per cent of the work has been grounded. The city SPV has completed an Integrated Command and Communication Centre at the GVMC office, Centralised Command Control Centre at the Police Commissioner's office, and Phase-II of the smart poles project for redesigning and beautification of roads costing Rs 600 million. Works worth Rs 6.50 billion (under smart city mission) are underway, which includes the 800 million 24 x 7 water supply project and Rs 650 million sewerage network.

Smart infra: The city is extending the smart street project to 34 more roads spanning 11.5 km. This project is already underway at 20 roads, spanning 19.5 km, and will cost around Rs 1.60 billion. To make Vizag energy-sufficient, the SPV has planned a 15 MW floating solar power plant worth Rs 1 billion.
Total budgeted amount towards the city’s civil infrastructure works: Smart city projects will be implemented over a period of five years with an outlay of Rs 16.02 billion. So far, the city authority have spent close to Rs 3 billion.

Projects worth Rs 600 million are under DPR phase in Ujjain

Despite being selected in round two of the Smart Cities Mission, Ujjain has been able to bid out 42 out of its 43 listed projects. Of the 42 tendered projects, 13 projects worth Rs 1.62 billion (8.68 per cent of the total smart city projects) have already been completed.

Current progress of works in the city: Projects worth Rs 11.90 billion (63.73 per cent of the total smart city proposal (SCP) cost) are under implementation while another Rs 5.09 billion projects (27.25 per cent of the total SCP cost) are under the tendering stage. Another Rs 60 million worth projects are in the DPR phase.

Smart infra: Under civil projects, the major projects under the implementation and tendering stage include:

Smart road with underground ducting: The entire ABD area is proposed to be covered with 25 km of smart roads, which will include five services, ie, sewerage, stormwater drains, underground electric cables, a shaft for telecom cables, and duct for the gas pipeline. The tender is a comprehensive development of road cross-section, which also includes pavement, footpaths, intersections, street lights and electricity feeder pillars. At an approximate project cost of Rs 3.45 billion, on completion, the project is expected to completely transform the urban fabric of the ABD area.

MRIDA: Of the 400 hectare ABD area, 40 hectare is covered by the Mahakaal Temple, Rudra Sagar Lake and the immediate surrounding area, which falls under the MRIDA Plan. Key elements of the project include a visitor plaza that will hold about 20,000 pilgrims at a time, multi-level car parking for 600 cars, 600 mt of heritage corridor from the plaza to the temple. Tender for the Rs 2-billion project has been awarded and construction is proposed to start soon.

Ujjain Convention Centre: This ambitious project will comprise of a grand hall of 1,800 sq m, five smaller halls, two restaurants, exhibition area and car parking for 250 cars. Tender for this 1.45 billion project has been awarded and construction is expected to commence soon.

Ujjain Swimming and Sports Complex: This complex comprises an Olympic size swimming pool, diving pool, warm-up pool and kids pool, along with a sports block for indoor sports like skipping rope and table tennis. It will also include a gym, sauna, steam bath, restaurant, tennis court and basketball court. Currently under construction, with 40 per cent work completed, the project is expected to cost around Rs 300 million.

Multimodal Transit Hub: Dewas Bus Stand is located adjacent to the Ujjain railway station, and the city has proposed to integrate the two terminals to develop an integrated multi-Modal Transit Hub. To be taken under the Railway station development project, it is proposed to be funded through PPP and an EoI has already been floated. The project cost is approximately Rs 860 million.

The major ICT projects under implementation and tendering stage include:

- ITMS (Integrated Traffic Management System): Nine junctions in the city along with all the entry and exit points will be covered under the ITMS system; this will be connected to ICCC for the live feed and necessary actions.
- Smart Poles: Proposed under PPP and the appointed PPP partner will install smart poles across the city featuring cameras, Wi-Fi, sensors and a network of OFC cable.

Kakinanda Smart City to issue bids worth Rs 3.60 billion

As on date, the city has undertaken 50 projects worth Rs 9.40 billion under the Smart City Mission, of which, 12 projects worth Rs 1.12 billion have been successfully completed, 16 projects worth Rs 2.57 billion are in progress, and another 22 projects worth Rs 5.68 billion are in the tendering or DPR stages.

K Ramesh, CEO & Managing Director, Kakinanda Smart City Corporation says, "We have also undertaken 15 other projects worth Rs 10.60 billion under convergence. Of this, work is in progress for six projects worth Rs 7.19 billion, and two projects worth Rs 1.50 billion is under the tendering stage."

Meanwhile, the Kakinanda Smart City Corporation has received three bids for development of roads in Kakinada, for which, they have completed the technical evaluation and are awaiting the EPC committee report in processing for approval of price bids.

A total of Rs 3.60 billion worth tenders are in process:

- Development of convertible stadium.
- 24 x 7 water supply including scada.
- Canal Front Development – Phase-I and –II.
- Godavari Kalakshetram.
- Science Centre.
- Multi-level car parking.
- Development of infrastructure in primary schools.
- Skill development centres.
- Smart community initiative – development of slums (Phase-II).
- Implementation of the underground sewerage system.
- Extension of solar or LED street lights.
- Waste management.
- Providing a sewerage system with STP at Yetimoga, Kakinada.
- Outfall stormwater drainage network.

Smart infra: At a total cost of Rs 1.08 billion, we have undertaken DPRs for an underground electrical cabling project, which is aided by the World Bank; and a disaster recovery project; electric public transportation system; smart service delivery interface;and development of stadiums.

Total budgeted amount towards the city’s civil infrastructure works: The total budgeted amount for the city’s infrastructure is Rs 9.40 billion, of which, till date we have spentRs1.15 billion. Under convergence, we have spentRs9.10 billion so far from the budgeted amount of Rs21.12 billion.

This GIS-based solution helps map city gas network

India is witnessing a significant boom in the city gas network and recently held ninth CGD bidding round which offers to cover 174 districts, grouped in 86 geographical areas and spread across 22 Indian states and Union Territories is a testimony of this.

With an objective to provide operators with a powerful and comprehensive gas distribution and pipeline specific data model, SmartGasNet solution is a set of geospatial business applications, tools and analysis that are designed to assist the operator's business processes. This solution specifies the project definitions, design, materials and equipment, welding, fabrication, installation, testing, operations and maintenance. It also offers to record customer connectivity within the network and attach relevant documents at appropriate indexes geospatially.

SmartGasNet comes with features such as network planning and mapping, asset planning and mapping, building Bill of Quantity (BOQ), construction management solutions, line and asset/equipment maintenance with alerts along with planned and unplanned outages management. During an outage, the solution offers to immediately identify the affected customers and send SMS to them.

The other offerings of SmartGasNet solution for the new projects include web GIS application, GeoDataBase for CGD networks, hosted web server, setup, configuration and maintenance services along with optional services for new data collection and for an existing network.

SmartGasNet has been designed keeping in view of the latest Petroleum and Natural Gas Regulatory Board notification, which states that ‘The entity operating a CGD network shall put in place a GIS (Geographical Information System) based system with the intention of capturing the entire underground gas network and customer database. This system shall include details of the entire pipe network. All the pipelines laid shall be identified in GIS through geo-referenced coordinates. All failures in the pipelines shall be mapped in GIS for investigations’.

Smart meter project in Delhi to save Rs 1.24 bn

Implementing smart meters is one of the operational performance parameters under the Government of India's Ujwal DISCOM Assurance Yojana (UDAY). The scheme would help in reducing AT&C losses. It will also help in monitoring round-the-clock power supply eventually leading to greater efficiency and a pathway to meeting the government's vision of 24X7 Power for All.

Smart meters are part of the overall Advanced Metering Infrastructure solution (AMI) that measures and records consumers' electricity usage at different times of the day and send this information to the energy supplier through over-the-air communication technology. This gives consumers better access to information and enables them to make more informed decisions on the use of electricity in their homes, leading to reduced power wastage, and providing long-term carbon and financial savings.

Recently, the New Delhi Municipal Council (NDMC) completed a project replacing 50,000 conventional electricity meters with smart meters and become the first distribution company (discom) in India to implement 100 per cent smart metering solution. The adoption of smart meters will enhance consumer convenience and rationalize electricity consumption. The project was jointly implemented by NDMC and Energy Efficiency Services (EESL).

Within a short duration, 50,000 smart meters have been installed and integrated with the NDMC IT legacy system. The adoption of smart meters will lead to total annual savings of Rs 1.24 billion to NDMC, which include revenue due to improvement in billing efficiency. The AT&C losses are estimated to be 12.63 per cent (Source: DERC Tariff Order FY2018-19). NDMC will benefit from enhanced consumer satisfaction level resulting from better complaint management, faster restoration of outages, awareness of optimized consumption pattern, and improvement in system stability, reliability and transparency.

India is making rapid strides in providing universal access to affordable power. The Government of India is accelerating the adoption of smart meters to ensure efficient management of electricity by checking data-entry errors, billing inefficiencies, and cutting the costs of manual meter reading through the web-based monitoring system. Smart meters will revolutionize the power sector through their vast cascade of benefits including reduced AT&C losses, better health of discoms, incentivization of energy conservation and ease of bill payments.

Trigeneration technology to save 40% in operating energy

Growth in commercial buildings and facilities has led to substantial use of electricity, heat and cooling, consuming almost 90 per cent of the energy bill. In high energy consumption industrial sectors, energy cost is about 30 to 50 per cent of the manufacturing cost.

Recently, Energy Efficiency Services (EESL), a joint venture of four national public sector enterprises under Ministry of Power, Government of India, hosted a round-table panel discussion on, “Creating an Ecosystem for Trigeneration Business in India”.

During the discussion, the stakeholders deliberated on the way forward for promoting the nationwide adoption of trigeneration as a transformative technology. This process uses a single fuel input to simultaneously generate electricity, heat and cooling. This solution enhances operating efficiency of an industrial application by at least 60 per cent, saving industries and institutions about 30-40 per cent in operating energy costs and reducing greenhouse gas emissions by up to 30 per cent, due to inherent efficiencies in energy generation through technology interventions.

The industry and government leaders further discussed potential sectors, institutions and industries that would benefit from trigeneration technology, while also identifying necessary financial models and policy and regulatory interventions for scaling the market for trigeneration technology in India.

EESL is offering trigeneration technology to industries and institutions in India through its unique Pay-As-You-Save (PAYS) business model for an integrated service offering that would include equipment maintenance, as well as electricity, heat and power supply. While clients will not bear any upfront costs for technology installation, EESL will redeem the capital and operating costs for the installations through demonstrated energy savings of the institution and industry.

EESL has already signed MoUs with GAIL (Gas and Bharat Petroleum) to co-create an ecosystem for providing readily-available gas, the input fuel for trigeneration technology, to potential customers.

EESL developed expertise and a compelling market offering in this technology after acquiring Edina UK Ltd, a leading supplier, installer and maintenance provider for combined heat and power (CHP), gas, and diesel power generation solutions in the UK in March 2018.

For this, EESL has signed four MoUs with industries, and institutions across Maharashtra. EESL signed an MoU with the Mahanagar Gas to promote the adoption of trigeneration and CHP technology in the Mumbai area, and a second MoU with Maharashtra Natural Gas for the promotion of trigeneration and CHP solutions across the state. A tripartite MoU was signed between Castrol India, IGS and EESL to jointly explore additional opportunities for natural gas-based trigeneration projects in India. EESL also signed an agreement with Mahindra &Mahindra

to install and service a trigeneration project of 803 kWe capacity with an investment of Rs 25 crore.

Shivmogga Smart City to award projects worth Rs 370 cr

The Shivamogga Smart City in Karnataka is leaving no stone unturned to be one of the finest smart cities in India. The city is progressing well in terms of issuance of work orders. The city has issued work orders for projects worth Rs 64.06 crore. That apart, the authority will be issuing work orders for all the key smart roads (infrastructure projects) by this weekend.

Says CharulataSomal, Managing Director, Shivamogga Smart City, “Smart road packages, combined with other three projects worth Rs 370 crore, will be awarded before January 25, 2019.”

Progress so far

On the smart street lighting front, the Shivamogga Smart City has done the GIS mapping of all the streetlight poles in the city and has floated Request for Proposal (RFP) to replace the 19,500 number of existing conventional streetlights with LED streetlights, and to deploy 2,000+ more new LED lights in the upcoming project proposals.

The RFP has been floated at an estimated cost of around Rs 31 crore on January 4, 2019, and the last date for bid submission being February 6, 2019. “We have conducted a pre-bid meeting for the project for which there was a very good response from the potential bidders,” Somal said.

The idea of a Smart Road is to take all the utilities underground in the ABD area. Shivamogga Smart City has divided the ABD area into five zones for the ease of tendering and execution. These smart road packages include the underground ducting of the utilities like electrical LT/HT cabling, water supply pipes, sewerage, OFC cabling and street light cabling, and gas pipelines. The work orders for these five packages, costing Rs 370 crore, will be awarded soon.

At present, the smart city SPV has allocated Rs 900 crore towards civil infrastructure works and works worth Rs 430 crore is already been awarded and the utilization so far is around Rs 9 crore.

Agra Smart City to revive its micro commerce

Under the holistic vision towards bolstering the image of Agra as a truly tech-driven city, a number of noteworthy projects are being implemented across the length and breadth of city's Area Based Development (ABD) region. Agra's smart city proposal totals to around Rs 21.33 billion, out of which Rs 13.65 billion is envisaged to be done using smart city funds and PPP and the rest Rs 7.68 billion through convergence, which comprises of 23 projects under smart city and 17 projects under convergence.

Arun Prakash, CEO, Agra Smart City, says, "Work orders for 15 projects have already been issued and tenders are already in process for other projects. Under Smart City Mission, a total 18 projects are covered in ABD area, and in pan-city, a total of five projects. In addition to smart city projects, there are other departments working under different schemes. The total project cost as per the smart city proposal is Rs 21.33 billion." He added: "As on dates approximately Rs 40 crore has been spent."
Smart City proposal of Agra defines another heritage precinct called Taj Improvement District (TID). It envisions retrofitting of 2,250 acre of selected local area – Taj Mahal and area comprising Tajganj, Agra Fort, Jama Masjid and Fatehabad road till inner ring road. With an envisaged outlay of Rs 16.99 billion under ABD and Rs 4.34 billion under Pan-city spread over the next five years, TID aims to revive the historic relationship of the micro commerce with the monument.

The retrofitted areas are imagined to become a new socio-economic engine for the Taj experience. The proposal revolves around mainly street improvement, beautification, decorative flyovers, murals and some facade improvements in the old city and lacks a comprehensive approach towards making provisions in conserving the heritage precinct defined in the Smart city proposal.

Major projects
That said, as part of the unique initiative aimed at preservation of urban morphology walk, the heritage walk is proposed to be conducted around the old market area comprising of the little known as well as art and culture of Agra like marble inlay, Zardosi work, and flower market. The total cost of the project is Rs 3.14 crore.
The project, which is aimed at enhancing the image of 'Street Vending Zones', entails providing facilities and designated place for the street vendors as well as tourist to enhance the experience of Agra streets and food, flowers and other markets. As part of this project, the following locations have so far been identified: near Amar hotel, towards Vibhav Nagar; Vishal Mega Mart, Fatehabad road, BasaiSabji Mandi, towards 100 ft road.

Under the 'Junctions Improvement' project, being executed at an estimated cost of Rs 6.97 crore, junctions at Bijli Ghar, Agrasen Taj view crossing, Basai chowki crossing, TDI mall junction, Hotel Marriott crossing, Jaypee hotel junction and Tiraha Junction (Taj east) are being given a complete makeover. The development work at all these locations includes: new signage, pavement marking, median, roundabout, landscaping, signals, channeliser, and

earthwork wherever required. Also, in a bid to beautify the area around the city's major landmark—Taj Mahal—the project of tree illumination at Taj east and west gate is in full swing. The total project cost is Rs 6.56 crore. Further, the work is in full swing on street-scaping and beautification of Fatehabad road in the ABD area. The Fatehabad road has much more significance than just being considered as a connecting road to the city. Once completed, the project will help actualize the following objectives:

- It would relieve congestion across ABD area and beyond
- It would provide better linkage to the radial arterial roads
- It would provide improved access to Taj Mahal
- It would improve connect between the new urban nodes outside/ nearby ones

Another important project being implanted under Agra Smart City Mission is the Solar Installation on Renewable Energy Service Company (RESCO) mode. Being implemented at a total Project cost of Rs 2.65 billion, the implementation of this project will lead to significant reduction of conventional fuel and help in the reduction of carbon emissions also. This would also lead to a substantial reduction in power bills of the building owners. For this, says Prakash, "we are working with the understanding that 3 MW solar power plant would be required to generate 4.4 MU of electricity and 24,000 sq m area is required to set up 3 MW solar power plant."

Other major projects are providing 24/7 water supply integrated with SCADA systems and sewerage system in entire ABD area, Sewerage System in ABD area , rehabilitation of all major and minor roads in ABD area, solid waste management in ABD area, etc.

Haryana's ISMO to help tackle cyber security issues

To address the challenge of cyber security, the Haryana Government has formed a dedicated department - Information Security Management Office (ISMO), which will help the state authorities in tackling, preventing and detecting various threats along with monitoring, risk-assessment and other security breaches. The State Government has deployed a dedicated team of 50 cyber security specialists to carry out Vulnerability Analysis and to limit the extent of Penetration Testing (PT) for designated IT Assets. On yearly basis, approximately 55-60 applications were being audited.

Earlier, ISMO was being contacted by the State Government organizations for their system information security-related requirements. Many of the queries of the departments' stakeholders can be resolved if they have knowledge and awareness of cyber security concepts. Hence, there was a need to provide a platform to such stakeholders to enable suitable dissemination of cyber security-related content and information. ISMO acts as a platform for information dissemination on latest trends on cyber-attacks, preventive measures, awareness materials, policies, guidelines, cyber security and hygiene factors.

As part of the Haryana ISMO portal, a full fledge e-learning module has been developed. The e-learning module provides a course on cybersecurity to various stakeholder (students, working professionals, Government officers, IT professional (Government and private sector), etc.) such that they can adopt best practices with respect to cyber security, information security and data privacy etc, and apply these in there day to day life. In the near future, the user will also be given a digitally signed completion certification from ISMO, Haryana after completion of the e-learning course and an assessment quiz.

Nagpur recycles 90% of sewage water (other cities can learn from them)

Burgeoning populations coupled with slow and unorganized development in sewage infrastructure pose a major threat to the sanitation conditions of cities, subsequent river water quality and public health of the inhabitants. According to the report on the Composite Water Management Index by the NITI Aayog last year, about 600 million people face high-extreme water stress. To tackle this menace, several cities are taking precautionary measures to strengthen their water and sewage infrastructure. That said, the Orange city of Maharashtra, Nagpur is all set to recycle 90 per cent of its sewage water by increasing the capacity of its treatment plant to with an aim to recycle 480 million liters of the total 525 million liters per day (MLD) is generated in the city. With this, Nagpur will become India’s only city to treat wastewater at this level.

Meanwhile, the state-run National Thermal Power Corporation and Maharashtra State Power Generation Company has agreed to procure 150 MLD and 190 MLD treated water, respectively, making it as a profitable project for the city as it will cover all its expenses. The 'Nagpur Model' is definitely commendable and something that other cities in India can take a cue from.

Bengaluru, which is generating 1,600 MLD sewage, recycles only 600 MLD, meaning that almost 80 per cent is going waste. The untreated water then flows to other water bodies like lakes and rivers, polluting them, which then leads to the bizarre phenomena like catching fire. Bengaluru, which is predicted to be the first Indian city that will run out of water, urgently need to step up its game in recycling and reusing wastewater.

Neighbouring Chennai, which too is facing a similar situation, is in the process of increasing its recycling capabilities. The city generates around 580 MLD of sewage. The Tamil Nadu Government recently allocated Rs 86 crore to rejuvenate the city's water bodies using treated sewage water. According to the plan, which is based on IIT-Madras's ‘recycling and reusing’ model, treated sewage water will be pumped into the water bodies, which will then help in increasing the ground water levels.

In Delhi (which generates waste water of over 2,600 MLD) around 1,600 MLD is treated and 338 MLD is reused. Last year, the Delhi Government had also proposed to supply treated sewage water to though Delhi Jal Board's pipelines. According to the proposal, treated sewage water will be pumped to Palla, where it will mix with river water channel. It will then flow downstream 11km to Wazirabad where it will be treated again before it is supplied to individual homes.

India's first solar ferry boat saves 58,000 liters of diesel in 2 years

India's first solar ferry boat, ADITYA has contended its two years (730 days) effective activity in Vaikom, Kerala. The sun-powered transport ferry is manufactured (under the 'Make In India' initiative) by NavAlt Solar and Electric Boats, that expects to make water transport progressively effective.

ADITYA was introduced in January 2017 by PinarayiVijayam, Chief Minister of Kerala and Piyush Goyal, the former Cabinet Minister for New and Renewable Energy, Power. The solar boat was launched for transportation purpose with a capacity of 75 passengers in Kerala Backwater. NavAlt stated that it has helped to save Rs 40 lakh on cost of diesel, which is equivalent to 58,000 liters in a span of two years.
The quantity of daily commuters which ADITYA drove in a range of two years (730 days) is a total of 6,40,000 passengers and has voyaged 38,500 km. This means income of Rs 6,000 every day and in two years is an absolute income of Rs 43.8 lakh. The main cost that the department has caused over the two years of running is the power charge, an aggregate of Rs 1.31 lakh. The all-out savings is about Rs 40 lakh.

In States like Goa, Kerala, Telangana, West Bengal and Assam, water transport framework is huge and it can be broadly utilized. The company is under process to introduce more solar boats in other States

Join Smart Cities Think Table in Nagpur

Smart Cities Council India (SCCI) in association with Nagpur Smart and Sustainable City Development Corporation (NSSCDC) is organising a Think Table meet on January 31, 2019, at Nagpur. Smart Cities Think Tables (SCTT) are a series of forum sessions organized by Smart Cities Council (SCC) in different cities of India where the biggest challenges facing the sector are detailed and discussed threadbare. The Council's partners will be in attendance to discuss the future smart city requirements of Nagpur, as well as address the urban challenges faced, and solutions for the same.

The Think Table deliberations will focus on addressing the problem, through expert opinions from the Council's partners, as well as any other area of concern important to Nagpur Smart City. According to Dr Ramnath Sonawane, Chief Executive Officer, NSSCDC, the city is focussing on the implementation of town planning based on the principle of retrofitting; rehabilitation and resettlement plan; smart infrastructure and utilities; and zero waste garbage city.
The event is an opportunity to bring together city representatives and private stakeholders, in order to discuss practical solutions and strategies for the advancement of Nagpur's Smart Cities Mission. It will also present a platform for stakeholders to share relevant case studies on initiatives that could be useful to Nagpur Smart City, and what initiatives need to be implemented in order to capitalize on innovations, smart technologies and best smart practices to help in the sustained growth of Nagpur.

The Nagpur Smart City Think Table will also provide networking opportunities as it will bring together government and private stakeholders to deliberate on the opportunities, challenges and solutions for building sustainable, liveable and efficient cities in India.

Incorporate AI with Zero Liquid Discharge and Improve Energy Efficiency

The rise of the Industrial Internet of Things (IIoT) has had strong implications for the zero liquid discharge (ZLD) systems market. To keep pace with the rate of digitalization in end-user industries, ZLD vendors have implemented the use of IoT-enabled wastewater monitoring and handling systems for improved efficiency, as well as Artificial Intelligence (AI) technology and smart meters for monitoring fouling issues in membranes. Additionally, they are making substantial investments in smart solutions and adopting advanced technologies like forwarding osmosis (FO) and electrodialysis reversal to gain a competitive edge in the market.

Frost & Sullivan's recent analysis, Growth Opportunities in the Global Zero Liquid Discharge Systems Market, Forecast to 2024, covers the technologies of membrane systems, brine concentrators, and evaporators. It assesses the challenges, market drivers and restraints, and key trends affecting the future of the market. Disruptive technologies, macro to micro visioning scenarios, and market forecasts by region are analyzed to provide an overall understanding of the dominant segments and technologies. Lastly, the study examines innovative financial models, the role of smart solutions, and customer-focused and other value-added services.

"Leveraging existing expertise and developing smart technologies to efficiently improve the energy efficiency of the ZLD process will be a key differentiator in the market," said Akshaya Gomatam Ramachandran Research Analyst Energy & Environment. "Vendors realize that developing advanced technologies will give them ample opportunities to customize ZLD packages based on customer requirements and therefore, they are increasingly seeking collaboration and partnership opportunities with technology providers or government agencies."

As innovations in thermal systems, membrane distillation systems, and FO technology will significantly reduce the overall operational costs, the systems will become affordable to a wider customer base.

"In addition to high value-added products, there is also a large market for specialized value-added services, such as operations & maintenance for industrial customers," noted Ramachandran. "Companies like Aquatech, Desalitech, and Saltwater Technologies have already created portfolios of technologies that specifically address existing challenges and demand for customer-focused services."

There are significant growth opportunities for players in emerging regions such as Asia-Pacific. For instance, the increasing number of coal-to-chemical plants in China has created an urgent need for advanced ZLD systems. The most successful vendors are likely to:

- Employ business models like build-own-operate (BOO), BOO–transfer, BOO-maintain, and engineering, procurement and construction.
- Offer pre-feasibility studies and value-added services, such as an analysis of the type of wastewater, to help customers choose the best-fit ZLD system.
- Partner with IoT solution providers to digitally transform wastewater recycling.
- Develop an effective brand positioning strategy based on the needs of industrial customers.

Growth Opportunities in the Global Zero Liquid Discharge (ZLD) Systems Market, Forecast to 2024 is part of Frost & Sullivan's global Environment & Water Growth Partnership Service program.

Indore clears 13 lakh tonnes of garbage in six months (and saves Rs 50 crore too)

Indore, a city in Madhya Pradesh has set an example for wannabe smart cities by clearing over 13 lakh tonne waste in just six months as compared to a mere 2 lakh tonne in the last two years. Under the previous model, the government had outsourced the task to private agencies, which were charging Rs 475 per cubic metre. The whole task would have cost over Rs 60-65 crore and taken a painfully long time to conclude. However, when the Indore Municipal Corporation took it upon them, it managed to clear the garbage from 100-acre dumpsite no more than Rs 10 crore on the entire process.

The corporation, which was grappling with fund crunch decided to rent a machine for bio-mining instead of outsourcing the whole process. The machine was rented to IMC at a reasonable cost on a per month basis. IMC operated the machine for 14-15 hours daily using their own resources, and within six months, 13 lakhs of garbage was cleared.

Bio-mining process

The bio-mining refers to the process of segregating waste into biodegradable and non-biodegradable segments, which is a proven technology and has been used extensively in Indore. The Indore civic body, meanwhile, is using wet waste to produce methane gas — which is being used for public buses in the city — and compost, which is given to farmers for agricultural and horticultural use. It is a model that is bound to be adopted across India.

India's start-ups' witness 108% growth in 2018

According National Association of Software and Services Companies (NASSCOM), the start-ups in India witnessed a 108% growth in total funding from $2 billion in 2017 to $4.2 billion in 2018. During the year, more than 1,200 startups came up, including eight unicorns, taking the total numbers to 7,200. What's more, these companies have created direct employment opportunities for 40,000, while providing 120,000 opportunities for indirect employment. According to NASSCOM, the key growth drivers were fintech, healthcare, and edtech. Data analytics, artificial intelligence, and IoT start-ups have been witnessing fastest adoption across the spectrum. That said, there was 120% funding growth for AI with $150 million investment during the year 2018.

Innovation Hub Awards

The Smart Cities Council India, part of the global consortium of smart cities, is organising 6th 'Smart City Summit - SM@RT Urbanation' at Hotel Shangri-La Bengaluru from February 13-14, 2019 to commemorate three years of the initiation of Smart Cities Mission. That said, spotlighting innovation and entrepreneurship, SM@RT Urbanation is organizing a Start-up Innovation Hub!

SM@RT Urbanation, through this platform is providing opportunities for start-ups and technology leaders to showcase their innovative technology, apps and smart solutions that will drive execution of smart cities in the coming years. The main aim of Start-up Innovation Hub is to convert urban challenges into opportunities. This award is meant for those Start-ups who have created the most innovative solutions for cities. Our eminent jury members will thoroughly vet the start-ups projects, to find the top 3 winners.

Our jury will be choosing the 25 most innovative solution providers to give a 15-minute presentation at the Innovation Hub Theatre from the pool of Innovation Hub applicants, on 13-14, 2019 in Bengaluru.

Meanwhile, the summit will see participation from across the globe with more than 1,500 delegates, over 80 international visitors, 20 innovation hub speakers, 60 city officials, 100 exhibitors and start-ups. More than 50 eminent speakers will debate and deliberate on the various opportunities and pertinent solutions with regards to smart cities. The theme of the summit is "Project management and sustainability".

The summit has received wholeheartedly support from the Government of Karnataka as a host state. Testimony to this will be the presence of HD Kumaraswamy, Chief Minister, Karnataka; G Parameshwara, Deputy Chief Minister, Minister of Bengaluru Development & Town Planning, Karnataka; UT Abdul Khader, Minister for Urban Development, Karnataka; TM Vijay Bhaskar, Chief Secretary, Government of Karnataka; and AB Ibrahim, Managing Director, Karnataka Urban Infrastructure Development and Finance Corporation.

So, what you waiting for? If you have any innovative solutions for Smart Cities, this is the platform to get noticed!

See how this interactive IoT platform can benefit consumers

To enable professional customers to unlock the full potential of connected lighting for the Internet of Things (IoT), Signify (formerly known as Philips Lighting) launched its new IoT platform. This interactive IoT Platform—Interact—enables connected LED lighting systems and embedded sensor networks to deliver insights, benefits and new services to customers.

The platform delivers new insights to help customers drive operational efficiencies and take more effective decisions. It also supports the company's strategy to deliver new data-enabled services as value expands from lighting products and systems to services.

The company has already installed 29 million connected light points worldwide and plans for every new LED product it produces to be connectable by 2020.

This growing number of connected light points, sensors and devices, as well as systems, can collect large volumes of data for which Interact was designed to handle. The highly secure, scalable cloud-based Interact platform uses sophisticated and modern data management and data processing capabilities, including machine learning, to bring sense to all manner of data – creating data-enabled services for customers that will deliver benefits beyond illumination. It also offers a growing suite of licensed open application program interfaces (APIs), which will foster innovation from third-party developers, development partners and customers, enabling various data-enabled services to be developed.

A typical example of such a service is occupancy data from different buildings, combined and analyzed to help managers to understand and predict how people use office space. Such insights can help deliver savings by optimizing the use of existing office space and support better designed, more efficient buildings.

In addition, data from authorized third-parties can also be analyzed by Interact. For example, for a municipal authority, news articles and social media posts, reacting to a new lighting installation on a bridge, can be analyzed and data sent to a social impact app dashboard that summarizes the public sentiment.

Interact connected lighting systems

These connected lighting systems, offering a unified user experience, feature applications that address industry-specific verticals. Available now are:

- **Interact Office –** enables you to turn your office into a smart sustainable workspace with software that allows you to increase building efficiency and employee productivity.
- **Interact City –** helps improve street lighting, safety, reduce energy consumption, improve efficiency and support your sustainability goals and beautify the urban landscape across roads.
- **Interact Retail -** enables customers to group, zone and schedule connected lighting to create stopping power in stores. It also supports in-store location-based marketing services to increase shopper engagement and indoor navigation to improve staff productivity.
- **Interact Landmark –** aids in managing and triggering light shows with dynamic architectural lighting to help increase tourism, regenerate downtown areas, and stimulate commerce.

- **Interact Pro -** an intuitive cloud-based software for small and medium enterprises that automates lighting and allows management via the Interact Pro dashboard.
- **Interact Sports –** aids in monitoring, managing and coordinating across all lighting infrastructure from a single dashboard from pitch lighting, entertainment light shows, hospitality areas and exterior architectural lighting.

See how smart cities can earn revenues and fund projects

Although smart cities have been provided with some seed money from the Centre and the state, with some to be generated from their own budget, the financial requirement still remains huge as smart city plan has to benefit the entire city and not just limited to the area identified for development.

The SPV needs to identify bankable projects to attract private investment. The challenge is to mitigate funding as well as keep it self-sufficient to generate revenue from various available sources for sustainability. Currently, SPVs are in a comfortable position. The reason, assured funds from both the State and Centre for launching projects. However, as soon as the first few billion spent on envisaged projects, SPV becomes paranoid where the rest of the money will come from. In such cases, other revenue sources for urban centres such as user charges for specific services, taxes and non-tax revenues, grants, loans and other receipts can play an important role. According to the report titled 'Municipal Finance: Funding Urban Development in India' by JLL India, it is estimated that as much as Rs 250 million can be raised annually through advertising fees by municipal bodies of metropolitan cities of India.

Advertising fees are trending as a key instrument for revenue augmentation in the urban centres of India. The advertising fee or revenue collected through the leasing of advertisement rights on assets owned by various government agencies have the potential to be a game changer in the near future. It is to be noted that many Indian cities are now focusing on developing, planning and expanding this opportunity to assets that present an advertisement fee opportunity including public convenience facilities, lamp posts, public parks an open spaces, and government buildings.

The report notes that metropolitan cities (population of 1 million and over) have a potential to attract average revenues of over Rs 250 million per year through out-of-home advertising. Cities that have a population of up to 1 million, revenue from out-of-home advertising is estimated in the range of Rs 7.5 million to Rs 10 million per annum.

For smaller municipalities and town panchayats, the estimated revenue generation potential through advertising is estimated in the range of Rs 1 million to Rs 2.5 million per annum. Megacities have an even higher potential of generating revenue through advertisements revenue and tax and can be in the range of Rs 750 to Rs 1 billion depending on the availability of space in their assets, the report says.

Fiber-reinforced plastic is a game-changer for structural requirements (See how)

By connecting places, they facilitate the movement of goods and services and people, thereby ensuring a means of livelihood for those who would otherwise be cut off from the rest of the population. Typically, as bridges in difficult-to-reach locations are made of wood or steel, they tend to rot or corrode easily.

Moreover, as bridges are susceptible to damage during natural disasters and, are often in locations close to India's borders, they require frequent checks and maintenance to ensure that they meet their design life.

Material of choice

The search for a material that is both lightweight and maintenance-free ends with fibre-reinforced plastic (FRP).

FRP is an alternative to steel and does not corrode even when exposed to harsh environmental conditions. It is a composite material manufactured by the combination of glass and polyester, with the same mechanical strength as steel but half its weight.

FRP's density is one-fourth that of steel, but its mechanical properties are much better, resulting in a superior strength-to-weight ratio.

The production and use of this material have become widespread with time, leading to a significant reduction in cost and making it affordable for various ordinary applications. In the past few decades, the use of FRP has become common for structures such as cooling towers, hand-rails, walkways, platforms, etc.

It has become the material of choice for civil engineers in applications where low weight and weather ability are important considerations. FRP can be used to build bridges, too, and this has several advantages.

FRP does not corrode and has a lifespan of up to 50 years.

FRP bridges are therefore ideal for installations deep within forests, where precipitation is high; or in areas near the sea, marshes, or salt pans, where steel bridges tend to corrode within a few years.

An FRP bridge will typically weigh less than half as much as a steel bridge of comparable size. This makes it easy to carry and install in hilly or mountainous regions, where connectivity with neighbouring towns is essential for survival. What's more, FRP bridges have a significant impact on local commerce and economic activity by enabling faster movement of people and goods.

Global examples

Spain has some excellent examples of how FRP bridges can be feasible candidates as 'future bridges' owing to their durability and rapid installation. The first vehicular FRP girder bridge in

the country was built in 2004 along the highway leading to Asturias Airport. The 46-m bridge consists of three longitudinal carbon reinforced polymer (CFRP) beams with a trapezoidal cross-section. The beams were manufactured in Madrid and transported to Asturias's bridge site; owing to the lightweight composite beams, transportation of the beams was easily carried out. It took only half a day to place the three 46-m-long beams on their supports. On the outskirts of Madrid are identical M111 bridges, made up of three simple supported spans (10, 14 and 10 m) of four FRP girders each. Based on the experience gained during the design and construction of Asturias bridge, the M111 bridges' girders were designed to have open cross-sections, making it possible to manufacture them by hand lay-up on a reusable steel mould. Formed by a simple supported 24-m-long FRP girder, the Canary Island footbridge offered a good chance to test a different manufacturing process: Resin infusion. A hand lay-up it is labour intensive and a normal choice to manufacture large elements, such as boat hulls, it further reduced the cost of the FRP girders. The Almuñécar footbridge, built in Madrid in 2010 to substitute an old reinforced concrete one crossing the Manzanares river, offered the possibility to test the resin infusion manufacturing process on a much bigger element.

And the Cuenca footbridge offered the possibility to study the behaviour of the carbon fibre cables in view of their future applications in other types of bridges, such as cable-stayed and suspended bridges.

The India advantage

FRP is also the best option for areas such as Ladakh, Kashmir, the Northeast, and areas along India's borders. The presence of troops on both sides of the border makes it necessary that our supply lines are maintained. Having strong, lightweight, portable bridges will be advantageous for our military. The military application of FRP bridges may well be among its most important ones.

The Indian Army is also often called upon for assistance in disaster-hit areas. Because FRP bridges can typically be installed in less than 12 hours, they can come in handy in disaster management situations, where we can save precious time that would otherwise be lost in building a bridge.

FRP bridges are a new-age solution to old-world problems. Their use will not only improve the lives of our fellow citizens but increase the sustainability of India's infrastructure spending.

Here are the six predictions for surveillance industry in 2019

As the New Year takes off, Johan Paulsson, Chief Technology Officer, Axis Communications, has curated some security predictions of the surveillance industry for the year 2019. These are expected to be the focus points for the year.

Artificial Intelligence

For all the attention and discussion, you could be forgiven for thinking that artificial intelligence (AI) is fundamentally changing every industry and sector. Though for the more cynical (and with reference to the Gartner Hype Cycle) you may feel that a lack of demonstrable applications of AI (and the associated machine learning and deep learning) points to either a peak of inflated expectations or even the Trough of disillusionment. In reality, of course, progress differs from industry to industry and from application to application. In some fields—notably healthcare and specifically cancer detection—AI is already having a significant positive impact. In other areas, progress is steadier. Video surveillance is one of them.

In our industry today, machine or deep-learning is mostly used for video analytics, but we expect the technology will be an important component in many different applications and products in the future. Over time it will become a common tool for software engineers and will be included in many different environments and devices. But, again, its application will be driven by the most compelling use cases, not by the technology itself. There is a temptation in the surveillance and security sector to over-promise in relation to new technologies. This has been true of AI in video analytics and, particularly, in some of the claims made around the current application of deep learning. With AI and deep learning, as with any new technology, we're committed to making sure its implementation is robust, reliable and addresses real customer challenges.

Deep learning consists of two different phases: the training phase and the execution phase. The former requires a lot of processing power, data and time, so most likely will be run on a server and/or in the cloud, while additional training (fine tuning) could be done at the edge (which is a neat link into our next trend). The execution phase – that which requires 'trained' data to work – can be done at any level within the system, purely dependent on how much processing power is required and how time-critical the application is.

Research and progress will continue, steadily, and bring incremental improvements and benefits over the next year rather than radical change.

Cloud &edge computing

If AI could still be said to be in the earlier stages of the Gartner Hype Cycle, it's difficult to argue that cloud computing is anything other than firmly established and heading towards, if not already on, the Plateau of productivity. There can be few organizations in the private or public spheres that aren't making use of cloud computing at some level, and many have moved their entire infrastructures to a cloud-based model.

That said, cloud computing is based on the centralized computing in one or many data center, and as the proliferation of connected, Internet of Things (IoT) devices grows

exponentially, so does the amount of data produced. Even as more data centers with ever-increased capacity are created, this tsunami of data could become overwhelming. This can be particularly critical in areas such as video surveillance, where despite the development of technologies designed to reduce storage and bandwidth needs, data demands are still significant.

This is where the benefits of edge computing come to the fore. In simple terms, as its name suggest, edge computing puts more data processing at the 'edge' of the network, close to where the data is collected by the sensor and before transfer to the data center. One particular benefit in some sectors relates to speed of processing and ability to act upon the data captured. Take, for instance, an autonomous vehicle. Without edge computing – where both data capture and processing take place in the vehicle itself – the delay in communication with a cloud-based data center, even if only milliseconds, might be the difference between the vehicle avoiding an accident or otherwise.

In our business, edge computing means processing data within the camera itself. While perhaps not as dramatic as avoiding road accidents, the benefits can still be significant. Firstly, initial processing of data within the camera can significantly reduce the bandwidth demands of both data transfer and storage. Additionally, data can be anonymized and encrypted before it is transferred, addressing security and privacy concerns.

Ultimately, cloud and edge computing will not be an 'either…or' decision; the two will work in balance to the greatest benefit.

Personalization v/s privacy

In years to come, 2018 might be considered as the year when broad awareness of data privacy reached its highest point, particularly that associated with personal information. To those in the public and private sectors, the EU's General Data Protection Regulation (GDPR) bought a higher level of scrutiny than ever before to how organizations collect, store, share and use personal information (including that captured by video surveillance). To the broader consumer, however, it is more likely to be issues relating to Facebook's use of data which has heightened awareness and concern regarding what happens to the personal data given away online.

Ultimately, we live in a world where we have been given valuable online services in exchange for knowingly or unconsciously handing over a significant amount of personal data. Indeed, this data is used by the likes of Facebook, Amazon, Google and others to increase the value of these services through a high degree of personalization. To many, however, it feels like a line has been crossed between useful personalization and invasion of privacy, and the rumors that home voice assistants listen in to domestic conversations will only cause this unease to increase.

Ultimately, the trust between an organization and its customers is becoming an increasingly important and tangible asset. Indeed, recent research from consulting firm Accenture has established a correlation between stakeholder trust and revenue. Concerns about a

company's approach to privacy and the use of personal data will be one of the most impactful aspects of trust in business moving forwards.

Cybersecurity Can something continue to be a 'trend' when it appears every year, and is a constant concern? Whatever your answer to that question, it's impossible to think about issues that will affect every sector this year without a mention of cybersecurity. Indeed, in relation to the previous point, the fastest way to damage trust between a company and its customers (and shareholders) is through a cybersecurity breach. Just ask British Airways.

Cybersecurity will never be solved, because the cybercriminals (and increasingly nation states) will never stop trying to find and exploit vulnerabilities. These organizations are incredibly well-funded and organized and can innovate much more quickly than companies that need to adhere to industry regulations. Attacks are becoming more sophisticated, at a time when the number of connected devices mean that potential vulnerabilities and insecure network end-points are growing exponentially.

One particular area of vulnerability that has been highlighted recently is in the supply chain, where either a lack of good cybersecurity practice or even deliberately malicious actions can result in cybersecurity breaches being achieved through both software and hardware. The provenance of products is ever more critical than ever, with manufacturers needing to be confident that every link in their supply chain is a secure as it should be.

Smart technology

We've already seen how video analytics can be used as an operational planning tool by organizations looking to improve energy efficiency within offices, with the subsequent positive benefits for the environment. But new types of sensors can more accurately measure environmental impact across an organization's sites, effectively acting as highly sensitive artificial 'noses' calibrated to different forms of output, and thermal imaging can be used to pinpoint areas of energy wastage.

For instance, one critical area where such sensors can heighten awareness, understanding and, increasingly allow for remedial action is in air quality. Whether inside buildings or in the external urban environment, the negative impacts on health and associated costs are becoming an ever-greater issue. Smart sensors will have a central role to play in addressing the problem globally.

Such applications add value to organizations through efficiencies and cost savings (and, hopefully, health benefits), but also help them reach their own environmental and sustainability goals.

Sensor integration driving smart actions

In themselves, individual sensors such as those described above can deliver significant benefits. But a final trend that we're confident will be increasingly prevalent in 2019 will be combining and integrating sensors to prompt 'smart' actions.

For instance, in a smart city, a motion sensor connected to a barrier could trigger a camera which, in turn, would trigger an alert in the operations center, allowing for rapid and

appropriate response. Or an environmental sensor could again trigger a video or thermal camera to quickly identify fires or spillages, again prompting alerts which will create a more rapid and effective response. When the range of sensors are considered – from thermal to motion, from atmospheric to video – the ways in which they could be combined are endless, as are the potential benefits of doing so.

Technology continues to develop at a rapid and accelerating pace. While it can be easy to become distracted by the potential of every new trend or innovation, each must be considered in relation to the use cases that are going to deliver maximum positive impact and value to organizations and citizens. This remains the lens through which we view technology trends and their application, and 2019 promises to be another exciting year in bringing new technologies to market in increasingly useful ways.

Shimoga plans projects to the tune of Rs 4.44 bn (tenders floated for Rs 2 bn)

Shimoga, also known as Shivamogga, is a large city and the district headquarters of Shivamogga district in the central part of Karnataka. Situated 569-meter above sea level and gateway to the hilly region of the Western Ghats, the city lies on the banks of Tunga River and is popularly nicknamed 'Gateway of Malnad'. What's more! Shimoga has been selected in the third round of the cities to be developed as 'smart' under the government's smart cities mission.

The city has selected about 74 projects to be taken up under the smart city. Of these, 60 are Shimoga City Corporation funded, six projects are taken up in PPP and eight under convergence (i.e. other departments executing the work under the ambit of smart cities mission). These eight projects are ongoing and are completely funded by the state government.

"Under the smart cities mission, we have selected projects at a total cost of Rs 11.84 billion; these are under various stages of project preparation or execution or tendering," says CharulataSomal, Managing Director, Shivamogga Smart City Corporation, and Commissioner, Shimoga City Corporation.

Vision

The city is aiming at sustainable development centered around the themes of water and environment, following its mission statement 'Ecological transformation through green Urbanism'.

"We want to improve existing infrastructure in area-based development (ABD), which we expect to be replicated in other areas in due course. Once we establish well-developed infrastructure, we aim to replicate it in other areas with corporation funds," Somal declares.

For road projects that the city has taken up, the authority aims to have all the utilities such as power cables, water supply lines, sewer lines, TV cables, etc, underground. Further, for roads with a smaller width, the city corporation is planning to integrate the level of the footpath with that of the cover slab of the drain, so that it can be used for vehicular movement in the middle and the sides can be used for parking as well as cycling.

Present status

"We recently floated tenders to the tune of Rs 2 billion, for which we are soon awarding work orders. Besides, we recently called for bids for the second time for two road packages worth Rs 1.4 billion and Rs 700 million each," announce CharulataSomal.

Apart from these, several DPRs are being prepared. According to Somal, the city corporation have projects to the tune of Rs 4.44 billion for which DPRs are under preparation; the tenders for these will be announced in the coming two to three months. These include works for the conservation of buildings for which we are preparing the

concept; road works for last-mile connectivity and Ring Road improvement at about Rs 900 million.

“Also, we will be tendering works for riverfront development – the frontline project of the smart city programme – at an estimated Rs 1.4 billion for the civil engineering component,” she says. Other projects include heritage works, with certain focal points of importance like the Shivappanaika Palace (known as Heritage Walk), which actually depicts the heritage of Shimoga city. So, it would be developing about a two-km stretch of roads—face-lifting existing roads as well as taking all the utilities underground—around these heritage places.

The heritage works include a hard component such as the physical structure and a soft component wherein an app will provide an audio guide at important points while passing through the road. The corporation is planning to tender out all the works for this before March.

Forecasting floods, now a reality (all thanks to Google's AI)

Floods are devastating natural disasters worldwide – it is estimated that every year, 250 million people around the world are affected by floods, also costing billions of dollars in damages. Flood forecasting can help individuals and authorities better prepare to keep people safe, but accurate forecasting isn't currently available in many areas. And the warning systems that do exist can be imprecise and non-actionable, resulting in far too many people being underprepared and under- informed before a flood happens.

To help improve awareness of impending floods, Google is using AI and significant computational power to create better forecasting models that predict when and where floods will occur and incorporating that information into Google Public Alerts. A variety of elements—from historical events to river level readings, to the terrain and elevation of a specific area—feed into our models.

From there, it generates maps and runs up to hundreds of thousands of simulations in each location. With this information, Google has created river flood forecasting models that can more accurately predict not only when and where a flood might occur, but the severity of the event as well.

In India, Google's presence is blessing in disguise. The company recently started these flood forecasting efforts in India, where 20 per cent of global flood-related fatalities occurs. Here, Google is has partnered with India's Central Water Commission to get the data to roll out early flood warnings, in the Patna region. The first alert went out in September as part of the pilot project in eastern India.

Taking this pilot project forward, the California-based company is now expanding it ahead of the monsoon season to cover many more parts of the country. In the pilot, implemented in partnership with the Central Water Commission in India, Google showed, via Public Alerts, a map that included areas designated as 'high risk' 'medium risk' and 'low risk'. The pilot used an operational hydro-dynamic model, with the explicit goal of preparing the ground for integrating Machine Learning (ML) models into the process. Alerts were then sent out to individuals in the catchment area in the form of maps and Android notifications.

For 20 years, Google Search has provided people with the information they need, and in times of crisis, access to timely, actionable information is often crucial. Last year Google launched SOS Alerts on Search and Maps to make emergency information more accessible. Since then, the company has activated SOS alerts in more than 200 crisis situations, in addition to tens of thousands of Google Public Alerts, which have been viewed more than 1.5 billion times.

Four paradigms to leverage India's Smart Cities Mission

The need for Smart Cities becomes apparent from the development dilemma – the faster the nation's development, the greater is the strain on its limited resources, including higher demand for energy that intensifies the impact on climate change issues. As curbing development is never an option, and urbanization is an inevitable process with India striving to enter the league of developed nations, there is a call for us to move towards methods and solutions that can lead ensure sustainable ways of development. The recent report by India's NITI Aayog "Strategy for New India @ 75" deliberates four paradigms to leverage Smart Cities Mission of the country.

Scaling area-based development: There is a need to measure the impact of current area-based development projects on the ease of living, economic growth, investments, job creation and citizens' participation. The central government can consider transferring the lessons learnt from such area-based development projects to other cities. States should also be encouraged to launch their own state-level missions for other cities.

Mobility: An integrated institutional architecture for planning and coordinating the regulation of mobility such as a Unified Metropolitan Transport Authority is needed. Spatial plans should provide for integrating land-use and transport planning to support more mixed-use development for enhancing economic activity, reducing commuting time and improving environmental quality. There is a need for focused attention to public transport, including existing intermediate and para-transit services, especially in smaller cities. A pooled green transport fund to support such investments is recommended. A high-level inter-ministerial electric vehicle (EV) mission is necessary for proper coordination on the EV agenda.

Achieving desired service delivery levels: Funds for the provisioning of basic services and infrastructure are accessed from complementary missions, such as the Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Swachh Bharat Mission (SBM), and Housing for All (HFA). There is a need for a framework that mandates measurable outputs and outcomes for all capital investments in infrastructure and services in cities. These outputs and outcomes should be predefined and measured at quarterly intervals. The present liveability assessment underway will provide the baseline for measurement on 73 indicators.

Digital transformation roadmap: Conventionally, cities have been using information technology and communication (ICT) in three ways: (1) use a single application to address burning problems, say, waste collection, and then add more applications as per the needs and priorities of the city; (2) build infrastructure and add services, and (3) experiment with a number of applications without having a long-term or definitive vision in place.

The conventional ways ignore the value hidden in human interactions – among citizens, with the city's infrastructure (e.g. roads, bridges, parks) and the environment. These interactions contain data and information and digital technology has the potential to recognize and capture the hidden value in their interactions.

To harness internet connectivity and its various applications in governance and service delivery, cities need to put in place a digital transformation roadmap across both hard infrastructure and software applications. A digital transformation roadmap would recognize and capture these interactions and the whole becomes greater than the sum of its parts once the information that flows in the "systems of systems" is captured.

Additionally, the digital transformation roadmap would also build on the considerable work done in cities on geographic information systems (GIS) and apply these for geo-locating, mapping and publishing public assets in the city such as parks, playgrounds, public toilets, bus stops, streetlights, manholes, water and sewerage lines, stormwater drains, power lines, etc., and linking these to grievance redressal, participatory budgeting, transparent works management, and contractor payments.

Municipal acts need to provide for a digital transformation roadmap for ULBs as a mandatory policy document, like spatial plans. This will also help build data observatories for multiple uses, including citizen engagement.

Inclusive development: Cities must ensure that the urban poor and slum dwellers including recent migrants can avail of city services and subsidies and are financially included through the Jan Dhan Yojana. A dedicated benchmark could be considered to measure if benefits reach the targeted poor. Cities should dedicate a single-window facility for the urban poor to access basic services such as water supply, drainage and sewerage, and affordable housing in the form of the dormitory and rental housing. Urban poor communities and slums, benefitted by area-based development (ABD) or pan-city proposal (PCP) solutions, should be mapped in conjunction with improvements in parameters such as access to public assets and reducing service deficit including in the areas of education and health.

See how Atal Nagar became the safest city to live in India!

Indian cities are expected to house 200 million people by 2030. Driven by soaring numbers, India is expected to account for a 25 per cent rise in global energy usage by 2040, leading to a higher carbon footprint. The immense strain on the overburdened cities can well be imagined. Already, the infrastructure in cities, including the metros, is inadequate in meeting the present needs of citizens and, therefore, in no position to handle the additional burden of the population influx.

The creation of smart cities aims to address such concerns, thanks to the effectiveness of Internet of Things-enabled (IoT-enabled) technologies driving greater process efficiencies in all types of buildings – residential, commercial or industrial. The recent completion of the smart city project at Atal Nagar (formerly known as Naya Raipur) has the Integrated Command and Control Centre (CCC) as the backbone of the city. It includes a utility management system (electrical and water SCADA or Supervisory Control and Data Acquisition– an online system for gathering and analyzing real-time data), as well as an intelligent Building Management System.

The centralized CCC deploys IoT, mobility, sensing, analytics and cyber security tools to promote safety, sustainability, reliability, efficiency and connectivity for its citizens. As the central hub, the CCC manages the city's operations and emergency response.

The Atal Nagar Smart City initiative amalgamates and connects various verticals, integrates diverse segments, with the activities being overseen by the city's Development Authority. As a part of the project, the entire city is covered with GIS mapping that is backed by 128 CCTV cameras, 40 speed-detection cameras and 42 numbers plate recognition cameras, making Atal Nagar as one of India's safest cities.

The four pillars of this smart city is vest on institutional, physical, social and economic infrastructure. The focus has been on developing critical services such as 24x7 supplies of quality water, water connection metering, fully-automatic generation of utility bills by application systems, enhanced city security and safety, citizen-based mobile apps as well as city portals.

Another benefit of smart cities is that preference will be given to clean energy since sustainability tops the agenda. Solar and wind power can be the main alternatives for clean fuels in India. Note that smart power equipment of solar systems can communicate among themselves, analyzing any problems arising between their structures. Such smart systems ensure downtime is avoided or minimized.

Bengaluru generates electricity from waste (saves Rs 15 lakh per month!)

Waste management is a serious concern globally, and Bengaluru is no exception. To mitigate the waste menace, and, the same put to good use, the Bruhat Bengaluru MahanagaraPalike (BBMP) has started generating electricity from waste. The corporation's Yediyur area is setting a positive example for the city and others with a fully- functional biogas electricity production unit in place, that generates electricity from waste. The plan is to use this electricity to light up the lake area, seven parks in the ward, and other spots.

Hence, all the seven parks—RanadheeraKanteerva, SanjeevaniVana, Dhanmantri, Chandavalli Thota, Ambedkar, Chaitanya and Kalikamba—are now self-sufficient and being lit by the bio-electricity produced atthe ward.

At this point, BBMP generates 50 KW of electricity, which is being used to light up the seven parks and have plans to increase the generation to 250 KW which will be used to light up major spots of the area, including the model footpaths and 17 BBMP buildings, likecorporation schools, shopping complex, dialysis centre, etc. These model footpaths, stretched across more than a kilometre, have been equipped with catchment structures for rain-water harvesting.

On a regular basis, BBMP collects as much as five tonne of garbage every day, which is being used for this. The corporation also collects cow dung from several cattle-owners for an exchange of Rs 1,000 daily, and that is also used to produce electricity.

So, as per the process, the wet waste is segregated, and along with the cow dung, it is sent to the mixer machine. Later, the same is to a recycle chamber, slurry tanks, balloon digester and eventually intothe bio-gas container, where it is processed to create electrical power. The officials say that owing to this method, they have beenable to save almost Rs 15 lakh in power bills in the past few months.

The officials are hopeful that these few steps towards sustainable development will inspire the rest of the city to go green!

See how this drought-stricken village in Maharashtra is building a sustainable water supply

Shirpur, one of the drought-prone areas in Maharashtra, has always witnessed insufficient water supply, depleting rainfalls and extreme summer heat. Yet dripping pipes, spilling water on the roads, washing vehicles with oodles of water was a common sight in the town.

As no one was accountable to pay as per their consumption, there was excess water usage and the high number of unauthorized connections resulting in the theft of water. Due to the intermittent supply, the pipeline network was vulnerable to bursts and leakages and very little attention was paid towards repairs, as timely information was never available. Moreover, it took more than two months to take meter readings, prepare and distribute bills, thereby consistent delay in collections.

Thereby, reeling under the constant pressure for effective demand management and building a sustainable water supply that generates revenue, the city council implemented a 24x7 water supply scheme that launched in 2013.

“In 2013, we set out on a mission to create a sustainable water supply for the entire town and we were on the lookout for a solution that not only solves the problems of today but also ensures smart water management for years to come. After careful evaluation and scrutiny, we selected the ultrasonic metering technology and the AMR system offered by Kamstrup, and we have been extremely satisfied with their performance so far”, says Amrishbhai Patel, MLC, Shirpur.

Smart metering was a critical component for achieving fair billing, managing revenues with respect to the cost of production and other expenditure. SCCI’s partner Kamstrup’s ultrasonic smart metering technology came out to be a clear winner amongst many others, primarily due to the accuracy and reliability our meters offer throughout their lifespan. Additionally, the Automatic Meter Reading (AMR) solution drastically reduces the manual effort and error, therefore improving process efficiency and reducing costs.

“Since the beginning of meter installation in 2014, we were actively involved with the council as a change management partner. We conducted training sessions and reading trials for the council employees to empower them with grievance handling mechanism, and even prepared demos for the citizens to ensure transparency and trust between the council and its citizens”, says Suneel Bhambere, Director, Kamstrup India operations.

A holistic solution

In its endeavour to give each household clean water 24x7, the Shirpur Municipal Council wanted to efficiently measure, monitor and manage consumption and introduce fair billing

mechanism for their residential and commercial customers. Shirpur is the first-ever smart water-metering project at the city level in the country until date. Their focus was on the quality and durability of the meters and a dependable Automatic Meter Reading solution with long-term operations and maintenance and Kamstrup checked all the boxes.
"The government directive is to provide 135 LPCD to each citizen and a key success factor in achieving this has been the installation of Kamstrup smart meters. Seeing the performance of the meter and its durability, we have taken insurance for all the meters that not only benefits the municipality but the citizens are also reassured of any obligations", says Amol Bagul, Chief Officer, Shirpur-Warwade Municipal Council (SWMC). Additionally, smart alarms help detect any incidents like the leak, burst, etc.

Challenges

The installation started in 2014 and there was no looking back for the council and for Kamstrup. The company encountered the issues relentlessly – one of the interesting ones was narrow lanes and dense housing infrastructure, which made it impossible to install the meters in the traditional horizontal position. Nevertheless, thanks to the ultrasonic technology, Kamstrup meters work perfectly well in any direction; therefore, the meters were installed in a vertical position. The Operations and Maintenance (O&M) began in January 2017 and with that meter data collection also started. It took a lot of collaborative effort with the council and the contractor, Balraj Tech for physical meter/consumer data verification, creating DMA and sub-DMA for master data preparation for efficient meter reading and reporting purposes.
The rigorous activity that went on for the next 6 months resulted in the following:

- Comparative analysis of water consumption pattern post meter installation
- The difference in water consumption of residential and commercial connections
- Consumer segmentation as per high, medium and low water consumption
- Based on the above analysis the council formed the billing policy based on telescopic rates

Value creation at each step

Shirpur began the official cycle for water bills from April 2018 and they are already seeing tremendous results. The smart meters supplied by Kamstrup measure water consumption with pinpoint accuracy and overcome all the shortcomings of traditional meters like air measurement, low flow challenges, the lifetime of the meter, recalibration and repair every few years.
"With Kamstrup meters and AMR system, we are recording monthly reading and issuing quarterly bills on a volume consumption basis. Therefore, it is easier to track and customer complaints have reduced a lot", says Ulhas Agarwal, HOD – Water Supply, SWMC. There is ease of operation in day-to-day tasks and supply process efficiency seen within the council that translates into an increased level of service from the field service department and boost employee performance and morale.

"Earlier we used to supply 120 lakh liters of water per day, but now we need to supply only 80 lakh liters every day, therefore, we are saving a lot of water. Moreover, we used to take two months to issue water bills but now with AMR system, it takes only four to five days

including reading, billing and bill distributions. Hence, saving a lot of time," says, Madhav Patil, City Engineer, SWMC.

Conclusion

The case of Shirpur's smart water management is a learning lesson to all the municipal corporations, councils, water supply boards and even smart cities. In the last two years of meter reading, the council has realized many unauthorized connections and converted them to authorized one, thereby adding accountability at each step. A lot of effort went in generating awareness about water conservation, consumption-based billing, and it has benefited the citizens as well as the council. The number of high volume consumers shows a sharp decline and the otherwise low consumption consumers are seen on the map due to the transparent and automatic meter reading mechanism

See how ICCC in Surat is integrating people-centric services

Considering the fast growth of Surat and increasing demands and expectations of citizens from the city-government, Surat Municipal Corporation (SMC) has envisaged a Smart City Plan to serve citizens in an effective manner. For the corporation, to monitor different services, like night brushing; cleaning of roads; garbage collection and disposal; road repairing; health services; and illegal construction was a challenging task. This situation has led the SMC to implement a Smart City Centre. In times of exigencies, the centre is to double up as an emergency operations centre that will coordinate and execute tasks with different agencies in the city.

Implementation

The SMART City Centre (SMAC Centre) is an initiative of the Surat Municipal Corporation under the Smart Cities Mission of the Government of India. The Surat Smart City Development (SSCDL), a Special Purpose Vehicle (SPV), is responsible for the execution of all Smart City Projects in Surat. Inaugurated in June 2016, SMAC centre uses ICCC platform integrated with a GIS platform with 12-13 layers for the project. This centre is linked with the CCTV project of Surat city police department that has over 650 CCTV cameras at different locations. An additional 1,000 CCTVs, proposed to be set up by the SMC soon, will also be linked to this centre.

This centre collects functional information of all the departments and public on a real-time basis. Automated sensors and systems send various data sets to the SMAC, which are analyzed to avail important information to make decisions. All the online applications and mobile applications of SMC for people-centric services would be monitored from one place at the Smart City Centre. Birth and death certificates, relevant information on development plans and essential services, including water supply, are being integrated at Smart City Centre. During the time of natural calamities like floods, officials of different departments can remain in contact through the centre.

Results and impact

With the implementation of this pilot project, SSCDL is able to monitor traffic movement, control the smart street lighting system and maintain a bird’s eye surveillance of the city from the SMAC. This centre is collecting functional information of all the departments and public on a real-time basis and helping all the departments in maintaining civic service delivery standards on a day-to-day basis.

In hyper-connected India, IoT to connect 2 billion citizens

According to a recent report published by Assocham and EY, Internet of Things (IoT) has the potential to reach an estimated 2 billion connections in India, unlocking revenues of $11.1 billion by 2022.

The reports states, by 2022, five mobile connections per second are estimated to join the power of the internet. Nearly 50 per cent of the households are likely to be connected through fixed broadband. Connectivity will move beyond people to connect billions of devices, vehicles, household appliances and machines, the study said estimating that in a hyper-connected India, the Internet of Things (IoT) has the potential to reach 2 billion connections, and unlock revenues of $ 11.1 billion.

Fiberisation

The joint report highlights that while India holds huge potential, this promising market currently lags behind the US, China and South Korea in connectivity via optical fibre. Recently, Telecom Minister, Manoj Sinha informed the Parliament that the government's BharatNet scheme has connected 1.2 lakh of the targeted 2.5 lakh gram panchayats through the fibre with 1.16 lakh of them ready with broadband services as well. That apart, as fiberisation of towers is critical in India, the report compares only 25 per cent of telecom towers in India carry optical fibre whereas the corresponding share in the US, China and Korea is about 65-80 per cent.

Nearly 60 per cent of the towers will need to be fiberised by 2022, as outlined in the National Digital Communications Policy (NDCP) 2018, notes the study titled 'Propelling India to a trillion dollar digital economy' As demand for 4G and subsequently 5G grows, networks will become "denser and deeper" making fiberisation an imperative, it said.

New technologies

"The emergence of new technologies is set to multiply the consumption of data, necessitating the need for installing more towers. Additionally, 1,00,000 telecom towers will be required to meet the growing demand for data across the country," it said. The study also underscored the need to upgrade backhaul networks and fiberise minimum of 60 per cent of mobile towers to support 5G ecosystem.

Hubballi Dharwad Smart City to integrate essential services in ICCC

By mid-2019, the Hubballi Dharwad Smart City will implement Command & Control Centre components and other IoT enabled smart ICT systems. The technology is provided by Japan-based NEC Corporation's Indian arm, NEC Technologies.

The city will implement an Integrated Command and Control Centre (ICCC), city-wide surveillance system and ICT-based solid waste management system. Additionally, NEC Technologies will also integrate ICCC with various other smart elements, including an intelligent transport management system, parking management system, smart poles, a geographic information system, power and water SCADA and others.

"Efficient, effective and timely implementation of various citizen friendly ICT systems and smart elements has been the key objective of Hubballi Dharwad Smart City. We have already implemented many smart systems like a multi-level public parking management system, e-governance and intelligent transport management system in the twin cities of Hubballi-Dharwad," said **Hephsiba Rani Korlapati, Managing Director, Hubballi Dharwad** Smart City.
One of the key elements of the project is an ICT-based solid waste management system in which RFID tags will be placed on around 300,000 household bins, and garbage collection activity will be centrally tracked from the ICCC, right from the bin collection at households until dumping in designated areas. Citizens will also be able to send their grievances related to garbage collection directly to respective authorities through a smart mobile application. Higher authorities in Hubli Dharwad Municipal Corporation (HDMC) would be able to directly monitor and track all these activities through a common dashboard at the ICCC.

See how cities tackling traffic issues with advanced technologies

India's biggest cities are subjected to traffic congestion every day, and the commuters are bearing the burden. Transport demand in India has increased by almost eight times since the 1980s as rapid economic development and increasing wealth among households has led to higher vehicle ownership.

In fact, this is higher than anywhere else in the Asia-Pacific region! Partly attributable to India's large population and high population density, as well as additional traffic cause due to expanding the metro network in many cities, the reliance on cars is slowly but surely increasing, adding more pressure to road networks.

Bengaluru itself is constantly ranked in the top 3 cities in India with traffic problems, especially during peak hours. Keeping this in mind, Smart Urbanation's session on 'Tackling Traffic Tantrums' will be the optimal stage to discuss the issues of traffic in India, and to find innovative, smart solutions for the same.

SmartUrbanation is organised by Smart Cities Council India, part of the global consortium of smart cities at Hotel Shangri-La Bengaluru from February 13-14, 2019 to commemorate three years of the initiation of Smart Cities Mission.

Tackling Traffic

To begin with, the Government of Karnataka has shown leadership in finally addressing the most basic mobility infrastructure - the city road. Project Tender S.U.R.E. (Specifications for Urban Road Execution) is about getting the urban road right. The project has been championed in the belief that Tender SURE provides tremendous advantages not just of better roads, but that it is just plain good financial sense to spend more and spend right, rather than spend even more by spending wrong many times.

The very design of Tender SURE prioritises the comfort and safety of pedestrians, cyclists apart from recognising the needs of hawkers and street vendors. This apart, Tender SURE also combines the street landscape and hardscape aesthetics with practical considerations of user behavioural change. Roads developed under Tender SURE will neither develop any potholes nor fall prey to tree cutting as the roads are well organised to bring utility ducts on either side of the roads.

Amritsar is dealing its illegal car parking menace and traffic congestion with the help of LoRaWAN. The city has selected six sites where they installed LoRaWAN enabled Smart Parking Sensors. The technology has given a highly competent tool to the enforcement agencies that, if used properly, can completely curb the menace of illegal car parking and reduce traffic congestion in future smart cities along with an increase in revenues.

In case of Vizag, the Visakhapatnam Municipal Corporation (GVMC) will introduce smart parking application soon. The app will be in sync with low-cost sensors and real-time data that will allow users to monitor available and unavailable parking spots on the prime junctions in the city. Meanwhile, Pune through their state-of-the-art command and control centre, and revolutionary traffic management system, aims to integrate parameters of the Municipal Corporation, Police Department, Fire Department and other utility departments under one centralized control. Through this system, the city will be in a position to provide to its citizen a faster response time for emergencies, provide real-time traffic and weather data on variable message displays, and manage the public transportation system with the highest level of efficiency.

Smart Cities Council India's Think Table series kicks off with Pune Smart City

Smart Cities Council India (SCCI) in association with Pune Smart City Development Corporation organised a Think Table meet on December 6, 2018, at Pune. The meet focused on various standardisation initiatives to be adopted in the smart cities. Smart Cities Think Tables (SCTT) are a series of forum sessions organised by SCCI in different cities of India where the biggest challenges facing the sector are detailed and discussed threadbare. During the conference, the Council's partners were in attendance to discuss the future smart city requirements of Pune, as well as address the urban challenges faced, and solutions for the same.

In his inaugural address, **Dr Rajendra Jagtap, Chief Executive Officer, Pune Smart City Development Corporation (PSCDCL)** mentioned that the city [Pune] aims to use an 'integrated approach to provide solutions'. This means, through their state-of-the-art command and control centre, and revolutionary traffic management system, Pune aims to integrate parameters of the Municipal Corporation, Police Department, Fire Department and other utility departments under one centralised control.
Through this system, says Dr Jagtap, "the city will be in a position to provide to its citizen a faster response time for emergencies, provide real-time traffic and weather data on variable message displays, and manage the public transportation system with the highest level of efficiency." The city has already deployed and is currently monitoring 136 emergency call boxes, made possible through systems integration. The city will use the data collected to be more proactive in the future.

For Pune Smart City, improving city services through data analysis is a big priority. Using data, gathered from the CCTV surveillance, and traffic patterns, etc., the city hopes to deduce important information so as to help with junction redesigning, carry limit for streets, areas that require parking spaces, trees and more open spaces, and even urban street art.

During the Think Table meet, Dr Jagtap took the opportunity to interact with SCCI members and discussed the progress on the city development plan and defined its needs. "This would help the participants in developing best practices and standards for successful implementation of the Mission projects," he said during a brief interaction. Going forward, he emphasised on the need for IT solution for traffic management, solutions on health, education, governance and mobility, smart lighting, water metering, green transport, safety and surveillance for the city.

Manojit Bose, Chief Knowledge Officer, Pune Smart City Development Corporation interacted with the SCCI members that include TomTom, EY, SenRa, Anchor, SAS and Vmware and conveyed expectations from them, particularly about improving liveability standards as the core of the smart city framework and importance of timely implementation

of the projects. To this, SCCI partners presented solutions to meet the challenges that the city faces and to take ahead the development of Smart Cities in Pune.
According to Bose, Pune Smart City is ensuring the constant promotion and adaptation of new technology and is in the process of procuring 500 e-buses, 150 of which will be on the roads by January 26, 2019. That apart, the city is also using optic fibre ducts to establish high-speed internet connectivity. An e-corridor is being set up in order to create Wi-Fi & connectivity throughout the city, accessible through smartphones, as well as 500 new smart toilets and smart poles will be constructed around Pune.

Dr Rajendra Jagtap thanked SCCI for hosting Think Table with Pune Smart City and stressed that with large-scale ‘smartification’ of 100 cities, Pune could provide useful insights regarding smart city standards and best practices to the rest of the world.

Puducherry: Empowering Citizens Digitally

Puducherry is in the process of evolving from E-Governance to Digital Governance and building digital capacities. In line with the flagship Digital India programme of Government of India, the Government of Puducherry has introduced and implemented various digital schemes to provide better Government to Citizen (G2C) and Government to Business (G2B) services to the citizens. The major digital innovations introduced in Puducherry are eHRMS related to personnel management, eOffice project, Soil Health Card Scheme, services related to land record, dematerialisation of land record and registration, property tax, college management, online admission, online old age, and disability pension, etc.

IT plays an important role in the implementation of various projects under the Mission. Puducherry Smart City Development Limited (PSCDL) has signed a contractual agreement with Nippon Koei India Ltd for implementing the Smart City Project. It would be responsible for preparation of detailed design, project estimate and implementation of projects over three years. The Union Government has approved Puducherry Smart City proposal in June last year. The total cost of all project under Puducherry Smart City proposal is Rs 1,828 crores. The Smart City proposal includes area-based development projects at Rs 1,663.69 crores and pan-city projects at Rs 94.19 crores. The infrastructure projects include laying of the dedicated underground corridor for cables, augment sustainable water source, the introduction of smart metering for water and electricity, establishing a plant to generate energy from water, construct 1,750 housing units and redevelop swadeshi mill complex.

The plans also involve developing a city app for the municipality to extend various services and establishing an Integrated Command Control Centre, as well as to transform all the Government Department agencies in Puducherry to provide online services with secure online payment system through debit, credit cards or Aaadhar-enabled payment system.

In order to boost tourism as well, the Tourism Department has launched tourist kiosks at promenade beach and launched a prepaid cashless Rupay card. The tourism promotion initiatives included in the Smart City project are the rejuvenation of Grand Canal, setting up of urban entertainment village at the old port, construction of art and culture complex at the old distillery, upgrading Gouber market and extension of beach promenade. The projects on providing urban mobility include establishing a dedicated corridor feeder system, smart integrated bus terminal, and multi level parking at old jail complex, electronic cycle track and cycle sharing system besides making J N Street pedestrian friendly.

Puducherry wants to evolve from e-Governance to Digital Governance, build digital capacities, and achieve the digital dividend for each and every citizen through digital literacy accessibility for all, and their Smart Cities project is bringing them one step closer to their goals.

Soon, smart parking solutions for Bhubaneswar, Kanpur & Nasik

A homegrown product development and technology company, iRAM Technologies has won three multi-million-dollar projects for developing ‘On and Off-Street Smart Parking Solutions’ for Bhubaneswar, Kanpur and Nasik smart cities. iRAM has won these projects in partnerships with leading conglomerates in the Smart City Space. iRAM has the most advanced solutions based on Internet of Things (IoT).

iRAM will install their IoT architecture based smart parking technology that includes sensors, parking gateways, Parking Management & Guidance software, Mobile Point of sale solution and citizen application at 87 sites in Bhubaneshwar, 42 sites in Kanpur and 33 parking sites in Nasik respectively. The projects should be deployed over the next six months.

With this deployment, the respective smart cities will be able to provide citizens convenience to find and reserve parking even before stepping out of their homes or offices. Citizens will be charged appropriately through approved Mobile Point of sale systems providing multiple options of credit card/ debit card/pre-paid card/wallet-based payments. IRAM envisages 80 per cent cashless payment over next two to three years’ in parking domain which is otherwise pre-dominantly a cash transaction.

On the other hand, smart cities will receive real time data wrt revenue collections, city wide parking occupancy. Analytic engine will help smart cities to plan for new investments in parking spaces at required areas in the city.

iRAM’s Smart Parking Solutions can be deployed on-street, off-street and covered parking spaces. The Smart Parking System efficiently optimizes the usage of the available parking space, enhancing the functioning of streets in the city and ensures appropriate parking fees, avoiding payment pilferages through digital payments aligned to government’s vision of cashless payments. Using a mobile application, it allows users a great convenience to find available parking spaces, reserve and pay online.

Smart City projects worth Rs 518 bn under implementation

India has completed around 33 per cent of the total 5,151 Smart City Mission projects or are currently under implementation, utilizing around 25 per cent of the envisaged investment. Around 2,342 projects worth Rs 909.29 billion have been tendered. Out of these, 1,675 projects worth Rs 518.66 billion are currently being implemented or have been completed, according to data presented by the Ministry of Housing and Urban Affairs to the Lok Sabha. Hence, 3,476 projects have either only been tendered or have not gone through the tendering process.

The Ministry told Parliament, “The pace of implementation of projects has picked up significantly during the last one year. There has been a 290 per cent increase in projects tendered, 332 per cent increase in projects grounded/completed and 479 per cent increase in projects completed since October 2017.”

“It takes around 12-18 months to set up a special purpose vehicle (SPV), procure project management consultants (PMC), hire necessary people, call tenders and issue work orders,” the Ministry added.

See how Amritsar curbs the illegal car parking menace and reduce traffic congestion

The illegal car parking situation in India requires a conscious effort towards improving the situation not only on part of the citizens but also from the enforcement bodies. This means at the very minimum, identifying and acknowledging the problem as a prevailing menace. As part of the Amritsar Automated Illegal Parking Management project, SenRa's first steps were to educate the city officials about how the problem of illegal car parking can be solved using smart technology. The second step was to demonstrate the solution after having city official buy-in.

SCCI partner, SenRa deployed 6 LoRaWAN enabled smart parking sensors, LoRaWAN network for connectivity, and streamed the data to their IoT analytics platform and mobile application, providing the city with an end-to-end smart parking solution.

With all the challenges present in India's traffic and parking management, SenRa felt this solution could solve problems and have an amazing return on investment (ROI) for the city. After two months of data collection, SenRa has been able to determine the ROI is approximately 10 times the cost of the actual solution.

This proof of concept was conducted in Amritsar, a city located in the northern part of India. The city selected six sites where they requested to install LoRaWAN enabled Smart Parking Sensors. Based on the site locations provided, a survey was conducted of the area to determine where the LoRaWAN network infrastructure would be deployed to provide reliable, stable connectivity. Things that were looked at included accessibility of the site, power availability, backhaul capabilities, elevation above sea-level and ground-level obstructions and a clear line of site. Two sites were selected for this network deployment.

Based on elevation above ground, gateways being deployed, and other factors mentioned above, a green field planning of the LoRaWAN RF propagation was done. Since the devices were installed in the ground, there was a significant risk of interference and loss of signal due to a significant obstruction from the ground and nearby concrete inside the Fresnel zone. Therefore, the antenna polarization for both gateway and end devices was oriented vertically to ensure optimal reception. Also, a site survey was performed to verify the RF signal did not exceed -90dBm when no vehicle was parked on top of the parking sensors.

Smart Parking Sensor - Device Selection

After careful evaluation of Parking sensor vendors, a suitable OEM was chosen as the preferred supplier for the devices to solve the most mission-critical aspects of parking management: accurate and real-time vehicle detection. The sensor uses very accurate magnetic sensing system and sophisticated vehicle detection algorithms that accurately detect the presence or absence of a car in a given parking space even in dense urban

environments which are typically prone to magnetic interference. The device includes a built-in LoRa radio that communicates to a SenRa gateway with complete adherence to LoRaWAN technical and regional specifications.
One of the most important criteria for device selection was the ability to be installed, deploy and forget scenario. This means the device should have ultra-low power consumption and several years of battery life. It is ensured by the LoRaWAN MAC protocol and the device software algorithms that the device can deliver up to 10 years of battery life, and is stable over temperature fluctuations, even in harsh environments.

Installation Procedure

The illegal parking spots allocated to SenRa by Amritsar Smart City were located on the main streets which are in parallel to the traffic flow. Prior to installation each sensor's unique serial number was recorded and mapped to the location of installation. This is especially useful for individual parking space monitoring as well as trouble-shooting sensor performance and communication. The devices were then sealed and covered entirely with epoxy inside secure PVC casing to protect them against moisture and dust ingress

Sensor preparation

Around 4.5-inch diameter holes were drilled in the ground and the debris was removed. Next, a layer of sand with cement was used to level the bed to ensure a flat surface for devices. The sensors covered in epoxy and PVC casing was then inserted into the hole such that the top of the sensor sat 1/4 to 3/8 of an inch below the surface of the asphalt. After installation, a BLE device was used to activate the LoRaWAN module incorporated in the smart sensor, which in turn registered the device(s) successfully to the network.

Data analytics and post-processing

As part of the proof of concept (PoC), SenRa used its own IoT analytics platform to collect the sensor data and provide real-time results and processing of the data. SenRa also developed a mobile application which was given to the parking enforcement officials to inform them in real-time when a driver had parked illegally over the installed sensors. After several months of development for this specific use case, SenRa was able to create an intelligent interface that shows, in real-time, various parameters such as

- Occupied and vacant status of individual parking lots
- Illegal car parked status
- Overall average occupancy
- Daily and hourly parking activity • Historical data – both monthly and weekly
- Popular parking times
- Individual device monitoring
- Individual device status history

In retrospect, through the course of this PoC, the integrated application server/platform has been able to provide the city with information which had never been available prior to this deployment. The city was now able to see, in a transparent fashion, the non-generated revenue which could have been collected from issued tickets ("Challans") for cars which parked illegally in the no parking zones. As an additional benefit, this also helped curb the problem of corruption and lawlessness in the city. Leveraging cloud computing, artificial intelligence, complicated algorithms, and big data processing, then SenRa were able to demonstrate several data sets which helped the city improve the parking management as

well as enforcement. To ensure the traffic enforcement could be implemented efficiently, SenRa's mobile application was installed on the local law enforcement's Android phones to provide them with real-time notifications of the illegal parking at the aforementioned sites. The mobile app gave immediate notifications when a vehicle parked over the sensors and allowed the appropriate authorities to take swift action to clear up the no parking zone to include issuing parking tickets or Challans if required.

Conclusion

With a rapid rise in the number of motorized vehicles in Indian urban settlements, one can easily see an impending parking space crunch and insatiable parking demands. While the government bodies are becoming more and more aware of this issue, little has been done to incorporate smart solutions that can actually make a difference. With the ongoing efforts of this PoC, cities are now realizing that smarter parking solutions can be successfully implemented when leveraging cutting edge technology and in-house expertise from vertical experts. Smart Parking Management solutions would be able to identify and penalize illegal car parking, introduce variable pricing, ensure unhindered lanes for passage of emergency vehicles as well as enable overall street improvement for all road users.

Through this PoC, SenRa has enabled the city authorities to realize revenues never seen before. In addition, it has given a highly competent tool to the enforcement agencies that, if used properly, can completely curb the menace of illegal car parking and reduce traffic congestion in future smart cities

Karnataka to spend more and right on urban road execution

Every urban road in Bangalore and other cities of India is an example of the chaos of traffic, broken footpaths, hanging cables, clogged drains, overflowing sewage, and haphazard street lights, transformers, and telecom fixtures. Temporary fixes with poor design and construction result in repeated digging and fixing of the same road over and over again, continuously draining the city's coffers, while doing little to enhance the quality of the road - and thereby the quality of life for all those who use the road.

The Government of Karnataka has shown leadership in finally addressing this colossal wastage, and poor quality of this most basic mobility infrastructure - the city road. Project Tender S.U.R.E. (Specifications for Urban Road Execution) is about getting the urban road right. The project has been championed in the belief that Tender SURE provides tremendous advantages not just of better roads, but that it is just plain good financial sense to spend more and spend right, rather than spend even more by spending wrong many times.

Tender SURE had the guidelines on India's first design, specification and procurement contract for urban roads execution. Tender SURE mandated the integration of networked services under the road-water, power, sewage, OFC, stormwater drain and gas.

Here are the crucial focus points of the project Tender SURE

1. It aims at de-incentivising use of private transport
2. It aims at developing roads with uniform lane width
3. It aims at making footpaths pedestrian friendly after footpath are meant for pedestrians.
4. Bring all utility ducts under the footpath on both sides of the road
5. Developing separate lanes for cycle wherever feasible

The very design of Tender SURE prioritises the comfort and safety of pedestrians, cyclists apart from recognising the needs of hawkers and street vendors. This apart, Tender SURE also combines the street landscape and hardscape aesthetics with practical considerations of user behavioural change. Roads developed under Tender SURE will neither develop any potholes nor fall prey to tree cutting as the roads are well organised to bring utility ducts on either side of the roads.

For Tender SURE, the Karnataka government has already called tenders worth Rs 2.55 billion. Bruhat Bengaluru MahanagaraPalike will be taking up the first phase of Tender SURE roads around M.G. Road and Central Street (Shivajinagar). The first phase is expected to be completed in around 15 months. Next, the BBMP will take up development of Cubbon Park, K.R. Market, Russel Market and in and around the Shivajinagar bus depot.

Tarapur Atomic Power Project accomplish versatility with digitization

The 540 MW TAPP-3, a totally indigenous nuclear power unit, is the 16th nuclear power reactor in the country. It has been designed and built by the Nuclear Power Corporation of India Limited (NPCIL), a public sector after undertaking under the Department of Atomic Energy (DAE). Unit 3 of the Tarapur Atomic Power Project (TAPP-3) attained its first criticality on the 21st May, 2006.

The achievement of criticality was a major milestone in the project completion process. It signified the start of a self-sustaining nuclear fission chain reaction in the reactor core. The criticality of Unit 3 came about two months ahead of schedule. Unit 4, the predecessor of Unit 3, achieved criticality on 6th March, 2005. Tarapur Atomic Power Project Units - 3&4 (TAPP - 3&4) comprise of two Pressurized Heavy Water Reactor units (PHWRs) having 540 MW each. The PHWRs use both natural uranium fuel and heavy water as moderators and coolants respectively. TAPP - 3&4 were built in the shortest time than any other PHWRs in India. This gestation period is comparable to international benchmarks.

The Challenge TAPP 3&4 is located 200 km from Mumbai, the entire campus is of more than 2 km radial and civil infrastructure was constructed in a phased manner. The challenge was keep the campus in line with the latest civil infrastructure, IT investment and deployment.

The Solution

SCCI associate partner, Insight was approached for a solution design and the whole turnkey project.

Server Solution: As the project was conducted in a phased manner, the IT requirement was very dynamic and was not well defined, and since the project was working in a 3-shift availability, manageability was a key decision maker. The company has positioned the Intel-based Xeon server from Compaq/HP ProLiant which have gave them a great expandable solution, highly available, scalable and ease of manageability.

Backup Solution: Being in a remote location data management was on top priority. Solutions were to be easy to manage and deploy, support heterogeneous platforms and certain applications on HP UNIX, Novell and Microsoft. Insight had supplied and integrated HP autoloader with Net Vault's Backbone solution which gave them flexibility in terms of O.S. and database.

Connectivity Solution: The plant is 200 km away from Mumbai and the project should be working round the clock. The local telco Service provider was not having any connectivity, hence monitoring plant activity from TAPP Township which is 20 km away from the site and also the Mumbai office which is approx. 250 km from site and certain location within site were not having any wired connectivity. Insight provided a CISCO Remote Access Solution

with a secured login name and password with limited access to network depending upon the credentials. Besides deploying Wi-Fi for connecting various temporary office setups, Insight has also created a secured internet access to the entire plant by offering a mix of security of CISCO PIX and WatchGuard UTM solution. The company laid more than 20 km of OFC by providing more than 30 segments on campus in addition to delivering more than 40 km of CAT6 with 350+ networking.

Pune Smart City completes project worth Rs 48 bn (to issue 40 tenders in January)
The Pune Smart City, in a bid to stay ahead of all cities has already chalked out plans for the New Year. The city, which has completed projects worth Rs 48 billion, will issue 40 tenders by January 30, 2019.

Speaking with Smart Cities Council India, **Dr Rajendra Jagtap, Chief Executive Officer, Pune Smart City Development Corporation** said, “Pune is using ABD (Area-Based Development) and the retrofitting model for ‘new urban infrastructure’. However, when it comes to IT projects, we are focusing on PAN City Development.”
The city aims to use an ‘integrated approach to provide solutions’. This means, through their state-of-the-art command and control centre, and revolutionary traffic management system, Pune aims to integrate parameters of the Municipal Corporation, Police Department, Fire Department and other utility departments under one centralized control.

Through this system, says Jagtap, “the city will be in a position to provide to its citizen a faster response time for emergencies, provide real-time traffic and weather data on variable message displays, and manage the public transportation system with the highest level of efficiency.” The city has already deployed, and is currently monitoring 136 emergency call boxes, made possible through systems integration. The city will use the data collected to be more proactive in the future.

For Pune Smart City, improving city services through data analysis is a big priority. Using data, gathered from the CCTV surveillance, and traffic patterns, etc., the city hopes to deduce important information so as to help with junction redesigning, carry limit for streets, areas that require parking spaces, trees and more open spaces, and even urban street art.

Currently, Pune is leading other smart cities in India in term of project completion. They have already made available 5,000 bicycles for public use throughout the city, operated by smart technology, and are continually adding to this number. In the future, Pune is looking at e-rickshaws as a viable mode of transportation. Furthermore, as Pune is focusing on making their city smart, they have conducted a successful pilot project to convert 1.5 km of road into a smart road, and are in the process of converting 80 km of streets across the city into smart roads.

Says Manojit Bose, Chief Knowledge Officer, Pune Smart City Development Corporation, “Pune Smart City is also ensuring the constant promotion and adaptation of new technology, and is in the process of procuring 500 e-buses, 150 of which will be on the roads by January 26, 2019.”

The Pune Smart City is also using optic fiber ducts to establish high speed internet connectivity. An e-corridor is being set up in order to create Wi-Fi & connectivity throughout the city, accessible through smart phones, as well as 500 new smart toilets and smart poles will be constructed around Pune.

In order to cater to the citizens needs, and create more open spaces in the city, Pune Smart City will retrofit areas by tailoring their function to the public needs. For example, a multipurpose sports ground may be created in an area with many children, open reading spaces near colleges, and eating spaces near the cities numerous IT parks. The city is also in the process of trying to convert all their street lights to LED powered, using the PPP model to raise finance for the project.

Future plans

Pune Smart City will develop a ‘smart card’ to give Pune citizens access to all the smart amenities being built in the city including toilets, maps, poles, etc. The ‘Pune Idea Factory Foundation’ being launched by Pune Smart City will be a mentorship and ‘hand holding’ organization for the cities smart projects. Citizens will have the opportunity to pitch their smart solutions and invest in the cities future. Under this model, 19 incubation centers have already been set up throughout the city.

10k Maharashtra villages to get “SMART”

The Government of Maharashtra has launched an ambitious project—State of Maharashtra Agribusiness and Rural Transformation (SMART)—in 10,000 villages within the next three years with an aim to achieve sustainable farming.

The project will cover almost one-fourth of Maharashtra. The State has around 40,000 villages. The focus is clearly on villages that are reeling under the worst agriculture crisis compounded by lack of infrastructure and assured value chains to channelize the farm produce.

Maharashtra Chief Minister Devendra Fadnavis launched the project, which was followed by signing of 50 MoUs between big corporates and farmers producer groups. SMART will be assisted by the World Bank. Amongst the corporate houses that have pledged support include Reliance Retail, Amazon, Walmart, Mahindra Agro, PepsiCo, Tata Rallis, Big Basket, Patanjali, Tata Chemical, Happy Roots, MeraKisan, Way Cool and others.

The project is to create and support the value chains in post-harvest segments of agriculture, facilitate agribusiness investment, stimulate SMEs within the value chain, support resilient agriculture production systems, expand access to new and organized markets for producers and enhance private sector participation in the agribusiness.

The project, which will be implemented in 10,000 villages, was shortlisted by the State Government based on multiple parameters of socio-economic backwardness in terms of development and growth.

Delhi start-up, eBike to help curb air pollution

eBike is one-of-its-kind revolutionary start-up aiming at providing environment friendly means of transportation. eBike is India's first-ever platform offering electronic mode of transportation, which runs for around 200 km after an electronic charge for about two hours and makes the daily movement zippy with a speed of 75 km/hr. eBike targets to have their services in 30 cities (100 clusters) within the next one year. The start-up aims to reduce two to three per cent of the pollution through this unique eco-friendly electric mobility solution.

eBike is a fresh concept, answering the major yet untouched concerns of growing India. The social responsibility towards betterment of nation has prompted us to start eBike. The air quality of the national capital continues to be hazardous. With the introduction of eBike, we hope to bring down the level to at least two to three per cent in a short period of time. The company is using biodegradable batteries so that further pollution can be reduced in the eco system. The platform will provide eco-friendly services in three broad categories – eBikeTaxi, eBikeRental and eBike Delivery.

eBike is also India's first-ever electric bike rental/taxi/delivery platform that provides economical and environmentally-friendly travelling option for everyone. Revenue is generated through rental services for tourists and customers, taxi rides through mobile apps and also through tie-ups with logistic delivery providers. It is aligned with the Smart City mission.

,p>eBike will establish a wide network across the country. It aims at quashing the notions like pollution, mobility, convenience, cost, etc. by implementing a smooth operational model through its Mobile Apps (eBikeTaxi) and Online Booking (ebikerental.in). The company has come up with innovative ideas to create a unique identity for itself.

Eco-friendly public transport on Bhubaneswar's radar

Bhubaneswar Smart City, in its constant effort to implement smart projects, has now formed a mobility plan coordination committee. The city authority has setup a special purpose vehicle (SPV) that will create a roadmap for bringing low carbon emission transport modes in the city.

The committee, which held its first meeting recently, was attended by experts in the field of sustainable urban mobility jointly coming together to design the implementation plan of greener transport means.

As per the sources, the plan is already under execution by the Sustainable Urban Transport Systems for the Smart Cities (SMART-SUT) team. The team constitutes of WRI, India, Wuppertal Institute backed by Bhubaneswar Development Authority (BDA) and Bhubaneswar Urban Knowledge Centre (BUKC).

The plan was targeted at finding multiple modes of transport that boast of a low carbon emission. Some of such options have already been employed, including the Mo-Bus, a fleet of 125 new buses offering Wi-Fi, in-bus CCTV surveillance and a dedicated app to the commuters, all at an affordable rate.

The buses are aimed to encourage the use of public transport, thus reducing the dependency of the city on motorized travel. The progressive steps taken by the authorities surely mark a smart transition towards a more integrated and cleaner mode of transportation within the city. Several others are following on these lines, including the NCR region, for which the Delhi government officials recently visited China to understand the working of the electric buses.

Once the same are deployed here, which is planned to happen by June next year, these electric buses are expected to act as a great relief from the rising air pollution within the city. To know how the other states are taking measures in this regard.

Nagpur commuters get three-tier transportation structure

The Maharashtra Metro Rail Corporation Limited or Maha Metro Nagpur has undertaken construction of one of the biggest infrastructure projects of Central India – the Rs 86.80 billion Metro Rail Project of Nagpur. Touted to be one of the biggest infrastructure projects in the history of Nagpur district, the project is spread over 38.21 km in the city and touches all its four corners. State-of-the-art technology and aesthetic design is hallmark of the project.

But Maha Metro Nagpur isn't just building a Metro project for Nagpur. It's in fact knitting a beautiful dream for the city with multiple features. One such feature is Double-Decker along Wardha Road – which is part of Reach-I of Maha Metro Nagpur. While work along 8 km long Metro Route alignment of Reach-I from Airport Metro Station to Sitabuldi Intersection is being completed, the 3.4 km long double-decker structure, which runs parallel to the national highway and metro alignment, has generated tremendous interest among Nagpurians, for its unique and innovative design.

The double-decker and the road beneath, once completed, will have a three-tier structure in place, which would cater to the dual transportation needs of the people. While the existing Kanyakumari-Bangalore-Hyderabad-Varanasi National Highway and the bridge would cater to two-wheeler and four-wheeler vehicles, the top-most structure would be used for movement of Metro trains.

Wardha Road, is always been crowded because of its location. The road is a gateway to South India and connects Nagpur to major cities like Hyderabad, Bangalore and Kanyakumari, Nagpur Airport, Butibori Industrial Estate, MIHAN – Multi-Modal Cargo Hub, Cricket Stadium are located along this road, leading to higher volume of traffic there.

The volume of traffic thus generated on this route, demands alternate measures for vehicles to commute from city to other places. The double decker, with two-tier transportation facility is ideally suited to meet traffic demands here. In other words – a system that is capable of construction without disturbing existing traffic and environment is needed here, and hence Double Decker.

Bhubaneswar makes a smart move with smart buses

With an aim to boost the urban mobility services, the Capital Region Urban Transport is all set to roll out 200 new city buses with ultramodern IT technology from November 6, 2018. The transport body has finally got the area-based permit from the Commerce and Transport department, which issued the notification of providing permit to the buses.

Reportedly, the buses can enter as many as 465 revenue villages of the state capital along with its surrounding areas such as Khurda and Jatni. However, currently, 110 buses run on 17 routes in the city and also connects Puri. Officials have prepared the presentation and submitted the application with the transport department to get the area-based permit for the new buses. The application was passed and a notification was issued in accordance to the permission of the buses, informed a transport body official.

Of the 107 bus shelters, most of them are broken down. As of now, the authorities are working on renovating them. The application for other areas will be submitted after November. As per the Urban Bus Design Code, smart features such as spacious cabin are also to be added to the new fleet of buses to make it citizen-friendly. Citizens will be able to book their tickets and minimise their waiting time at the bus stop by tracking the location of the vehicle with the help of the mobile app, which will be available, both on Android and iOs operating systems.

Bus shelters are expected to have advanced features like digital screens to display the bus routes and the arrival times. Along with the mobile app, the bus operation would be integrated with a commerce and control centre of Bhubaneswar Smart City. With the help of the vehicle-tracking system, experts at the command control centre will be able to monitor the bus services and also coordinate with the app service.

Reportedly, they are developing 200 new bus shelters, of which 100 will have cycle-docking facility to provide last mile connectivity to the commuters. Also, plans are to procure 90 electric buses.

Puducherry smart city goes cashless

A private bank, launched a co-branded prepaid card for the citizens of Puduchchery Smart City in partnership with Puducherry Tourism Development Corporation (PTDC). The pre paid card is a RUPAY card. The programme aims to bolster Digital Payments ecosystem in Puduchchery and aid the Digital India initiatives of Government of India.

As a part of this project, YES BANK has digitized payments for Government to Citizen (G2C) services as well as for retail payments. The solution allows citizens as well as tourists traveling to Puduchchery to make instant payments via an open loop prepaid card, specially designed for their payment needs. Users of the card can now make day-to-day payments at PTDC authorized outlets, like Le Café at Puducherry Beach, Sea Gulls Bar and Restaurants, Transactions at Chunnambar Boat House, ticket purchases at historical sites etc. in addition to payments for PTDC Tourist cabs, Prepaid Taxi services at Puducherry airport, online booking of tickets among other services.

By way of RUPAY PREPAID card, Puducherry tourism will achieve 100% cashless transaction. It is possible only with committed partners, for which we selected YES BANK who all along work for Puducherry Tourism and Puducherry Smart City Project. PONDICHERRY – a French corner of India will be the first in INDIA to introduce RUPAY CARD in the Tourism Industry.

In order to make the city truly cashless, YES BANK is also launching a unique mobile app for retail merchants that allows for payments to be made by the way of the registered mobile number of the resident, such that the merchants can now initiate a transaction for the card user through his mobile app and the transaction gets processed by the way of an OTP sent to the card user on his registered mobile number. This app will be made available for Android users through the app store once the cards are made available at the retail & government facilities.

Chandigarh to roll out 30,000 “smart” meters

The Smart Grid project has finally been started by the UT Electricity Department, Chandigarh; wherein its first phase, it will replace the old meters by installing 30,000 smart meters in four sectors (29, 31, 47 and 48), six villages (Faida, Ram Darbar, Hallo Majra, Raipur Kalan, MakhanMajra and Daria), and industrial area.

In order to carry out the work within four to six months, the department has hired Analogics for Rs 280 million, informs MP Singh, Superintending Engineer. To monitor all the consumers, a control room will be build in Sector 18 by the department. The control room will receive an instant alert in case of tripping of the main line. The smart meters ensures to reduce the tampering problem to zero as it will not only be beneficial to the department but also to the consumers, confirms an UT official. The smart system aims to assist the electricity department in measuring the load, voltage, outage, peak-hour demand and consumption across the city. Besides, it will also aid the consumers to track their power consumption online and manage it.

According to UT’s smart grid detailed project report (DPR), which was approved by the National Smart Grid Mission (NSGM), the Centre has agreed to bear 30 per cent of the cost. However, a technical committee has cleared the project already. Post the DPR’s approval, the UT electricity department has started working on smart meters and advanced metering infrastructure, preparing data centre, disaster recovery centre, GIS mapping, metering billing collection software, substation automation system (SAS) and integration of rooftop solar energy plants through net-metering and distribution transformer monitoring unit.

Pune is India's first lighthouse city for urban mobility lab

In a program organized by the Rocky Mountain Institute (RMI) and NITI Aayog, Pune has been selected as India's first lighthouse city for urban mobility lab. The lab ensures to promote and support a replicable process for identifying, integrating, implementing and scaling innovative mobility solutions in the Indian cities. Four multi-stakeholder working groups along with eight solutions providers from India will develop innovative mobility solutions for Pune, through the urban mobility lab which is led by RMI in partnership with Pune Municipal Corporation (PMC).

The aim of the urban mobility lab is to support broad adoption of shared, clean and connected mobility by connecting local, on-the-ground learning with state and central policy making. Doing so, not only will it save India 1 gigaton of carbon dioxide emissions but also USD 330 billion of avoided fuel imports by 2030.

Ashish Kumar Singh, Principal Secretary, (Transport and Ports), Home Department, Government of Maharashtra said, "It is our consistent endeavor to improve access, affordability, congestion, pollution and safety. I look forward to the outcomes of the Pune urban mobility lab and how solutions can be scaled up across the State."

From data analytics for public transport service providers to electricity mobility services, six opportunity areas in Pune's mobility system were proposed in its conclusion report, namely, traffic and parking management, non-motorised transport, public transport, intermediate public transport, booking and payment and electric mobility. A total of eight solution providers--Ashok Leyland, Lithium Urban Technologies, Ola Cabs, Ridlr, Mahindra and Mahindra, SUN Mobility, Transit Intelligence and Tata Motors--participated in the program.

That said, the Central Government also intends to help to scale up. "Urban mobility has been a core focus area of the Central Government as it looks to reducing its reliance for imported fuel and controlling air pollution levels across cities. In order to achieve advanced passenger mobility, India is poised to lead the world. It can also help to leapfrog the traditional paradigm of privately-owned, under utilized and fossil fuel-powered vehicles to a future of shared, clean and connected mobility," added Jules Kortenhorst, Chief Executive Officer, Rocky Mountain Institute.

This is how Delhi will tackle air pollution in high traffic zones

In order to address air pollution at high traffic zones like traffic intersections and parking areas, the National Environmental Engineering Research Institute (NEERI) and the Council of Scientific and Industrial Research (CSIR) has developed a device.

WAYU, a prototype of the device, has been installed at the ITO Junction in central Delhi and Mukarba Chowk in north Delhi. 54 more units will be installed in other parts of the city in a month's time and the cost of each purifier would be Rs 60,000. With the help of the Industrial Design Centre at IIT, Mumbai, the current prototype has been designed.

The device contains a fan that sucks the air around it. It then separates pollutants like dust and particulate matter with the help of three filters of different dimensions. The air is further lead into a specially designed chamber that oxidises carbon monoxide and hydrocarbon contents in the air into less harmful carbon dioxide using activated carbon coated with titanium dioxide. As the oxidation is supported by two ultraviolet lamps, the purified air is forcefully ejected into the atmosphere in order to help dilute pollutant content in the outside air.

Dr Rakesh Kumar, Director, NEERI stated that the filters are made of non-woven fabric and their removal efficiency for particulate matter is 80 to 90 per cent and of the poisonous gases is 40 to 50 per cent. The device is 5.5 feet tall and one foot wide and can bring down the particulate matter (PM) 10 values from 600 microgram per cubic metre to 100 microgram per cubic metre, while PM 2.5 values from 300 microgram per cubic metre to 60 microgram per cubic metre in half an hour. Also, for every 10-hour operation, the device consumes half a unit of electricity and is capable of providing purified air for an area of 500 sq m around it.

For the device to cater up to an area of 10,000 sq m and to treat other atmospheric pollutants like nitrous and sulphur oxides, the institute is working on scaling up the device in the coming next three months.

Now Mumbai commuters can book a parking spot with an app

In a cramped up city like Mumbai, where even footpaths are occupied, finding a parking spot is a herculean task. However, the city is all geared up to witness a car parking revolution as the Brihanmumbai Municipal Corporation (BMC) has initiated to develop a mobile app that will enable commuters to book a parking slot online. Based on the lines of IRCTC booking app, BMC plans on introducing seven parking lots in South Mumbai, namely Eros Cinema, Crawford Market, Flora Fountain and four others, by the end of the year.

How will the app work

The app will show available parking spots to its user. The user can then book the slot in advance for an hour or more, depending on the availability. The app allows the user to pay the parking charges online. Once the payment is done, the user can show the e-receipt at the parking lot and park the car.

At the moment, BMC has already invited Expressions Of Interest (EOI) from companies to develop the app. Though automatic parking is truly helpful to streamline traffic pressure, AV Shenoy, Transport Expert, Mumbai Vikas Samiti mentioned, “The plan needs to be holistic. BMC needs to map all parking lots in South Mumbai, only after which this mobile application will be successful.”

India completes 332 smart cities projects worth Rs 60 billion

Considering 100 smart cities, the Government of India is expecting a total investment of Rs 2 trillion over a period of five years. Out of which, Rs 1 trillion will be aided by the Central Government and balance will come through the State Government and conversions, through synergy of various programmes and PPP.

As we speak, around 332 projects worth Rs 60 billion are complete. Around 697 projects, amounting Rs 277 billion are under implementation at different stages and 432 projects worth Rs 191.62 billion are under the tendering stage.

During an exclusive interaction, Durga Shankar Mishra, Secretary, Ministry of Housing and Urban Affairs (MoHUA) gave some specific examples. He said, “You must have heard about the Prime Minister inaugurating the Integrated Command and Control Centre (ICCC) near Naya Raipur. It was tenth in the country. Apart from these 10 cities, the ICCCs in another 15 cities are under implementation at present and 32 ICCCs are under the tendering process.”

In case of smart road, four roads are already completed, 32 are under implementation at different stages and nine are under the tendering stage. For rooftop solar projects, seven solar projects are already completed, 42 are under implementation at present and seven are under the tendering stage.

Six smart water projects have been completed so far; 34 are under implementation and 10 are under the tendering stage. Two cities have completed smart waste water project, 28 are under implementation and 17 under the tendering stage.

In case of public-private partnership (PPP), 14 projects are already completed, 30 are under implementation and 29 are under the tendering stage. We have got PPP projects worth nearly more than Rs 80 billion.

Chennai Metro using new technology for underground stations

For the first time in India, the construction of the D-wall for an underground metro station was accomplished by the overcut method using a hydromill, conventionally used for irrigation projects.

Chennai's urbanscape will be transformed when one of Asia's biggest metro stations becomes fully operational this December. No other underground metro station in the city has demonstrated more remarkably than Chennai Central, the uncertainties of digging into the darkness. As this iconic underground station gets ready for full-fledged operations, AnantakumarRayaprolu, Executive Vice President, Urban Infrastructure BU, Afcons Infrastructure, shares one of the most challenging momentsin the construction of this mega structure and how it was overcome with a precise construction method.

The challenge

The diaphragm wall (D-wall) construction at Chennai Central was severely impeded by the highly unpredictable and loose soil strata. The conventional stop-end method took more time than usual, which led to delays in boring and eventually threatened to impact the time cycle. The conventional methodology also resulted in inconsistent trenching and water seepage through D-wall joints, and threw up hurdles in cage-lowering works. The situation demanded a desperate change of tactic and a remedy that would prevent further delay. The engineers took a bold decision to use the overcut method using a hydromill for constructing the D-wall. Traditionally, the method is used for irrigation projects.

With this move, Afcons is among the first Indian EPC companies to successfully construct the D-wall of an underground metro station by using a hydromill.

D-wall construction

The scope of the D-wall at Chennai Central metro station is about 845 running metre (Rm) length (width: 1 m) for main box construction with 248 wall panels. The diaphragm wall panels were supposed to be founded on rock profile or strata.

The method

In the overcut method, trench excavation started with primary panel cuts located alternately at 2.5 m (2.4-2.6 m being the ideal length). The primary panel was cut in a single bite for full depth. This process involved continuous loosening and breaking down of soil material and mixing it with the support fluid. Before reinforcement and concreting, the support fluid was cleaned, so that parameters such as density, sand content, viscosity and pH value were complied with. For this, the slurry was circulated, which was pumped from the bottom of the trench with the mud pump of the cutter, and passed through the mud regeneration plant until the specified parameters were met.

The primary panels were then fitted with reinforcement cages and concreted using tremie pipes before overcutting the secondary panels. As the concrete filled the trench, it displaced

the lighter support slurry, which was then pumped out from the trench, and reused after recycling as support slurry for new wall panels.

The secondary panels were then cut 0.15 m, overcutting into adjacent casted primary panels in a single bite. During excavation of secondary panels, 150 mm of concrete on adjacent primary panels was cut away. The panels were then reinforced and concreted in a similar way to the primary panels. This way, the secondary panels were concreted against the edges of the primary panels, giving a water-resistant overcut joint.

This provided an excellent watertight joint system and minimum water seepage in unpredictable soil or rock strata. Plus, it also helped in better trenching with no caving inside the trench, helping in concreting activities too. To avoid damage of stop ends and water bars, leading to more leakage in certain instances, the D-wall was stitched to overcut panels.

Standard panel vs overcut panel

While working with a standard panel, trench cutting and cage lowering-activities take a lot of time. In comparison, the overcut method uses only about 1/4th of the time. Also, in the overcut method, stop end lowering and removal takes minimal time and cage lowering is done only after completion of trenching. This not only saves time proportionately but is also cost-effective.

Environment-friendly

Another major advantage of using the overcut methodology is the minimal impact on nature. The cutter operation is extremely quiet. There is minimal vibration while excavation, making it safe and effective in maintaining noise levels in surrounding areas. Formation of deep trenches adjacent to sensitive buildings and areas is also possible using this method owing to the advantages explained above.The Chennai Central metro station is right under the Poonamalle Highway. The area is a transport hub and connects four railway stations. The use of overcut methodology using the hydromill not only prevented disturbances on the surface but brought in efficiency in the D-wall construction. Indeed, Chennai Central is the epitome of innovation, which is the hallmark of Afcons. Upon completion, the station will have an estimated footfall of around 100,000 commuters daily. Chennaites have already got a taste of the mega interchange station after it was partially opened earlier this year – now, they can get ready for the entire experience!

Jaipur among world's top 10 smart renewable cities

Jaipur has bagged the third position in the list of the world's top 10 Smart Renewable Cities (SRCs), with Bengaluru being ranked sixth. While America's San Diego topped the list, Paris was ranked at the bottom.

"Jaipur is a nationally-driven SRC. India's national government created a 100 Smart Cities Mission that included a solar energy requirement. Jaipur does not have a renewable target but will benefit from ambitious state and national targets set this year," stated the Global Renewable Energy Trends report, which was conducted by the accounting and consultancy firm, Deloitte. According to the report, rooftop solar powering of infrastructure, beginning with eight metro stations that would be entirely solar-powered during the day was Jaipur's key SRC initiative.

Bearing a population of 3 million, Jaipur generates 30% of its annual electricity through solar and wind as compared to Bengaluru's 10% share for a population of 11 million.

Cities with solar and wind power and a smart city plan that includes renewable energy component falls under the category of Smart Renewable Cities. With over a million people by their share of power generation from wind and solar, San Diego was a global leader. The report said, "Solar and wind already account for over a third of its electricity mix and the city has a 100 per cent renewables target by 2035. San Diego is also a locally-driven SRC, while the US government is stepping back from climate commitments; the city has vowed to continue its deployment of renewables."

Ferrocement technology to help rebuild Kerala

It has been an uphill climb for Kerala after the floods that ravaged the state, killed hundreds and left scores homeless. The state has slowly started returning to normal life, with the Cochin International Airport also resuming operations. But there is still a long way to go. As people return home from relief camps, many find that their houses have been destroyed – reduced to heaps of bricks and mud. Reconstruction will prove to be a time-consuming and costly affair. But there is help on the horizon.

According to reports, the Indian Institute of Architects (IIA), and Institute of Indian Interior Designers (IIID) have come up with a method that enables the creation of a house measuring 450 sq ft, comprising two bedrooms, a kitchen and a formal living space, on a budget of only Rs 5 lakh!

What's more! The house is made using ferrocement technology, giving it the ability to withstand natural disasters like floods better than conventional homes. For those who have lost their homes, this unique innovation may just be what they need.

So, what is this ferrocement technology? Ferrocement or ferro-cement is a construction material made up of wire meshes and cement mortar. Cement mortar is applied over a layer of metal mesh, woven or expanded metal, and closely spaced steel bars.

It has many advantages – like low construction material cost, ease of construction, low weight, a long lifetime and the ability to be fabricated into any desired shape.

Ferrocement technology is excellent for rehabilitation purposes, as it takes only a month to complete the construction of one house and the cost of maintenance is low. In fact, the first ferrocement house was handed over to a beneficiary at a function at Ramankary, by R Nazar, the president of the Alappuzha district panchayat.

The technology will be deployed to rebuild properties that were destroyed or damaged in the Kerala floods, and Jiji Thomas, an engineer and expert in the field, will be a part of the rebuilding project. Many homes around Thrissur, built about 10 years ago, were constructed using this technology, and according to IIA Thrissur Chairman architect Ranjith Roy, if the government and other agencies are ready to bear the construction expenses, the centre will provide technical help and supervision for free.

Coimbatore to get smart trees that allow people to sit, rest & use free WiFi

Visitors to VOC Park can now enjoy WiFi connectivity free of cost, thanks to the presence of a “golden tree” or “smart tree”. The initiative by the Coimbatore Corporation, at a total cost of Rs 30 lakh under the Smart Cities programme, is under public-private partnership mode.

According to a press release from the civic body, from 7 am to 9.30 pm the public can get unlimited WiFi access sitting within 30 sq m radius around the tree. There are 30 chairs under it for the public to access the facility. Plug points have been provided to recharge mobile phones, laptops, and other electronic gadgets. CCTV cameras will be installed for 24x7 surveillance.

Power requirement for the entire area around the tree is from solar energy. Arrangements have also been made for uninterrupted power supply. It was proposed by the government to rent out the space on hourly basis for a nominal fee for holding meetings or small get-together. Such WiFi trees will be commissioned at 25 locations in the city. The government is expected to earn annually Rs 18.25 lakh from the 25 trees, including Rs 73,000 for the Corporation. Meanwhile, similar facilities were planned near SITRA and Gandhipuram bus stand in the next phase.

See How Maharashtra Improves Water Distribution Using Technology

A city in Maharashtra has applied LPWAN solutions to solve stringent water supply problems. Inconsistent water distribution throughout the city was a longstanding challenge. Due to lack of infrastructure, further issues cropped up, including erroneous meter readings and billing, no proper billing cycle, no safety measures like anti-theft infrastructure or leakage detection, and high operational expenses because of non-optimal battery life and frequent maintenance. The response to all these challenges came with the installation of smart AMI ultrasonic water meters powered by LoRaWAN technology, replacing older meter readers. The project was executed by SenRa. Solutions such as LPWANs based on LoRaWAN protocol allow cities to reduce operational costs dramatically while still obtaining the necessary data to make better decisions.

Dhananjay Sharma, Chief Operational Officer, Senra, explains, “The city selected 41 sites within its limits where they requested to install the new AMI meters. The infrastructure for LoRaWAN network was set up in two locations, selected based on accessibility of site, power availability, backhaul capabilities, elevation above sea-level and ground-level, obstructions and clear line of site. The aim of the meter was to provide end-to-end automated mechanisms including wireless communication, secure data transfer and real-time analytics.”

On successful installation, city administratives, utilities company and water distribution company reaped major benefits. First, the smartmeters provide real-time visualisation of data related to water distribution and consumption.

Second, administratives become aware of higher consumption regions and of the fact that water consumption triples during holidays, allowing them to plan their supply accordingly and reduce water wastage. Daily and monthly water usage analytics enable them to generate accurate bills. Unusual behaviour in water lines warns them of potential leakage or service required, enabling predictive maintenance.

Additionally, there has been a massive reduction in costs pertaining to operations, including substantially reduced investment in manual resources, no frequent maintenance of infrastructure and battery longevity. A long battery life guarantees a vigilance-free functioning up to 12 years. The infrastructure has been made theft-proof with central alarms. Overall, water distribution has become consistent, with greatly improved satisfaction from the citizens.

Chhattisgarh's Ambikapur is converting waste into wealth! (other cities can take a cue)

Chhattisgarh's Ambikapur—with a population of 1.45 lakh—generates around 52 metric tonnes of waste on a daily basis. Unlike other cities, instead of putting the waste into dumpyards or landfills as the conventional practice, the city is converting its waste into wealth. Today, the city's waste to wealth economy has a turnover of Rs 20-25 lakh per month. And that's the reason why the city has been rewarded as one of India's best city in 'Innovation and Best Practices' (population 1 – 3 lakh) category in Swachh Survekshan 2018.

Since 2015, there is a mandate in the city that each household needs to give waste in segregated form – wet and dry waste. There are 447 sanitation workers that go out every morning and cover each household to collect the segregated waste so that this can be further treated. The waste collected then goes to 17 secondary segregation centers within the city where it is sorted further into various categories and is sent for recycling, composting or other kinds of processing depending on the type of waste.

Today, Ambikapur is a zero dustbin and a zero-landfill city. It has become a role model when it comes to effective waste management. The whole State of Chhattisgarh, which has been ranked third best State in India in Swachh Survekshan 2018, is in the process of following Ambikapur's footsteps to become India's first zero-landfill state.

Here, the wet waste is either converted into compost which we sell or used in bio-digesters to make cooking gas. The dry wastes is sorted into paper, plastic, metal, etc. at these centers and then send to the right recycling units according to the type of material at a cost price. This has led Ambikapur earning Rs 1 lakh by converting its wet waste into compost, whereas Rs 6-8 lakh from the sale of recyclable items and some amount as user charges (which the municipal corporation charged from each household for managing their waste.

The authorities have taken this whole process of collection on a dashboard system online. The reason is that it makes the monitoring of the whole activity easy and since everyone is accountable. The municipal corporation have 142 rickshaws/e-rickshaws that are equipped to collect the segregated waste–wet and dry waste. Moreover, the rickshaws are equipped with GPS trackers and all the sanitation workers have been given mobile where on daily basis they have to upload the amount of garbage collected from each house and report if any house is not following the waste management code of conduct.

Naya Raipur is India's first integrated greenfield smart city

Hon'ble Prime Minister Narendra Modi inaugurated India's first integrated greenfield smart city project at Naya Raipur, the capital of Chhattisgarh. Schneider Electric, the global leader in the digital transformation of energy management and automation, announced the implementation of the integrated Command and Control Center (CCC) along with utility management system (Electrical and Water SCADA) and intelligent Building Management System (BMS) there. The integrated project has been executed by Schneider Electric along with consortium partner, IL&FS Technologies Limited. The contract was awarded to the consortium in 2017.

Rajat Kumar, IAS, CEO, Naya Raipur Development Authority, said, "It is a happy moment for us today as the Naya Raipur Smart City project takes off with the consortium and our partners. This is a unique project, one whose organic growth we shall pursue aggressively. The project shall be spread across verticals and integrate diversified segments.

Around 5,60,000 individuals now inhabit and experience first-hand benefits of living in an integrated city. Entire city being covered with GIS mapping along with 128 CCTV cameras, 40 speed detection cameras and 42 number plate recognition cameras, Naya Raipur now becomes one of the safest cities in the country. Supported by Schneider Electric, the Integrated Command Control System of Naya Raipur will deliver a world-class experience of urban living in the city.

Schneider Electric was awarded the contract for executing the entire gamut of the Command & Control Center and its overall integration covering transportation, surveillance, citizen applications, end-to-end Smart Grid solutions, end-to-end Water Management system and integrated Building Management System (BMS). With the inauguration of the project a wide range of technology enabled services will be available to the citizens including-smart lighting, smart transportation, smart traffic management, etc. This transformation is supported by connected products of more than 1,00,000 IO points, edge control, applications, advance analytics, and services. The state of art architecture by Schneider Electric in NRDA is open, scalable and interoperable.

Prakash Chandraker, Vice President, Energy Business, Schneider Electric India, said, "It is a moment of immense pride for us as Naya Raipur is inaugurated, it reflects the efforts put at delivering world class digital tools to enable the ease of living which a smart city promises."

The centralized Command and Control Center (CCC) executed by Schneider Electric leverages IoT, mobility, sensing, analytics, and cyber security technologies to ensure safety,

reliability, efficiency, sustainability and connectivity to citizens. It will be the central hub for managing city operations and emergency response.

Naya Raipur is the first integrated city in India and aims to develop four pillars of smart city across, institutional (including governance/legal framework), physical, social and economic infrastructure. The aim is to deliver critical services like 24 x 7 supply of quality water, metering of water connections, complete automatic generation of utility bills by application system, enhanced city security and safety, citizen based mobile apps and city portals. Also including increased situational awareness to achieve a high level of operational readiness and substantial increase in the efficiency of operators and management.

A citizen-oriented smart city development for Dehradun

Dehradun's area based development (ABD) envisions to retrofit and redevelop 875 acres centered on CBD of Dehradun and transform into a light-house for the city and to showcase as a smart neighborhood. A Delhi-based consultant, Rudrabhishek Enterprises (REPL) will design, develop and manage this smart city project, and will be monitored and controlled by Dehradun Smart City.

REPL will assist DSCL in various phases of project implementation, which includes activities such as preparation of DPR, coordination with various appointed consultants, project prioritization and phasing, preparing capital investment plan, implementation roadmap, conducting feasibility study, bid process management for selection of implementing agencies, and overall project management. REPL is a leading infrastructure consultancy firm, already working on multiple smart city projects.
The process of developing plans for Dehradun Smart City will focus on extensive citizen consultation based action plans. The emphasis will be on environmental sustainability, economic vibrancy, smart mobility, use of technology for proactive governance and similar other dimensions that increase the ease of living while paving ways for greater development.

ABD will focus on areas like rejuvenation of cluttered market spaces in city core through compact mixed-use built forms and pedestrianization of market looped with parking facilities for enhanced walkability; recreation of urban green; sustainable- and environment-friendly public transport, intelligent traffic and parking management, transport planning interventions and MLCPs for better urban mobility. Core infrastructure will be strengthened and heritage structures will be restored as per colonial architecture. The project will also entail all the other essential components of a smart city, including smart security; solid waste management; vibrant infotainment hub, etc.

The Pan City proposal for Dehradun has mail agenda of improving public life through better and modernized service delivery (DehradunOne), maintaining a bird's eye view of the city (City Nervous Centre), making use of the existing infrastructure to transform the city into a smart city and creating an infrastructure for future smartness (Intelligent Poles), smart healthcare (Smart Ambulances) and empowering citizens to make change (Citizen Outreach Program).

See how this village in Uttarakhand enjoys Wi-Fi without electricity

A remote village in Uttarakhand where electricity is a distant dream is now enjoying high speed Wi-Fi without any grid power.

Operated on a solar power, the newly installed Wi-Fi network in the village by the State's Information Technology Development Agency (ITDA) has brought about a significant change in the lives of residents. In the village school, for example, administrators have taken refuge in the internet to make up for the lack of teachers for subjects like economics, political science, english, and geography.

Back in January, the ITDA had begun work in Ghes to set up an internet connection. However, there was one major problem—the village was located 30 km away from the last electrified village in the state. When a six-member State Wide Area Network (SWAN) team of the Uttarakhand government travelled 300 km from Dehradun, they went looking for "any possibility" of setting up an internet connection in the village.

Within one month, however, officials set up RF antennas in Ghes and another neighbouring village Himini, alongside solar panels and 2 KVA inverters. In addition to Ghes and Himini, the SWAN team set up RF antennas in another two nearby villages. The total budget for this entire venture was Rs 34 lakh.

By the second week of March, the local government college received a computer and projector, following which the rest of the village went online. Those within a 200-metre radius of the college can access the Wi-Fi network. Nonetheless, the Wi-Fi network is undergoing some teething problems, as the network is run on solar power. Inclement weather, which often results in poor sunlight, is having a deleterious effect on connectivity since the entire network is run on solar power.

Now a smart tree in Coimbatore will let you charge mobile and use wi-Fi

Coimbatore's smart tree will allow people to sit and rest while providing Wi-Fi and charging facilities. The 'tree,' is an ambitious Rs 12 lakh project, and only holds a bare minimum resemblance to natural tree. Its fibre-covered trunk is made of heavy metal, and its leaves are made of zinc and have been painted gold.

The tree will be built across 600 square feet in Coimbatore and be surrounded by five benches. Around 30 people can sit and use the Wi-Fi, and the area will be well lit to make it aesthetic.

Running on solar power, the Smart Tree in Coimbatore, will be a place to recharge your phone batteries and surf the net!

A solar panel on the top of the tree will generate power, storing it in a battery. Charging points for phones and laptops will be there, led by the panel which is capable of generating 1,500 watts of power daily.

The first smart tree will see the light of the day next week and depending on its success, another 30 such smart trees will be set up in Coimbatore, in due course of time. The design and space may vary, but the basic concept and idea will remain the same.

Nagpur Smart City to Run Metro Rail Services on Broad Gauge

Even as free joyrides are being extended to Nagpurites on the 5-kilometre stretch from the Airport South to Khapri on the Nagpur metro rail before its formal inauguration, the federal government has plans to extend the service to the city's outskirts using the existing broad-gauge railway tracks.

A proposal in this regard has been approved by the Ministry of Railways, Nitin Gadkari, Minister of Road Transport & Highways, Shipping and Water Resources informed reporters on the sidelines of American Chamber of Commerce (AMCHAM) India annual general meeting in New Delhi on Thursday.

"I thought why couldn't the existing broad-gauge tracks be used to run the metro railway? The Maharashtra Metro Rail Corporation (MAHA-Metro) will buy the rolling stock for 25 trains," said Gadkari.

Thanking Piyush Goyal, Minister for Railways and Coal for his support, Gadkari said that metro rail services to the townships of Wardha, Bhandara, Katol and Ramtek near Nagpur will be run on the regular railway lines. The move is part of the larger plan to develop them as satellite centres around the city.

"The average speed of the proposed metro services will be 100 KM per hour. Regular passenger services that are supposed to run at a speed of 60 KM per hour are often only able to travel at 30 KM per hour as they have to slow down in order to halt at the next station. It again takes time for them to pick up speed." Passenger train services should, therefore, be completely replaced by metro, added Gadkari.

The proposed metro rail services will comprise of four air-conditioned coaches. Two coaches in the train will be set aside for use by farmers to ferry dairy and farm produce to markets in the main city. A memorandum of understanding (MoU) is expected to be signed between MAHA-Metro and the Indian Railways after the results of the Karnataka state assembly elections are declared on May 15.

Work to also commence on major Delhi, Mumbai ropeway projects
Gadkari said the government would shortly commence work on the 70-kilometre DhaulaKuan to Manesar ropeway project.

"The project got somewhat delayed as there were some issues pertaining to safety norms. Following the safety clearance, we have received three bids that are presently being examined. We will try to give a work order in a month's time to start work there," he said.

Located in Haryana's Gurugram district, Manesar's Industrial Model Township (IMT) is host to several leading automotive component manufacturers with a global footprint.

The minister also said that the tender for India's first and longest ropeway to connect the country's commercial centre Mumbai to the Elephanta Island on the Arabian Sea was

floated. The island is home to the famed Elephanta Caves, a UNESCO World Heritage site.

Together with its main objective of providing efficient rail evacuation systems to major ports for enhancing their capacity and throughput, the Indian Port Rail Corporation (IPRCL) is also mandated to build ropeway projects. Ajoint venture company (JVC) between the major ports under the Ministry of Shipping and Rail Vikas Nigam (RVNL), it would be entering into a joint venture with a leading global player for ropeway development across India. A consultant appointed by IPRCL had already identified 100 projects that may be economically viable. Personnel from the company had toured sites in different states to further examine their feasibility.

However, IPRCL is presently constrained for funds as it is already involved with the Rs 6,000 crore Indore to Manmad railway project. Gadkari has therefore proposed IPRCL taking up 51 per cent equity in ropeway projects while the remainder 49 per cent would be contributed by other investors. “We will then work on the project on nomination basis under the public-private partnership (PPP) mode. The government of the state where the project is located will provide us with the land acquisition notification.”

In case the project is not economically viable, the state government could provide it with free electricity for a period of ten years. “After recovering our investment during the stipulated period, we would hand over the project to the government,” assured Gadkari.

The minister emphasised that the rapid expansion in automobile population and rising pollution levels in India’s urban clusters necessitated the move towards public transport solutions running on electricity.

Kochi Metro is now India's first integrated transport structure

Kochi Metro is the first Indian metro to have communication-based train control (CBTC) signaling system, and the trains are unattended train operation (UTO) compatible.
The integrated transport system that Kochi Metro Rail Ltd (KMRL) has planned for Kochi Metro involves the use of a single transit card and integrated timetable, and a command and control center.
For this, a first-of-its-kind agreement was signed with Axis Bank for implementing an automatic fare collection system (AFC) on the public–private partnership (PPP) model with an open loop EMV re-loadable repaid debit card, which can also be used for purposes other than transit.
KMRL is also planning a click and collect system, whereby commuters on the metro rail system will be able to order goods and services using this debit card, which can be delivered at our metro stations. The tender for the same has been floated.
A key focus of KMRL is to integrate all public transports—waterways, taxis, autorickshaws and private and KSRTC buses—under one centralized management system, whereby all the routes and timings would be synced with the commuters in mind. Eventually, a single ticketing system needs to be introduced for all public transport systems, as is the case in several western countries. The Kerala Government has prepared the law for setting up a Unified Metropolitan Transport Authority, with these objectives in mind and it is expected to be discussed in the current assembly session. Seven private bus operators and nine autorickshaw unions have each formed a society to facilitate these changes.
KMRL is the first transit operator in India to open up its train running information in general transit feed specification (GTFS) format. This will enable a commuter-friendly, inclusive and informed transit information ecosystem in the city.

All the stations are designed on different themes associated with Kerala, and the station activities are managed by a women's self-help group called Kudumbashree, which is a project under the poverty eradication programme of the state government. This is the best example of social inclusion. We are also the first government agency to engage members of the transgender community in functions such as ticketing, customer relations and housekeeping.

Agra becomes smarter with facial recognition system

In the current fiscal, Agra Smart City (ASCL) has been allotted Rs 216 crore, out of the total approximate Rs 1,200 crore. ASCL is working on a war footing mode to implement various projects in the city. In this endeavour, the project management consultant (PMC) at ASCL has already submitted reports (DPRs and RFPs) for some projects under the Smart Cities mission.

“We had recently (in January) implemented the Public Bicycle Sharing (PBS) project on PPP mode under pilot basis near the Taj Mahal area. Also, a facial recognition system (FRS) project under PoC (Proof of Concept) has been launched in January, along with the Agra Smart City logo, branding and website. The PMC has submitted RFPs for about Rs 60.5 crore projects, which are under review. These projects will be floated for tenders soon. Under convergence projects, we already have about Rs 220 crore worth projects completed,” says **Arun Prakash, CEO, Agra Smart City.**

In the area of solid waste management, door-to-door waste collection is currently being undertaken by the Nagar Nigam from its own sources. Also, for waste-to-energy, a PPA has been signed for 10 MW electricity from 500 MT waste (extended upto 750 MT) from gasification technology. The waste-to-energy project is at approval stage. What’s more, an MoU has been recently signed between ASCL and SEAK s.r.o., Slovakia, for smart lighting control technology POC in the ABD area, which will later be extended throughout the city.

Further, Prakash adds, “We will be floating tenders for several projects, for which we are looking for civil contractors. These include junction improvement (Rs 18.17 crore); street vending zone (Rs 2.84 crore); improvement in the vicinity of lesser known monuments (Rs 2.72 crore); beautification and streetscaping of Fatehabad Road (Rs 34.28 crore); construction of e-toilets (Rs 2.40 crore) on PPP mode; beautification of 2-km radius around the Taj (Rs 11.23 crore); rehabilitation of major or minor roads (Rs 250 crore); pilot 24 x 7 water supply (Rs 136.45 crore); sewerage network (Rs 153.95 crore); and the Taj east drain improvement plan (Rs 14 crore), among several other projects

Jabalpur tags 1.50 lakh houses with RFID for waste collection

In Jabalpur, work is under progress for RFID tagging of household dustbins – tracking and monitoring of household waste collection and community bins – at Rs 6.98 crore; out of 2.50 lakh houses, 1.50 lakh have been tagged. Also, work is in progress for a solar roof top project with 790 kW capacity at Rs 4.83 crore at Ramnagara, Lalpur and Ranjhi WTP; with expected savings of Rs 60 lakhs annually on power bills.

Says **Gajendra Singh Nagesh, CEO, Jabalpur Smart City (JSCL), "** Tenders have been issued for the development of a multi sports complex at Wright Town; multi-level parking at Civic Centre and Bhawartal; beautification, restoration and improvement of heritage properties; riverfront event zone; Jabalpur Smart Road Phase-2 and Phase-3; and development of a recreational zone; among others."
Other key projects include multi-level parking at Manas Bhawan at Rs 2.17 crore with capacity for 37 cars, which is currently functional; smart classroom at Rs 2.98 crore – 20 classes of five municipal schools have been awarded to BSNL. The smart classrooms integrate voice-recognition, computer-vision, and tele-education, multimedia and network technology; they have electronically-enhanced lecture theatres.

Another project worth mentioning is the charging facility for e-rickshaws at Rs 3.25 crore, out of which Rs 1.46 crore is being paid by JSCL – 450 kW solar system has been installed at nine locations with capacity for 15 e-rickshaws at each location. An MoU has been signed with NTPC for promoting electrical vehicles and establishing charging points. Work is in progress for this project.

Nagesh adds that upcoming projects for which DPRs are under preparation include the development of Ranital Lake; Teen Patti Commercial Complex including metro bus stand; Madan Mahal eco-tourism zone; a garment park (manufacturing hub); heritage and cultural museum; mini sports centre at 10 locations; an intelligent traffic management system; a disaster management and mitigation centre; and 24 x 7 water supply with SCADA under pan-city initiatives.

In a first in India, Bengaluru to aerially map its rooftop solar potential

The Center for Study of Science, Technology and Policy (CSTEP) has engaged in a first-of-its-kind project (started in the year 2016) to develop a tool that would accurately assess the potential of solar photovoltaics on rooftops in Bengaluru along with the associated business case for all consumer categories. The project involved using aerial Light Detection and Ranging (LiDAR) technology to develop high-resolution 3D maps of the city including building heights and neighboring obstacles such as trees, other buildings, poles, billboards, etc. The aerial data gathering flights started on February 19, 2018 and the last flight took off on March 6, 2018, after 15 days of flying. This exercise was carried out by Geokno India Pvt Ltd.

The data will now be processed to account for shading aspects after digitizing each rooftop. The solar rooftop potential will be calculated based on shadow-free area and the associated economics will be estimated by linking the BESCOM consumer ID linked with a specific rooftop. The tool will be made freely accessible to all consumers in 6-7 months from now. From a planning perspective, the results obtained from the tool will be used to identify the most suitable rooftops in the Bengaluru area to achieve the 1 GW of rooftop solar capacity target, by 2021-22.
Additional Chief Secretary, Energy, Ravi Kumar, said that the project is an innovative way to map solar rooftop potential in densely populated cities. The results of this exercise will lay the foundation for replicating such efforts in other cities in Karnataka and the rest of the country. The time taken to finish this exercise using other means or technology would be far greater considering the levels of accuracy expected from the usage of aerial LiDAR. The raw data collected can also be processed to help in other city planning applications such as tree cover densities, surface water drainage systems, road networks, etc. The Government of Karnataka will explore these options to maximize the utility of this project.

Chennai is 4th Indian city to join league of 50 data-driven global cities

Chennai Smart City will soon join the list of three Indian cities (Pune, Surat, and Jamshedpur) for having got the certification from the World Council on City Data, a global network of data-driven cities under the City Data for Indian Initiative. Chennai Smart City will be on the list of over 50 cities certified by the World Council on City Data Certification (WCCD), the first ever ISO standard for cities. Once certified, Chennai can work towards emerging as a smart and sustainable city with independently verified and globally comparable city data.

The WCCD ISO 37120 certification, an international standard, published for globally-comparable city data, provides a comprehensive set of indicators to measure the city's social, economic and environmental performance in relation to other cities. Categorized under 17 themes and 100 indicators for city services and quality of life, ISO 37120 certification will guide the city towards a smart, sustainable, resilient, and prosperous future armed with independently verified and globally comparable city data. The WCCD certification ensures data reliability with third-party verification.

The certification is given to Indian cities after Tata Trusts partnered with WCCD and initiated City Data for India Initiative to explore technology-backed models for collecting data and visualization to support evidence-based, data-driven governance and decision-making.

The move to seek WCCD certification comes as Chennai's smart city proposal features in the top 20 best propositions submitted by the cities in the country. Sources indicated that Chennai, before joining the City Data for India Initiative, has to complete City Participation Agreement and the WCCD Certification and Registration Agreement to formalize its participation.

Once ISO 37120-certified, Chennai will be included in the WCCD's Global Cities Registry. The data pertaining to the city is then available on the WCCD's Open City Data Portal and can be accessed by civic bodies, state and Central authorities, international bodies and the public.

The data pertaining to the city is then available on the WCCD's Open City Data Portal and can be accessed by civic bodies, state and Central authorities, international bodies and the public. A comprehensive set of indicators will measure the city's social, economic and environmental performance in relation to other cities. It will help the city compete with global cities and ensure world-class amenities.

Bhopal gets a one-stop interactive solution for citizens

Following the Indian Government's Smart Cities Mission, Bhopal is selected as one of the 20 lighthouse cities in the first round of the project. The city is expected to create a replicable model, which shall act like a lighthouse to other cities. The core infrastructure elements in a smart city include adequate water supply, assured electricity supply, sanitation, solid waste management, efficient urban mobility and public transport, robust IT connectivity and digitalization, and good governance, especially e-governance and citizen participation, sustainable environment and safety and security of citizens, particularly women, children and elderly.

Challenges

Bhopal Smart City Development Corporation, as a part of its smart city initiative, envisaged a technology solution that could cater to the smart citizens of this new age and modern Bhopal. While smart city is a long-term project, the initial step is to build the basic building blocks, which can help in the long term. The Bhopal Smart City Organization was looking for a platform, which can provide information to the citizens on what is happening and take citizens feedback, this was just the first step and was very important because they want citizens to be a part of it.

Solution

Smart Map Bhopal is envisioned as a city level GIS portal that will act as a one-stop destination for citizens, businesses and government departments to discover, consume and share information about Bhopal. Smart Map Bhopal, a web application that seamlessly functions across various devices, has been developed using the Esri ArcGIS, a leading GIS software that provides unique set of capabilities for applying location-based analysis. The company has created a platform where all departments can contribute their set of available data and information and bring it at one place, which can then be used by various departments.

As part of the solution, an unprecedented array of information such as Ward Info, Know Your plot, Around Me, Queries and Themes have been developed to enable citizens of Bhopal to be aware of the public amenities and infrastructure-related components available for them in the city. The Base map gallery functionality in the solution provides citizens with different map data representations of Bhopal to view and scrutinize. The solution is a great avenue for the citizens to truly participate by providing feedbacks and report their grievances. Smart Map Bhopal solution, also ensures that citizens of Bhopal are kept updated about the latest events happening in their city and also, enter their own public events to be a part of the listed events in the application.

To promote the rich heritage of Bhopal, a unique and interactive Story map template has been used to allow citizens to explore geo-location information, images and descriptions of Bhopal's heritage sites, museums, gates and lakes.

"We have leveraged the power of Esri GIS technology to create a platform which can collaborate with various stakeholders and can be easily integrated with existing and upcoming platforms. Our endeavor shall be to further enhance the citizen experience," says Chandramauli Shukla, CEO, Bhopal Smart City Development Corporation Ltd.

Benefits

- Provide visibility to the citizens on the various initiatives of city administration and to involve them in the city administration processes
- A platform that provides authoritative data from local government
- A single platform to access varied data sources
- Enables citizen engagement in building/updating city area
- Empower citizen by public crowd sourcing
- GIS location based grievance redressal
- An easy to use platform that provides reliable, timely and accurate location-based information and services

Administration and municipal authority specific benefits:

- GIS as a system of record and a decision support system to improve the key processes of the city administration
- Security and safety of citizens and assets using location based technological implementations
- Improve the operational efficiency, revenue generation capability and transparency by integrating GIS with the current ERP system (Municipal Administration System)
- Back office portal ensures efficient management of queries and grievances
- Various ready to use maps and apps are available as part of the portal to enable self-mapping for planning, designing and implementations
- Portal makes data sharing and collaboration easy and transparent
- Platform that ensures quick results and actions

New terminal building at Belagavi airport goes green!

Considering the current trend in green airport construction, the new terminal building at Belagavi airport has been designed and constructed in an eco-friendly manner. Here, about 620 metric tons (MT) of structural steel and total steel reinforcement in RCC of 550 MT have been used for the project.

Fly-ash cement bricks have been used for the construction of the walls and 2,000 sq m of granite has been used for flooring in the check-in, arrival and security hold areas. Further, laminated glass on the city side and hermetically sealed double glass for sound insulation have been used on the air side. The building also features a 100-mm-thick metallic standing seam roofing system with sand witching rock wool for thermal insulation and a vapour barrier separately with plastic sheet for sound insulation provided with 28 per cent perforation in the bottom sheet backed with non-woven acoustic tissue paper. Apart from these, the terminal building has used ACP cladding; the false ceiling has been made with calcium silicate tiles and the ceiling with gypsum board.

The new upgraded terminal building at Sambra on the outskirts of Belagavi was commissioned on October 16 with the aim to facilitate passenger and cargo traffic in the region. With an area of 3,600 sq m, it has a handling capacity of 300 passengers (150 arrival and 150 departure) at peak hour.

Specs and designs

The new terminal building is spacious and showcases local art and culture. “The structure has been constructed with a combination of RCC, glass and steel,” says Rajesh Kumar Maurya, Airport Director, Belagavi Airport, Airports Authority of India. “The foundation has been designed for Seismic Zone-III. Further, the building is energy-efficient with a roof skylight and curtain-wall glazing,” he added.

An elevator has been provided along with parking for 160 cars, 11 reserved parking spots for VIPs, four coach or bus parking stands and parking for 36 taxis. The terminal has six check-in counters, 21 flight information display system, three elevating transfer vehicles, five door frame metal detectors and 15 hand-held metal detectors. For the safety and security of passengers, the terminal building has been equipped with a fire-fighting and fire alarm system, 80 CCTVs (72 in the internal building and eight outside), and baggage scanners.

Efficient mechanisms

To reduce electricity consumption, seven skylights have been provided in the roofing of the terminal building; the roofing system is a double insulated one. Further, to give a pleasant outer atmosphere and a vast landscaped look to an airport of international standard, curtain wall glazing with laminated glass has been used.

Structural glazing has been undertaken for all external walls and the top soil has been separated and used to develop gardens on the city and air sides. A sewage treatment plant

(STP) of 50-kld capacity with moving bed bio reactor (MBBR), an effective technology, has been installed to recycle generated sewage from the new terminal building, integrated ATC and residential colony and other ancillary structures. Treated water from the STP is used for gardening and horticulture. A water treatment plant has also been provided. All water and sanitary fixtures have automatic sensors, ensuring controlled water supply. The solid waste generated is segregated, and the treated waste from the STP is then used as manure.

What's more! Rainwater harvesting has also been proposed, which will be executed through a separate tender. Besides, hydro-pneumatic pumps have been used for water supply. Apart from these, other green features of the new terminal building include low-heat-gain glazing, partial use of LED lighting, energy-efficient chillers and variable frequency drives for high-capacity motors. An HVAC plant of Blue Star of 3 x 100 TR screw chillers with air-cooled condensers has been installed

90 sewage treatment plants set to protect Ganga from pollution

The whopping Rs 20,000 crore Ganga Rejuvenation project are gaining some tractions. To make Ganga pollution-free, around 34 projects worth Rs 3,581 crore have been sanctioned, while 56 projects worth Rs 9,630 crore have been approved since 2014 till date.

Says Upendra Prasad Singh, Secretary, Ministry of Water Resources, River Development and Ganga Rejuvenation, “Around 18 of these projects are ready and others will also be implemented by March 2019 and most of the projects awarded are sewage treatment plants in various states.” He added: “We have also taken over sewage plants run by the state governments and providing 100 per cent funding assistance to the state governments for operation and maintenance for the next 15 years.”

Recently, the ministry has awarded two projects for Haridwar and Varanasi under hybrid annuity mode (HAM). It is the first time ever in India that HAM-based PPP is being applied in the sewerage sector. The 50 MLD STP in Varanasi was awarded to a consortium led by Essel Infra Projects at an estimated cost of Rs 153.16 crore. In Haridwar, HNB Engineers won the contract for a total sewage treatment capacity of 82 MLD (68 MLD in Jagjeetpur and 14 MLD in Sarai) at an estimated cost of Rs 171.53 crore. The awarded projects would ensure that untreated sewage does not flow into River Ganga, thus giving a boost to India’s flagship NamamiGangeprogramme. The construction of these two new, greenfield STPs will commence shortly.

A second set of sewage treatment projects (STPs) under HAM are on the anvil. The upcoming projects which have already been sanctioned under HAM are at Naini, Jhusi and Phaphamau along with Allahabad (72 MLD); at Unnao, Shuklaganj, and Bithoor along with Kanpur (21.4 MLD); at Digha and Kankarbagh in Bihar (150); at Kolkata and Howrah (141 MLD); at Farukhabad (30 MLD) and at Bhagalpur (65 MLD). Tender documents for 10 of these projects are being prepared. The National Mission for Clean Ganga (NMCG) has also appointed strategic consultants for PPP design and transaction advisory support for integration of sewage treatment infrastructure in Kanpur, Allahabad, Patna and Kolkata.

Solar power, smart parking, GPS tagging and many more for Rourkela

With a focused plan of economic diversification, improved living environment, sustainable infrastructure, promotion of tribal culture and citizen centric governance the Rourkela smart city is adding extensive work to its plan. The special purpose vehicle (SPV) has already appointed Tata Consulting Engineers (TCE) and Deloitte Touche Tohmatsu India as a Project Management Services (PMS). The two agencies will be involved in planning, designing, implementing and monitoring the Rourkela Smart City projects. The SPV intend to spend Rs 2,571 crore on its plan.

The flagship projects are redevelopments of three old market areas, construction of a state-of-the-art skill development centre and a 1,000 capacity auditorium with all modern amenities. Under area-based development, 1,241 acres would be taken for retrofitting. The ambitious Brahmani Riverfront Project envisages development of exciting world class features to attract local and outside tourists. To ease traffic congestion, there would be two multi-layer car parking places, dedicated cycle tracks and no vehicle zones and many more.

Similarly, Green Rourkela Project envisages development parks, LED street lighting systems and tapping solar power as alternate energy to curb carbon footprints. Surakshit Rourkela project includes electronic surveillance with special thrust on women's safety and security, while Paribahan project aims at effective traffic management, GPS tagging of buses and information displaying at bus stops.

Other projects include uninterrupted power and water supplies, rain water harvesting, slum area development, smart classrooms for schools, introduction of telemedicine, solid waste management system and environmental monitoring. The sources said detailed project reports (DPRs) have been prepared for some projects, while layout designs of infrastructure works are in final stages and others are under survey to tendering stages.

Now, plastic waste to be used to clean water

Plastic waste is a growing concern, and recycling is the only option at the present time. Indian scientists—Dr Premanjali Rai and Dr Kunwar P Singh from the Environmental Chemistry Division of the CSIR Indian Institute of Toxicology Research in Lucknow—have found that decontamination of water can be done with the use of plastic waste. They have used plastic waste to develop a low-cost magnetically-responsive adsorbent material that can be used to remove an antibiotic cephalexin from water.

The indiscriminate burning of plastic results in emission of deadly gases and carcinogens into the environment. Dumping them in landfills results in leaching of toxins into ground and surface water resources. Scientists have formulated an effective strategy of upcycling polyethylene terephthalate (PET) waste into a functional material to mitigate another critical environmental problem -the emerging levels of antibiotics in water.

This newly developed low-cost magnetic nanomaterial has the absorptive potential for cephalexin from the water. The minimal adsorbent dose of 0.4 gram per liter could remove greater than half of the initial cephalexin concentration under laboratory conditions.

This technique of magnetic separation for spent adsorbent decreases the secondary pollution problems associated with the non-magneto active adsorbents. The newly-developed adsorbents have considerable desorption potential and can be reused. These advantages make it an efficient adsorbent for removal of emerging micropollutants. These findings will prompt to develop more innovative strategies for non-biodegradable waste management.

Now, Chennai produces power from non-biodegradable waste (other cities can take a cue)

Generation of waste is a major hindrance in any city. But Chennai has come our with an ultimate solution on managing waste. The Greater Chennai Corporation has decided to produce electricity from non-degradable wastes in a major step ahead in making Chennai 'zero-waste' city. The non-degradable wastes pose severe environmental and health issues. For this, the Greater Chennai Corporation is setting up two power plants in Chennai to generate about 64 MW of electricity per day.

The Chennai Corporation has roped in IIT-Madras and Anna University to assist it in studying the technology. Garbage that is already dumped in Perungudi and Kodungaiyur landfills also is used to generate electricity, thus resulting in emptying them.

To manage the daily waste accumulation of 5,500 tons, volume reduction using mass incineration technology is the only solution, according to Chennai corporation officials.

"Officials from Solid Waste Management Department of Chennai Corporation had visited cities in north India where energy is being generated from wastes. Cities like Jabalpur, Indore, Bhopal and Ranchi have started generating electricity from wastes. Two plants are functioning in Delhi, while Hyderabad and Bengaluru are studying the technology," a Chennai corporation senior official told.

The civic body has built biogas production units in many parts of the city and biogas generated from these units is being utilized in Amma canteens. The plants would come up at dump yards in Perungudi and Kodungaiyur, and the energy generation capacity would be 32 MW each.

"Chennai generates around 5,500 tons of garbage every day. Though source segregation is done in a decentralized way in many parts of the city, disposal of non-organic wastes remains a problem. To achieve volume reduction, mass incineration is the tested and proven method," the official explained.

"Jabalpur is using mixed garbage (Organic and non-organic wastes), but we are planning to use non-organic wastes only. The proposal is in the nascent stage and expert study has to be conducted before building power plants," the official added. The central government is also advocating mass incineration method. If power plants come up, this would help to reduce environmental issues in both localities, the official said.

Now, pollution-free e-rickshaws for Jabalpur

Air pollution data from the World Health Organization reveals that Jabalpur—a tier-2 city in Madhya Pradesh—is one of the most polluted cities in India despite having the maximum number of lakes. Increase in the number of vehicles was cited as the primary reason for the increasing pollution in the city. To reduce vehicular pollution and to deal with public transport issues in the city, the Jabalpur City Transport Services Limited (JCTSL) introduced electric rickshaws (e-rickshaws) throughout the city. Currently, Jabalpur has 400 licensed e-rickshaws plying in the city.

ABB India is providing critical technology through its solar inverters for solar-powered charging stations for e-rickshaws at four locations in Jabalpur. As the sun hits the solar panels at the charging station, generating the direct current (DC) energy, the ABB inverters convert that power to the alternating current (AC) used in charging the e-rickshaws. The solar-powered charging stations are part of a renewable energy project initiated by the Jabalpur Smart City Corporation. The solar panels are also connected to the state grid to feed in additional power generated through net metering. The ABB inverters come with Wifi connectivity for remote monitoring and centralized billing provisions in the future.

This pilot project is an endeavor to provide these e-rickshaws with renewable-energy-powered charging stations. The ultimate aim is to also convert the 5,000 diesel-run city rickshaws to a cleaner, greener mode of propulsion, reducing carbon emissions in transportation and bringing down pollution levels in the city. Currently, conventional rickshaws emit at least 46 tons of CO2 per day in the city. This project is one of the firsts-of-its-kind in the country, demonstrating green generation and green usage. The solar-powered charging stations, capable of generating 50 kW of electricity, take between 7 to 8 hours for a full recharge, enabling the vehicle to travel 100 to 150 km.

“We are privileged to partner Jabalpur’s journey in pollution-free and environment-friendly transportation with ABB’s market-leading charging technology for these e-rickshaws. Such pilots are key to creating a wider eco-system of clean energy generation and consumption and realizing India’s vision of 175 GW of renewable energy by 2022,” said Sanjeev Sharma Managing Director, ABB India. “It is an important step that this project has been included as part of the Smart City Mission, as this will aid faster deployment of such technology and also ultimately different modes of EVs and charging infrastructure can be explored with the required urban planning and development,” he added.

“We are creating renewable-based infrastructure for the e-rickshaws at nine locations throughout the city. For this project we generate solar power, some of which is fed back to the grid,” said Sachin Vishvakarma, CEO, Jabalpur City Transport Services Ltd.

Most rickshaws in the country run on diesel or compressed natural gas (CNG) transitioning to electric ones. The former contribute to local pollution, while the latter require grid-connected electricity, which is not always reliable. Solar-powered charging stations will

contribute to the overall transition to green transportation and bring about last-mile connectivity sooner.

These solar e-rickshaws are part of the country's larger ambitious program of going all electric in transportation by 2030. India is one of the signatories to the Paris Climate Agreement and programs like these taken up on a larger scale will also contribute to maintaining the Agreement targets of reducing carbon emission intensity by up to 35 percent from 2005 levels and 40 percent of India's energy being generated from non-fossil fuel sources. India imports over 80 percent of its crude-oil requirements, a figure that is projected to double to around $300 billion by 2030.

The Indian government is likely to float bulk procurement tenders for three-wheeler electric rickshaws on the same model as the government's Unnat Jyoti by Affordable LEDs for All (Ujala) scheme, where LED lamps are procured in large numbers through competitive bidding and distributed through an agency to bring down costs.

Raipur gets an intelligent public bicycling system

Known for deploying smart solutions like Intelligent Traffic Management System (ITMS), the Raipur Smart City Ltd, a special purpose vehicle for the city, is now deploying a smart public bicycle sharing (PBS) system. The proposed PBS will have 550 around cycles spread over minimum 50 stations across the city.

Meanwhile, for swift post-implementation of PBS, a hybrid system has been proposed where the stations will be manned by attendants and the operations of each station will be communicated to the central control system by the station attendants using card verification devices.

The central control system will collect data from each station for efficient planning and operation. This data will be used to make decisions on redistribution of cycles around stations during the hours of operations. PBS will also be integrated with the fare collection system of the bus rapid transit system (BRTS) through the ITS system to aid the multimodal integration in future.

Meanwhile, PBS will be made available in a closely-spaced network of automated stations. Users can check out cycles at one station and return them to any other station in the network. The bicycle sharing is expected to boost the use of public transport by providing crucial last mile connectivity to the all-area of city, thereby expanding the catchment areas for the region’s transit systems.

Smart Budgeting: Where are smart cities investing their money?

Right from smart transportation, GIS-based waste management to parking and smart lighting, the selected smart cities in India are investing heavily on their respective plans. To begin with, Bhubaneswar, with an outlay of Rs 4,095 crore outlined for area based development (ABD), will be retrofitting and developing 985 acres as 'Bhubaneswar Town Centre District'. A major portion of the fund is attributed to affordable housing, mainly for Janpath government housing and four slums. Another major project is to develop Bhubaneswar Railway Station Multi Modal Hub at Rs 845 crore. The hub would integrate different modes of transport, and would have a new railway station building and a commercial-cum-residential complex, etc.

Meanwhile, Pune's smart city plan is focusing on transportation such as intelligent transport management system and smart parking. The special purpose vehicle has allocated around Rs 1,700 crore to develop the Aundh-Baner-Balewadi (ABB) area. Of which, a major portion, i.e., half of the fund is for transport, mainly public transport and NMT projects like Bus Rapid Transit (BRT), electric buses, revamping bus stops, pedestrian-friendly roads, non-motorized street, bicycles, etc. in the area. However, building and widening roads – which may encourage private vehicles – is also a major component under transport, with Rs 190 crore allocation. Among other projects, Rs 100 crore is allocated for riverfront development.

As far as Jaipur is concerned, since the city is a major tourist attraction, it has allocated Rs 1,250 crore (nearly two-thirds of the total budget) to retrofit a part of Jaipur's Walled City that houses many historic monuments. However, apart from prioritizing tourism, the biggest component Jaipur is also focusing on is sewerage. This is incurred a Rs 544 crore of budget. Next comes smart heritage and tourism at Rs 388 crore, which includes projects like re-purposing of heritage structures, redeveloping a heritage lake, facades, etc. The city also plans to improve solid waste management for the entire city and has set aside Rs 388 crore, mainly for waste-to-energy plants.

That said, Surat, a textile-major city of India, has planned Rs 1,800 crore for ABD projects. Importantly, like Bhubaneswar, Surat too has set aside a major portion of the budget for affordable housing. Overall, the city under Pradhan Mantri AwasYojna has planned 2,000 affordable houses and 5750 under public-private partnership, a total of 7,750 affordable houses. Surat also has restructuring of creeks as a major project, at Rs 200 crore.

Kochi prioritizes developing basic infrastructure in the Fort Kochi-Mattancherry-Central City area. Rs 1,350 crore (two-thirds of the budget) is reserved for this. Developing water transport, which already connects these areas, is a major part of the proposal. Buying boats, building a boatyard and command control centre, building a walkway from Ernakulam Jetty to Metro station are some projects under water transport. Redeveloping slums,

markets, etc. at Rs 355 crore constitute the biggest ABD component. Kochi also allocates Rs 30 crore for a tourism master plan of the area, and another Rs 40 crore to upgrade government hospitals.

Bhopal to monitor civic utilities and citizen services through a central cloud

To win in the marketplace, an organisation must incorporate Internet of Things (IoT) data and analytics, as well as artificial intelligence, into its strategic vision. In this regards, the Bhopal Smart City Development Corporation Ltd (BSCDCL) has selected the HPE Universal Internet of Things (UIoT) platform from Hewlett Packard Enterprise (HPE) India to create India's first cloud-based Integrated Command and Control Centre (ICCC).

With its multitenancy capabilities, HPE's UIoT platform makes it possible to run multiple city command centre operations in parallel. Bhopal, Gwalior, Jabalpur, Indore, Ujjain, Satna, and Sagar are a few of the selected cities. The centre will enable the monitoring and administration of multiple city civic utilities and citizen services in each of these cities through a central cloud. It will also allow for state-wide monitoring of cities from a central command view. HPE's UIoT platform will play a major role in the ICCC, as it will adapt and integrate thousands of discrete sensors and applications on the platform. In addition, the platform will also help Madhya Pradesh build world-class smart cities.

SomSatsangi, Managing Director of HPE India, thinks that the vision of BSCDCL to create the country's first Integrated Command and Control Centre in Madhya Pradesh is driven by a future-focused vision for their cities and citizens. He added, "We are pleased to be selected as partners to implement this innovative solution. Our proposed solution is comprised of world class products and platforms that are proven in cities across the world."

"A benefit of creating one unified command centre will be significant cost savings as compared to deploying individual command centres across each city separately. Our technology solution has the capability to integrate a multitude of citizen services applications and sensors running across cities in Madhya Pradesh," added Satsangi.

Delhi gears up for automated driving test

Earlier the driving test used to be a manual process with human intervention. One had to make an “8” with their vehicle during a driving test to obtain a two-or four-wheeler license. A single inspector would determine the abilities of a driver and check for any errors during the test. The entire process was quite cumbersome. However, manual driving test will be a thing of the past. The Delhi RTO (Regional Transport Office) is likely to introduce technology-based automated tests before issuing a driver’s license by mid-2018.

The testing tracks will be equipped with CCTV cameras, along with cameras on the driver’s dashboard. Special computer hardware will also be attached to test the driver’s skill. The driving tracks are equipped with pole sensors located at equidistant points along the ‘8’ which a driving aspirant has to navigate. In addition, there are beam sensors along the track, which sense the forward and reverse movement of a vehicle in the track with precision. This system also generates computerized test results that include time taken to complete the test, number of sensors touched and the applicant’s total score.

All the data recorded is sent to the central control software, where the data is analyzed, and the results are given out based on the preset criteria. The result is then sent to the third-party application, from where it is then sent to the user. Meanwhile, the entire process is without any manual intervention, hence, one can expect increase in transparency

India to train 4,000 youth for smart cities (launch first-of-kind skilling centre)

To bring momentum in skilling through collaborative efforts, the government has launched India's first Pradhan Mantri Kaushal Kendra (PMKK) for Skilling in Smart Cities, in collaboration with New Delhi Municipal Council (NDMC).

The newly inaugurated Pradhan Mantri Kaushal Kendra leverages NDMC infrastructure for skilling initiatives. Located at Mandir Marg, New Delhi, the NDMC-PMKK Centre for Skilling in Smart Cities is an exemplary heritage building of approx. 30,000 sq.ft., with a capacity of skilling 4,000 youth annually. Catering to healthcare and solar energy sectors, the centre will be managed by one of NSDC's affiliated training partners - Orion Edutech, which has an impeccable record of training nearly 3 lakh candidates through its network of over 275 skill development centres across the country.

Affirming synergies with the Government of India's flagship programs, the new skill development centres underscore the commitment of the Ministry of Urban Affairs & Housing (MUHA) and the Ministry of Skill Development & Entrepreneurship (MSDE) to support skilling in smart cities. National Skill Development Corporation (NSDC), an executive arm of MSDE, has collaborated with New Delhi Municipal Council Smart City Ltd (NDMCSCL) to extend cooperation for setting up of PMKK Centres for Smart Cities, to provide skill training for unemployed youth through its short-term training (STT) module and contribute to the capacity building of municipal employees through Recognition of Prior Learning (RPL) program.

India’s optic fibre network reaches 83,000 gram panchayats

The BharatNet project, which aims to deploy high-speed optical fibre cables across rural areas of the country, has now reached 83,000 gram panchayats. This was informed by Aruna Sundararajan, Secretary, Department of Telecommunications, Government of India.

Sundararajan said that by December this year the first phase of BharatNet will be complete. This would provide 100,000 gram panchayats with broadband connectivity by laying underground optic fibre cable lines. The DoT is aggressively monitoring the prestigious BharatNet initiative that aims to provide Internet connectivity to 2.5 lakh gram panchayats or village blocks by March 2019. The entire project, when complete, is expected to give a fillip to reaching out e-commerce services, including e governance, education and television services to far flung areas of the country.

The DoT Secretary said that fibreisation was a national imperative and the government, industry and chambers of commerce needed to work in coalition to achieve the objective of doubling the telecom footprint in the country by 2020.

Quoting from internet guru Mary Meeker’s 2017 report released in May this year, she said that there are over 355 million monthly active internet users in India, where nearly 109 million smartphones were shipped in 2016. Nearly 46% of internet users in India consume content in local languages. In the first quarter of 2017, 27 million smartphones were shipped. Most Indians used the internet on their mobile phones (80% usage was on mobile as compared to the global average of 50%). The most used browser in India was UC Browser, followed by Chrome and Opera. WhatsApp, Facebook Messenger, Shareit, Truecaller and Facebook are the most used apps in India.

These figures, she said threw up challenges in the policy domain, particularly in terms of security; data privacy and protection; data regulation and data monetisation.

Digital project management helps save $18 million to Maha Metro

Project delays, time and cost overrun in infrastructure projects, delays in regulatory approvals, contractual disputes, etc., are some of the challenges faced while implementing a project in India. However, this is not the case with Nagpur Metro. The Nagpur Metro project—with the help of digital project management—has delivered huge benefits to the project. Here, Nagpur Metro's main focus was on asset lifecycle rather than project management.

Speaking during the recently-concluded The Year in Infrastructure 2017 event, organized by Bentley Systems in Singapore, Dr Brijesh Dixit, Managing Director of the Maha Metro Rail Corporation (MMRC), said, "We have achieved around 12 per cent cost savings w.r.t logistics, travel and man days, and it is expected to rise to 15 per cent." He added: "Around 8 per cent savings in time has been achieved so far and it is expected to touch 11 per cent."

That said, the Nagpur Metro is likely to achieve reduction in overhead costs from 5 per cent to 3.5 per cent by the end of the project. While other metro projects are going ahead with a 10.5-m (meter) viaduct, Nagpur Metro opted for a 8.5-m viaduct, which helped them save around $18 million. In addition, MMRC saved around 8.5 per cent on DPR of the project cost and around $60,000 on Metro Bhavan HQ because of early detection of quantity overrun through BIM mode and clash detection.

What's more! Due to optimal design of sheds, stabling lines, inspection bay lines and repair bay lines, MMRC has saved around $15 million avoiding delays through BIM mode planning.

Dixit added, "The digital project management in planning has benefited in effective utilities shifting, optimal ROW planning and importantly, effective land acquisition."

Benefits

- Improved and common understanding
- Constructability assessment
- Onsite drawing verification and up-to-date information
- Auditable change management
- Schedule simulations and sequence verification with project management system and 3D models
- Measurements from 3D models and corresponding billing from accounts module of ERP
- Integration of scheduling from project management system and billing, avoiding mismatches between construction progress and financial progress
- RFI's management
- Project monitoring through reports and dashboards

O&M benefits

- Asset Information Management System (AIMS) being developed for effective handover to O&M

- AIMS along with common data environment will support effective O&M
- CMMS (Computerized Maintenance management system)
- Asset management

Chandigarh adopts intelligent transport system to promote public transportation

In a major step forward in the initiative taken by the Government of India under the Jawaharlal Nehru Urban Renewal Mission (JnNURM) and Sustainable Urban Transport Project (SUTP) to promote bus-based public transportation in the country, Chandigarh will be implementing an Intelligent Transport Systems (ITS) as a part of Efficient and Sustainable City Bus Services (ESCBS) system.

With an originally set project timeline of 26 months, the ESCBS project is set to follow some of the best examples of ITS employed around the world, aiming to enable efficient management of public transport in the city and achieve traffic efficiency, reduction in travel time while enhancing the safety and comfort of the users. The project includes installation of GPS devices in the buses, which would help to track each of the vehicles in operation across the city.

A 24x7 Central Control Station (CCS) would be monitoring the movement of buses and provide real-time information on bus arrival and departure times to commuters on their mobile phones and through Internet. This would help in saving much of the commuters' time, which gets wasted while waiting at the bus depot. The city bus stand would also undergo a makeover with installation of screens displaying bus arrival time.

Additionally, the project would also introduce a Fare Collection System (FCS) consisting of Electronic Ticketing Machines (ETMs) with smart Card reading capability and development of a Transit Management System to enable improved planning and scheduling of bus operations and crew management

Ahmedabad startup's concrete curing method helps save water and electricity

The key to achieve strong, durable concrete rests with the correct ratio for mixing cement and water. In the process, there are many methods employed for concrete curing, and one of them is using gunny bags and sprinkling water. However, this method ends up consuming a lot of water, and is also labour-intensive, as the curing requires round-the-clock monitoring or the effort goes down the drain.

An Ahmedabad-based start-up—Cure It—has provided a solution to this. The company has come up with an innovative drip curing method, whereby limited amount of water is dripped slowly at a regular pace. Importantly, this method can save up to 80 per cent of water. With this method—which is inspired from drip irrigation system used in the agricultural sector—the flow of water is controlled and only the required amount of water gets sprinkled.

How the method works

The method includes multi-layered sheets comprising of water pockets, gunny bags (made from jute) and PVC (polyvinyl chloride) films that are tightly bound to each other. Through the PVC film, only the required water trickles down the concrete, while the jute in the sheet helps in maintaining the cool temperature. The sheets can be easily attached to the concrete surface using binding wires or belts.

Meanwhile, through this method, one can fill the pockets once every 24 hours. The process is carried forward throughout the day with the water being dripped down through the film. A cubic meter of concrete column requires about 20 litres of water through this method, which equals one bucket and takes only half a minute to fill, compared to the 1,000-litre tank. Once filled with water, these pockets automatically start with their curing action on concrete. Since the amount of water that is dripped is optimal for curing, the quality and strength of concrete stays perfect.

What's more! This method can also save electricity five times than conventional method whereby electricity is required to pump the water. The method also allows for re-usability, multiple times through the sheets, unlike the gunny bags that go out of service after a month in use.

Bhopal's multipurpose smart poles to save energy and monitor air quality

Bhopal, a vibrant economic centre of Madhya Pradesh, has launched many innovative smart solutions. The city recently has launched its first innovative public private partnership (PPP)-based smart poles and intelligent streetlights project under the Smart Cities Mission. The project is innovatively structured in such a manner that it delivers bundled smart services to citizens and gives maximum values for money to the city authority.

The two major components of this project are smart poles and intelligent streetlights. In smart poles, the city will install around 400 poles, which will offer multiple services to the city residents. Some of the integral parts of the smart pole are:

- Energy efficient and remotely controllable LED streetlights
- Surveillance cameras for safety and parking violation detection
- Environmental sensors to monitor air quality, temperature and humidity
- WiFi hotspot services for the city
- Electric vehicle charging points to promote use of electric vehicles in the city
- Mobile-based application with functionality of SoS
- Optical fibre for better bandwidth to WiFi users, providing backhaul to telecom operators
- Smart pole has telecom tower infrastructure to match with city aesthetic and ready to accommodate upcoming technology as 4G and 5G.

In the case of intelligent street lighting, around 20,000 LED streetlights are installed by replacing the conventional sodium and mercury lamps. Main features of intelligent street lighting system include:

- Increased life of LED lights
- Intelligent, programmable street light system for efficient power management
- Remote operation and control of streetlight system
- Report of operating (green sign) and non-operating (red sign) luminaries
- Power theft control detection
- SMS to maintenance field staff in event of faults
- Workforce cost saving
- Automatic report generation for day/month/year

India’s tallest MET tower to predict better energy output with reliable data collection

Commissioning India’s tallest MET tower is not an easy task. India recently erected its tallest lattice MET tower that stretches 150 metre (m) high and features an array of latest technologies, including 40C anemometers, 200P wind vanes, 110S temperature sensors, a BP20 barometric pressure sensor, and a SymphoniePRO data logger with iPackGPS for bankable, secure and reliable data collection. Installation of this tower will help the Indian wind industry grow, enabling developers to measure at increased hub-heights and, in turn, better predict energy output at a potential wind site.

This tower has been erected for one of India’s leading independent power producers in renewable energy. The decision to commission the tower was spurred by the growing proliferation of taller turbines.

For this project, RK Systems overcame a number of design challenges to erect the 150 m tower. To keep the tower stable, secure and under the 250-kg weight limit, RK Systems’ Director, Arun Mehra, and his team introduced a design that used square tubes – a first in India.

According to Mehra: “It is well known that square tubes are stronger than an ‘L’ angle or channel.” The tower was then subjected to the Indian Government’s current wind load software, which is 10 per cent more demanding than the preceding software. The tower cleared the test to 55 m per second.

Mehra added, “In response to the increase in hub heights, and in order to perform accurate resource assessment campaigns that reduce uncertainty, it has become necessary to capture data at these heights.”

Haryana gets integrated solid waste management project

In coming days, Gurugram and Faridabad Municipal Corporation will be developing first of ok its kind Integrated solid waste management project. This project will cost around Rs 430 crore and will use advanced technology to collect, transport, process and dispose daily waste of over 1,250 tonne per day from both Gurugram and Faridabad regions.

This is the first project in the country bided on Output Based Incentive (OBI) concept of Public-Private Partnership (PPP) model. This technology would not only process waste but also generate a minimum of daily 10 MW of energy from refuse derived fuel (RDF) combustion.

Ecogreen Energy Pvt Ltd, a subsidiary of China Jinjiang Environment Holding Company Ltd, one of the largest and experienced waste to energy companies in Asia, identified as the preferred vendor through an international competitive bid process to roll out the solid waste management project. The company will also segregate the municipal solid waste into RDF and compost and use only RDF for power generation for the proposed waste to energy power plant. The estimated daily power generation would be a minimum of 10 MW.

A significant step towards the Clean India drive under Swachh Bharat campaign, this project will process daily waste from both the urban local bodies, along with the existing waste at the Bandhwari landfill site situated in the Aravalli hills

Now, Varanasi Smart City to be built on BIM model

One of the oldest living city of the world—Varanasi—has utmost historic and cultural importance for the entire country. It has organically evolved over hundreds of years. The city needs to be turned into Smart City, without altering its basic fabric. Approach of Area Based Development (ABD) will be taken along with the pan city solutions. The planspreading over total 1,389 acre will include retrofitting of old city alongside river Ganga comprising of major temples, heritage sites and cultural places with emphasis on socio-economic growth. The challenges of Varanasi Smart City are unique and hence it calls for advance and innovative technological solutions.

That said, with the objective of providing advance technological solutions, Varanasi Smart City has roped in Hungary-based Graphisoft, a multinational firm that specializes in Building Information Modelling (BIM).

BIM is fundamentally a software driven interface which provides the project delivery team with a 3D virtual visualization of the look and feel of the building that is to be constructed. Traditional building design was largely reliant upon two-dimensional technical drawings (plans, elevations, sections, etc.).

Building information modeling extends this beyond 3D, augmenting the three primary spatial dimensions (width, height and depth) with time as the fourth dimension (4D), cost as the fifth (5D), estimation as the sixth (6D) and facility management as seventh (7D). Its application becomes more fruitful as the scale of project increases. This has direct implication on saving the overall cost project, and it enables the timely completion of the projects as well. Graphisoft's BIM Application software ARCHICAD has been extensively applied in complex projects worldwide.

Ahmedabad Smart City adopts contactless cards

The National Payments Corporation of India (NPCI) has launched JanmitraRuPay contactless cards in association with the Ahmedabad Municipal Corporation (AMC) and ICICI Bank for Ahmedabad Smart City. With this, Ahmedabad will be the third city in India to go live on RuPay contactless after Kochi and Bengaluru.

RuPay contactless card is an interoperable, open-loop EMV-based contactless product. These cards are designed in line with the National Common Mobility Card (NCMC) guidelines as envisioned by the Ministry of Urban Development (MoUD).

According to AP Hota, Managing Director and Chief Executive Officer, NPCI, “the launch of RuPay contactless cards are aimed at digitising micropayments rapidly. RuPay’s association with AMC, Bangalore Metropolitan Transport Corporation (BMTC) and Kochi Metro Rail Ltd (KMRL) are big steps towards this direction.”

BMTC and KMRL partnered with Axis Bank to launch RuPay contactless cards on June 17, 2017. Any amount can be added or transferred to the card through various payment modes such as cash and internet banking. It can be used at different acceptance points in both contact and contactless mode.

For payments lower than Rs 2,000, customers can simply tap their card and the transactions are processed in a matter of seconds. No second factor authorisation is needed through PIN as per the Reserve Bank of India (RBI) guidelines.

NPCI plans to launch many more such transit and smart city projects on the RuPay contactless programme along with banks to facilitate ‘One Card for All Payments’ across the country. This advanced and secure contactless card can be used for all payment applications, including transport (city buses, BRTS etc.), toll, parking, municipal payments, utility payments and retail.

India’s first Rural LED Street Lighting Project

The Government of India, through the Energy Efficiency Services (EESL) under the Ministry of Power, would be retrofitting 10 lakh conventional streetlights with LEDs in gram panchayats of seven districts in Andhra Pradesh. This is the first project for rural LED street lighting in the country under the Government’s Street Lighting National Project (SLNP). In the first phase, the replacement will be undertaken in the districts of Guntur, Prakasam, Nellore, Kurnool, Kadapa, Anantapur and Chittoor.

This replacement drive in rural areas will help the gram panchayats to cumulatively save approximately 147 million units of electricity annually and lead to reduction of 12 crore tonnes of CO2. The entire upfront capital cost of this project is being funded by the French Development Agency – AgenceFrançaise de Développement (AFD). As part of the project, EESL would be carrying out the entire annual maintenance and warranty replacement in these gram panchayats for a period of 10 years.

Through the installation of 10 lakh LED streetlights, EESL has assured the Andhra Pradesh Government of approximately 59 per cent savings in electricity, which translates to annual monetary savings of Rs 88.2 crore.

Andhra Pradesh was the first State to seek assistance from EESL to replace conventional street lighting with LED lighting in Visakhapatnam, after the cyclone Hudhud caused extensive damage to the then existing street lighting infrastructure. Ever since then, EESL has installed over 5,90,000 LED streetlights in the State. These installations have led to an annual savings of over 7.8 crore kWh, translating into an annual reduction of over 65,000 tonnes of CO2. Nationally, over 23 lakh conventional street lights have been replaced by LED streetlights in 21 states of India

SOLAPUR SMART CITIES WORKSHOP: City Infra Outlook and Development plan

The Smart Cities Council India successfully organised its first-in-its-series of India-wide multicity smart cities workshops in Solapur on June 2, 2017. Solapur was selected under the Centre's smart city mission, which witnessed a lineup of world-class solution providers. **Pratap Padode, Founder & Director of Smart Cities Council India**, outlined the objectives of the workshop, and stated that the rationale behind choosing Solapur was "to help cities that needed it the most and where the Council could help them to be 'smart city' ready." He also presented the current state of affairs in Solapur and provided areas where it could make a huge difference.
A research report prepared by the Smart Cities Council India was released by all the dignitaries during the inaugural session.

To make the city clean, efficient and progressive, **Sanjay Teli, CEO, Solapur City Development Corporation,** explained that the city has adopted nine development models that includes 100 per cent waste management, clean environment, housing for all, renewable energy, transportation, water supply and recycling, use of public space and efficient governance.
Dr Rajendra Bhonsle, District Collector, Solapur, emphasised on citizen engagement, which could improve green cover in and around the City. "To reduce dust and pollution, we must implement green zones and citizens should take the ownership," he suggested. The district collector requested the city authority to undertake smart mobility plan on a long-term basis.
That said, **Avinash Dhakne, Commissioner, Solapur Municipal Corporation,** explained various areas of concern like water management, waste management, mobility, increasing revenue taxes and public-private partnership projects in Solapur. "There isn't enough water available for households, let alone industries, which becomes a barrier to economic growth. And even what is available is plagued by inefficient distribution and collection," he said.
According to **Shobha Banshetti, Mayor of Solapur,** the projects undertaken under this mission will enable Solapur to catch up with other developed cities in Maharashtra and become one of the prominent cities in the State. However, "A special purpose vehicle (SPV) must fast-track envisaged projects to show results to the citizens of Solapur," he added.
Chief Guest, **Subhash Deshmukh, Minister of Cooperation Marketing and Textile, Government of Maharashtra**, asked city representatives to come together and make city clean with the help of 'Swachh Bharat' programme. The Minister also asked city authorities and various departments to work together instead of in silos to make the smart city programme a successful one.
Mahadev Tambade, Commissioner of Police, Solapur explained the role of police department in smart cities. He stressed upon deployment of surveillance cameras for security, and for efficient synchronisation in city services – a command and control centre.

The summit also witnessed an interactive session between city authorities and experts from UltraTech, Cisco Systems, Schneider Electric, Maharashtra Energy Development Corporation, Owens Corning, Mindteck, Itron and Responscity Systems.

Here, the Council partners provided solutions on how city can recycle 100 per cent waste water, avoid water pilferage with the help of leak-detection systems and SCADA, system to monitor solid waste management services at the ward level, 100 per cent waste management, and use of smart metering and solar energy with smart streetlights. The partners also provided city authority solutions to improve its revenue with the help of GIS-based asset management systems, and use of multiple digital platforms for complaint management. Presentations were also made on command and control centre installations in keeping with the city's plan of issuing tenders for the same.

The Solapur Smart City Seminar was highly successful and witnessed an audience of around 200 which included the presence of important dignitaries, government officials besides relevant organisations and financial institutions

India’s 1st battery swapping & charging station for electric vehicles

Energy storage solutions integrated with solar can be very effective in managing electricity demand and would be a game changer in times to come. That said, Nagpur would be the first city in the country to be equipped with EcoCharge battery swapping and charging stations for a pilot project initiated by Ola, a provider of cabs. In the first stage, as much as 200 vehicles including bus, auto and car – all running on electricity – was launched by ACME.

EcoCharge advantages:

- Lowest operating cost
- Fast charging
- Swapping time less than filling fuel
- Longer life
- Build, own and operate model
- ICAT/ARAI approved lithium batteries
- Option for battery to grid (B to G)

Battery swapping and charging stations are equipped with lithium batteries for electric vehicle at multiple locations in Nagpur. ACME also plans to replicate similar swapping and charging infrastructure in other cities to facilitate adoption of electric mobility. The company offers lithium batteries with in-house developed intelligent BMS technology for electric mobility and stationary applications ranging from KWh to MWh.

Ajmer zooms ahead with 10 development modules for smart city

Ajmer has a vision of becoming one of India's leading tourist destinations. A good national and state highway network connects the city to other parts of Rajasthan and many important cities in India. And now, having made it to the Government's list of smart cities, the city is executing its smart plans in haste.

The Ajmer Corporation, under its Rs 1,947 crore smart city plan has outlined 10 module development plans to kick start its much awaited mission. The 10 module development plan is focused on tourism, lake development, green energy, integrated infrastructure improvement, modernisation of railway stations, taskforce management system, surveillance, WiFi, and smart transportation.

Under tourism plan, the urban local body will upgrade the city road for swift traffic flow. The ULB is also developing a, Subhash Udyan as cultural park. This apart, the corporation will promote public art and culture, street painting and music and plan an auditorium, tourism centre and pedestrian pathways.

In our second module, the corporation is developing the Ana Sagar Lake at about Rs 110 crore. Here, the corporation is making an open-air amphitheatre with LED lighting, a musical fountain, boating, and water sports activities. Under green Ajmer, says Priyavrat Pandya, Commissioner, Municipal Corporation, Ajmer, "We are planning to install rainwater harvesting in 55 public buildings and are installing solar panels in public buildings and open parks. The government has declared Ajmer a solar city."

He further added: "Under Centre's Akshay-Urja programme, we will invest about Rs 100 crore on non-conventional energy."

That said, Ajmer is leaving no stone unturned for strengthening the city's integrated infrastructure. For its improvement, the corporation is engaged installing smart meters, a pipeline, new pumps and all it takes to ensure that water reaches the tail end of the city with sufficient pressure. That apart, the corporation is also looking into solid waste management with RDF plant installation at land fill site; since April 1, says Pandya, "we have started 100 per cent door-to-door collection in all sixty wards. Further, we are planning about Rs 125 crore worth of work on prepaid meters and underground cabling".
In its fifth development module, the ULB will undertake modernisation of railway stations with a provision of Rs 300 crore. The sixth module is a taskforce management system, under which, the corporation has already cycle-sharing booths at two locations. The seventh module involves making the city economically viable. We plan to renovate Patel Stadium where functions are organised and will enroll about 54 public schools in smart classes.

The next module involves ensuring Wi-Fi connectivity and e-governance at a cost of about Rs 100, including CCTV cameras to stop crime, multi-speciality hospital development and mobile healthcare services. The ninth module involves smart transportation, shelters and information centres for passengers, mini buses, IT centres, a multilevel modern bus stand and multi-level and open car parking, with a provision of about Rs 178 crore. And the last module focuses on making the city safe and healthy with CCTV cameras for surveillance, a command control centre, traffic management and reduction of noise pollution.

Recycled water masterplan for BMC in making

India’s largest recycled water masterplan for the Brihanmumbai Municipal Corporation (BMC) is in preparation. For this, BMC has roped in US-based Black & Veatch, who will deliver this project through a combination of local and global expertise. The recycled water masterplan is the company’s second marquee project win with BMC in the last 12 months. The project, once commissioned, is likely to be one of India’s largest in terms of treatment capacity.

In view of new discharge standards by the Central Pollution Control Board, BMC is planning to include tertiary treatment for a portion of the flow, and recycle the tertiary treated effluent for non-potable reuse.

BMC’s vision is to maximise the use of tertiary treated effluent, over the next 50 years, in order to offset fresh water demand and alleviate the anticipated deficit in water supplies. Using tertiary treated effluent could potentially defer the need for additional water supply projects, preserve raw water resources, and pave the way for sustainable growth.

The strategic recycled water masterplan will outline the framework for reuse of tertiary treated effluent from all seven of Mumbai’s wastewater treatment plants, and serve as a guiding document to build infrastructure for recycled water in a phased manner.

In May 2016, the company was awarded the contract to undertake consultancy services, and prepare a detailed project report and tender documents, for BMC’s wastewater treatment facility for Malad zone.

Now, monitor fire protection system with IoT

Monitoring of fire entire state's fire protection system is a daunting task; however, a tiny state in the western part of India has been well prepared for any safety challenges.

Here, the state fire and emergency service has developed an emergency monitoring system along with a statistical and analytical mapping programme called as "Safe Goa 24x7".

The programme is an emergency monitoring system (EMS) has been developed using IoT-based platform (Internet of Things) and by integrating IT applications and digitization. The EMS will help monitor the health of the fire protection system, which includes fire-detection, alarm and firefighting system. These will be monitored in real time and facilitate immediate dispatch of appropriate resources, thus saving on time lost in different rounds of response.

Industries, hospitals, hotels, banks, high-rise buildings, etc. which have fire-protection systems will be urged to connect with this system. Fire and emergency services also intend to integrate the EMS with the smart city plan.

EMS will also optimize the use of manpower needed for periodical fire safety audit and limiting it to physical inspection, and thereafter online monitoring of the functional efficacy of the fire protection system.

Fire and emergency services will also be collaborating with Goa University's department of Earth Science to utilize their expertise in statistical and time service analysis. This project would aim at developing two important analytics knowledge tools: hot spot mapping of recorded fire incidents, and creating a new fire hazard index to help identify locations that have higher exposure to fire-causing factors.

This data/analytics based approach increases public safety from fire because it helps to understand, assess and measure fire incidence and its patterns leading to cost effective solutions.

Hyderabad adopts white topping technology

The Greater Hyderabad Municipal Corporation (GHMC) is probably the first corporation in India to use white topping technology for road construction. White topping is a new technology of providing cement concrete overlay on the existing damaged and distressed bitumen roads with a purpose either to restore or to increase the load carrying capacity, or both. The newly-inducted technology by GHMC also works on the existing pavement and prevents frequent damage of roads.

GHMC has adopted this technology for two pilot projects – Road No 10 in Banjara Hills and PG Road in Secunderabad. After successful implementation of laying these roads stretches, the Government of Telangana and GHMC have formulated a proposal to carry this work over bitumen roads in several stretches in the premises. Accordingly, as many as 64 road stretches have been identified for the deployment of white topping overlay over bitumen roads in a phased manner.

According to GHMC official, white topping roads have a design life of 15-20 years. Roads designed with white topping do not require maintenance for 15 years. Meanwhile, white topping roads along with provisions of footpath, shoulders, stormwater drain with proper chamber correction and all other utilities duct are sustainable. These have long life, low-maintenance, low life cycle cost, with improved safety and environment benefits.

White topping was being used widely in the US, Europe, and some countries in Asia. The white topping layer keeps the road intact during rains, as it prevents water-logging. This technology uses fly ash and polymeric fibre, besides cement and sand, which strengthens the road surface. White topping is the covering of an existing asphalt pavement with a layer of Portland cement concrete. White topping is divided into types depending on the thickness of the concrete layer and whether the layer is bonded to the asphalt substrate.

See how Hyderabad's new innovation helps manage traffic and save fuel

The Traffic Police in Hyderabad has undertaken various IT-related measures and one of them is the Hyderabad Traffic Integrated Management System (HTIMS). These are smart signalling system with surveillance cameras. Interesting fact is that when the roads are empty on one side and there are no immovable vehicles, the system automatically allows vehicles on the other side to move quicker. This innovative system has allowed Hyderabad to reduce the waiting time for commuters at the signals. What's more! HTIMS also helps in saving fuel.

Meanwhile, the Hyderabad Police conducted an intensive survey and collected data from various available sources. The results were astonishing! According to the survey, HTIMS has reduced the travel time from 10 per cent to 20 per cent on some stretches. The system has also allowed Hyderabad Police to optimise signaling time in some places.

That said, apart from managing traffic, the Police Department has gone cashless over charging challans for the last two years. In fact, the city is going paperless too. The new app helps vehicle users to store documents related to vehicles in their mobile phones. The M-wallet application is available on Android and IOS platforms.

The app, which is a first-of-its-kind in India, allows a person to have a one-stop digital shop for all the documents issued by the Transport Department. Salient features include: lets one auto-fetch documents, share documents, have all the documents on one screen and add multiple vehicles owned by a single person. The documents, once downloaded, will be saved for future use on the application.

Last but not the least, the Hyderabad Police department has already started procurement of intelligent traffic management system and have established command and control centre.

Now, track school buses with iSafeTrack

School transportation has been a non-organised sector, and despite the fact that it deals with school-going kids, there are only few measures taken by the school authorities and transporters to ensure their safety. In some cases, transport is outsourced by the school to a transport company wherein buses, drivers and attendants are provided by the transporter itself. In some states, the government has mandated installation of GPS devices in the buses but it is only used to get the vehicle passed by the Department of Road Transport.

iSafeTrack is a school transport management system from Safeplanet Innovations that addresses school transport issues without adding any complexity in the process. The system has been deployed on a cloud platform and accessible as a service to both schools and parents. Mobile interface along with real-time availability of location on map makes it highly convenient to use. It is as easy as using an OLA or Uber and hence has high acceptability. The system has been deployed in schools in the NCR region and is gaining further traction through word-of-mouth. Roll-out of mobile-based transport management system has led to sense of safety and satisfaction among parents using school transport.

The system has helped reduce number of calls to school transport department and has given them a better control in terms of management of routes, students and user information. School transport can easily figure out route violations and monitor speed violations. In case of long halts, school transport can arrange alternate transport and arrange mechanic help to fix the issues if any. Based on the feedback received during parent-teacher meetings, parents are really looking forward to use these kind of services based on geospatial technologies and are expecting many more features to further enhance child's safety during travel between school and home.

End-to-end services, including device, application and connectivity, means greater accountability and lower cost of ownership for the schools. Access to scalable and future-proof services means you need not invest upfront in IT infrastructure. Quick and seamless deployment helps getting started at the earliest.

App features for parents

a) ***Pick & drop alerts via SMS***: Real-time alerts for arrival and departure of school bus. Prior intimation through SMS/mobile app notification to parents that bus is approaching a pickup point.

b) ***Live tracking:*** Live view of bus route on map. Track the school bus real-time on map and expected time of arrival for the pickup/drop point. Parents can plan their time to receive their children on return from school.

c) ***Long halt/breakdown alert via SMS:*** Information about long halts and breakdown of bus.

d) ***Absent notification:*** Parents can mark the student absent saving wait time for other

students.
e) ***Bus staff information***: Driver, attendant and school information.
f) ***Feedback/complaints:*** Parents can register complaints/feedback with school using the app.
g) ***Complete info:*** Information about the routes, pick up, drop time and facility to update the address information, etc.
h) ***Secured data:*** Account is password protected. Only authorised and approved parents/guardians can see student's details and track information.

App features for school

a) ***Route management:*** School transport can manage routes, parents and students pick up/drop information.
b) ***Live tracking:*** Live view of all buses on map. School transport personnel can see all the buses in real time on a geospatial dashboard.
c) ***Historical reports:*** Transport department can see history of trips done by school buses.
d) ***Driver analysis:*** School transport can also see long halt and over speeding incidents of school buses. Total distance and total time travelled.
e) ***Message broadcast:*** School transport can send information about transport issues through mass SMS/email system.

Smart energy management system in Pune

(To save 55% energy)

Energy saved is energy generated! Following this principle, [nowadays] most of the municipal corporations in India are striving hard to save maximum energy with minimum investments. That said, in a bid to save energy, the Pune Municipal Corporation (PMC)—under the Smart City initiative—plans to replace as many as 80,000 streetlights with LED bulbs.

Why are these LEDs smart? Apart from saving energy, the LEDs can be programmed based on traffic and public movement pattern. For e.g.: If there is little movement (traffic or public), the lights will get dim, and if there is no movement, the light gets dim to as low as 20 per cent of its total luminance. This further helps save more energy. The salient features of this project is energy savings, sensor-based lighting system, centralised control recent, to name a few.

Speaking exclusively to Council, **Kunal Kumar, Commissioner, PMC**, told that many cities in India have undertaken such projects, but no one can match Pune's scale. He further added that PMC is expecting to save energy to the tune of 55 per cent, which will further amount to save roughly Rs 1.4 crore per annum.
The smart energy management system will have a SCADA-based command control system that will monitor the functioning of streetlights. Through this command centre, officials will be informed about any malfunction, theft or any operational hazard. At present, PMC has replaced 50,000 streetlights. According to Kumar, the Corporation plans to replace as many as 1.30 lakh street lights in a phased manner.

The entire project will be implemented by Philips Lighting. Says **Harsh Chitale, VC & MD, Philips Lighting India Ltd**: "PMC will not be paying directly to us, but will be using an energy services company (ESCO) model wherein we will get paid in the form of savings from reduced electricity expenses after installing the LEDs."

Surat and Jamshedpur impress on infra services (Data plays the part)

Promotion of diversity in Government is considered to be a direct reflection of inclusiveness in governance. Two cities—Surat and Jamshedpur—are following the principle of inclusiveness. Globally, women continues to be under-represented in government, and increasing women's participation in Government displays a commitment towards increasing gender parity.

However, the World Council on City Data (WCCD) ISO 37120 indicates that 50 per cent of Surat's total elected officials to city-level offices are women. In fact, this is even higher than London with 30.77 per cent and Johannesburg with 38.5 per cent.

Jamshedpur scores high in education. Data indicates that Jamshedpur achieves a high level of female student enrollment of 99.3 per cent, which is greater than Bogota (98.7 per cent), Amsterdam (98 per cent) and Buenos Aires (96.8 per cent).

Access to continuous electrical services without interruptions is essential in ensuring reliability of a city's electric utility services. According to WCCD data, Surat has an average of 0.03 electrical interruptions per consumer per year, which demonstrates the city's capability to provide reliable electric services to its citizens. In fact, this is much lower than London with 0.19 electrical interruptions and Dubai with 0.14.

Jamshedpur has a reputation for providing high-quality, reliable infrastructure services. The city provides close to complete provision of authorised electrical services with 99.2 per cent. This electrical service is also reliable with an average of 1.8 service interruptions per year. The city's water infrastructure is also reliable, with only 0.04 average annual hours of water service interruptions per household.

The data indicates that the percentage of water losses from the water system (13.2 per cent) is very low considering the standards of Indian cities. In fact, Indian cities have lower losses than Boston (14.2 per cent) and Taipei (16.7 per cent). That apart, Jamshedpur Utilities and Services Company (JUSCO), the service provider for the city, is planning to invest in a new wastewater system that will achieve 100 per cent reuse of the water for horticulture and industrial use, a first in India.

Gandhinagar goes ‘smart’! (Installs Wi-Fi, IP surveillance and more)

Gandhinagar has now become the first city in the country to go smart! Setting up an example for other cities, the Gandhinagar Municipal Corporation (GMC) has equipped the entire city with Wi-Fi (open to sky), IP surveillance, smart street lighting, environment sensors, digital display, speed and face detection system, automatic number plate recognition system, public address system, smart call centre and a centralised command centre to monitor and control all activities. Gandhinagar has outdone its peers [Ahmedabad, Pune, Jaipur, Surat, Kochi, Coimbatore, Chennai, Ludhiana, Amritsar, Nagpur, Varanasi, Vadodara, etc.] which are yet to witness the project execution part.

The project was partnered with Sterlite Technologies, which has designed, built and will manage the smart city project of Gandhinagar.

Hetal Shah, VP & Head – Smart City Project (Gandhinagar), Sterlite Technologies, told Council that the city will be offering open-to-air Wi-Fi services free for the first 30 minutes, after which the services will be charged at a nominal rate, which is yet to be finalised by GMC.

To ensure that citizens get a quick, quality Wi-Fi services at a reasonable price, about 750 Wi-Fi access points have been installed across the city covering 75 per cent of the total area. According to LK Pathak, VP – Marketing & Corporate Communications, Sterlite Technologies, “Out of the total population of around 2.30 lakh, around 1.30 lakh have already registered and about 400-500 new users are registering on a daily basis.”

According to Shah, “the total cost incurred towards this project was Rs 22 crore, in which Rs 11-12 crore has been for capex and the remaining is for opex.” As far as the ROI is concerned, Sterlite will recover its revenue from two streams mainly through paid Wi-Fi, post free internet time and commercially using digital signage boards. “We are expecting a revenue generation to the tune of Rs 1 crore per year, and together with GMC it will be around Rs 2 crore.”

In phase 1, digital signage has been installed across five locations in the city. GMC will give information related to government programmes and other important information. Over and above this, citizens are also given information related to environment forecast.

CCTV surveillance

That apart, the city is also equipped with CCTV surveillance system. To regulate the city traffic and for safety of its citizens, around 210 cameras have been installed. CCTV cameras such as PTZ camera, which click 360 degree photograph can be sent to the control room.

Along with this, the Corporation has also fixed cameras at a specific angle to click photographs of the defined road. For traffic management, Sterlite Technologies has installed cameras that can detect the speed of the vehicle in motion and automatic number plate recognition cameras to help record the vehicle number plate so that in case of violation of any law, the violator can be caught.

Worth to mention, GMC has also gone a step forward by installing face detection cameras to curb criminal activity. With this deployment, it can capture criminals entering the city with a database of pre-registered records.

CCTV surveillance helps in monitoring all activities within the city, which has been set-up at SP office Command and Control Room. This helps in live monitoring of transport as well as the citizens' activity of all city roads due to which, at the time of any accident all the related information along with police detection information can be made easily available. In Phase II, GMC will also be able to control cleansing and other operations.

Smart lighting & PA system

Under the Smart City mission, the Corporation—in partnership with Sterlite—has implemented 1,000 street lights. With the deployment of smart lighting, it will be able to dim or brighten the light intensity automatically based on traffic condition. Due to smart street lighting, there will be a 30 per cent saving in electricity cost.

Under the IP-based public announcement (PA) system, the citizens are addressed on any incidental information and other important notifications are broadcasted as well through the loud speakers at below mentioned 13 locations. In case of natural calamity and man-made calamity citizens can be informed of urgent circumstances

Jaipur's lighting gets smart! (Saves 97 MwH)

Jaipur, one of the earlier movers in Centre's Smart City Mission, is saving a whopping 97 megawatt hours (MwH) with the implementation of smart lighting. The Jaipur Development Authority (JDA) has fitted 320 fixtures—each with 45 LEDs, motion detection and dimming possibilities—on Mahal Road. The technology has been deployed by Council's lead partner Cisco and has been integrated with its 'City Digital Platform'.

With the implementation of smart lighting system, LEDs can be programmed based on traffic pattern. For e.g.: If there is little traffic movement, the light gets dim, and if there is no traffic movement, the light gets dim to as low as 20 per cent of its total luminance. This further helps save energy.

Besides, the fixtures are also attached with four video nodes that count the number of vehicles entering and exiting the road. By doing so, it is helping the traffic authorities detect traffic violations and alert JDA authorities. Since, the current system has already started giving results, the JDA is planning to implement smart lighting on a 45-km stretch in the next phase.

Cisco's 'City Digital Platform' pulls the data from various operations in the city and provides a dashboard view to the operator. Presently, the digital platform has integrated traffic, parking, environment data and lighting system. Through this platform, the operator can see parking availability, humidity, noise, temperature, CO2, and NO2 through environment sensors installed in 15 locations.

Much of this data available on the dashboard will also be available to citizens soon. An all new citizen application will be released in January 2017. Tourist information, JDA services, information on environment and parking availability, grievance redressal and other Smart City solutions are the features of this new application, which is akin to citizen apps developed in European cities such as Barcelona.

ETAP ADMS transforms Noida's power utility into a smart utility

Noida Power Company Ltd (NPCL) distributes power in Greater Noida, near Delhi in Uttar Pradesh, which is being developed as an industrial hub and urban settlement. Currently, the peak load served is 265 MW as against 17 MW in 1994-95, reflecting a steady increase in consumer demand. As one of the fastest growing utilities in India, NPCL serves a demanding industrial, commercial, and residential customer base of 71,000.

The load profile is dominated by large and heavy industries that constitute 59 per cent of energy sale and contributes 62 per cent to the company's income.

With rapid customer growth and an increased demand for new substations and distribution network, NPCL took the decision in 2015 to implement ETAP ADMS (Advanced Distribution Management System) to improve its network reliability, performance, and response to customers.

With ETAP, NPCL has deployed a unique implementation called 'Go-Live'. The implementation of ADMS and OMS enables NPCL to embark on its journey towards smart grid implementation in the country, wherein the automation of every minute requirement has been taken care of through business process-oriented implementation.

This notable milestone for ETAP ADMS solution is enabling the transformation of NPCL's network into an intelligent, adaptive, and sustainable grid that provides reliable and quality energy for their customers.

With the implementation of ETAP ADMS, the gird will have an improved network performance, faster outage restoration, substation equipment maintenance, reduced dispatcher training time and more efficient power management & delivery.

How it works

The ADMS manages, controls, visualises, optimises and automates distribution networks from state-wide to city-wide power distribution networks. It also integrates the platform for design and operations, using a common model for planning & distribution management with a unified interface.

The system gives system operators, dispatchers, planning engineers, reliability analysts and managers access to the same network representation.

That apart, the ADMS provides situational intelligence that ensures efficient and reliable grid analysis and management during a rapidly changing network state. Importantly, the ADMS

has the capability of integrating advanced analytics including system protection, demand response, CVR, FLISR, outage management, load forecasting, unified AC & DC power flow, and renewable energy penetration.

ETAP's overall project scope:

- IEC 61850 oriented Substation Automation
- Integrated functionality of SCADA, DMS & OMS
- Open & scalable smart grid functionalities and distribution network applications
- Integrated network modelling, planning and distribution analysis
- Intelligent monitoring, control, automation and decision support system
- Intelligent model-based solution with Geospatial Information System (GIS) integration and electrical power system simulation capabilities.

Multimodal transport, GPS, GIS & surveillance for four Karnataka Smart Cities

In Karnataka, Hubballi-Dharwad, Mangaluru, Shivamogga and Tumakuru municipal corporations have commenced the process of selecting project management consultants by inviting request for proposals (RFPs) from interested parties to help execute their respective action plans for city improvement by January 6, 2017.
With this, the corporations will also begin the process of consultation for forming Special Purpose Vehicles (SPVs) for the Smart City programme implementation.

Meanwhile, cities including Belagavi and Davangere, who were the winners in the first round of the Smart City Mission, have already received funds to the tune of Rs 338 crore each, to streamline and execute the envisaged projects for pan-city and area-based development. The Centre and state governments have chipped in with Rs 194 crore each (two annual installments for the five-year Rs 1,000 crore Smart City Mission). Till date, Belagavi and Davangere have finalised their priority areas for development and are in the process of finalising tenders in that direction.

As far as Mangaluru is concerned, the city has prioritised redevelopment of 1,628 acres of the Hampankatta-Old Port-Bunder-River front area. That apart, the city, through its Smart City Mission, will be launching a “One touch Mangaluru” app to provide the city with 24x7 municipal services, security and transport operations. Besides this, to boost the aquatic sector, the city is likely to take up beach development, boost fishing, trade, set up a recreation centre and develop transport connectivity.

While Mangaluru has motored ahead with these plans, Hubbali-Dharwad is strengthening its multimodal transport infrastructure for better connectivity from the airport to the railway station. Besides, the city is also putting in place a non-motorised transport policy in connection with non-vehicular zones. To fight the garbage menace in the city, it will be introducing GPS and GIS for improving efficiency in segregation of garbage at source.

Meanwhile, Shivamogga has expanded its plans for the development of land stretches along the River Tunga passing through Shivamogga city (275 acres) and is putting in place an Integrated Traffic and Transportation System. For public safety and energy savings, it has planned intelligence LED street lighting and surveillance system.

Tumakuru has planned to decongest the city centre by expanding the Central Business Disrtict (CBD) around Tumakuru Amanikere lake and is deploying CCTV camera surveillance across the city. That apart, it will be setting up an integrated city management control centre to operate services like transport, water & energy supply and emergency response.

Converting solid waste into bio-fuel: It's all happening in Nagaland

December 15th will be a historic day for the state of Nagaland. Dimapur Municipal Council, (DMC) in partnership with Newwaves Biofuels India Pvt Ltd, a Hyderabad-based company, has implemented a revolutionary integrated solid waste management system. The system will produce bio-fuels with organic farming, encourage skill development, and implement a waste and drinking water management project. This is the first such project to be implemented in the country.

Meanwhile, this project is coming as a literal breather for the citizens of Dimapur, as the commercial hub may get relief from the putrid smell emanating from the waste accumulated at the DMC dumping site.

Speaking to the Council, **Krishna Prasanth, MD, Newwaves Biofuels**, said that the municipal solid waste project is the first of its kind to be implemented under the 'Make in India' programme. He added that the technology for waste-to-heat and conversion of solid waste into bio-fuel would be sourced from the UK and the USA. However, the machines will be manufactured in India.

Prasanth declined to disclose details on the technology to be used in this project as it is patented. With the implementation of the programme, DMC would be able to manage waste in a proper manner, and earn revenue for taking up more developmental programmes.

A Maharashtra village becomes India's first cashless hub

It was Akodara, a tiny village in Gujarat, which became India's first digital village in 2015. Becoming digital was a huge advantage for this village, which reaped the benefits of a cashless economy. While the whole country is reeling under the aftermath of the demonetisation of Rs 500 and Rs 1,000 notes, the villagers of Akodara, who carry out their transactions on mobile banking almost on a daily basis, have no reason to complain.

Another village in Maharashtra, Dhasai, is following Akodara's example. While Akodara uses mobile transactions, Dhasai uses card payments via Electronic Data Capture (EDC) machines. The village has installed as many as 40 card swiping machines, for cashless transactions.

Traders, vegetable & fruit vendors, doctors, barbers, and others provide goods and services in Dhasai by using swipe machines for all their cashless transactions. The initiative to make this Maharashtra village cashless was taken by Bank of Baroda in collaboration with NGO Veer Savarkar Pratishthan. All the residents have Jan Dhan Yojana accounts and hold RuPay ATM cards. The NGO trained the villagers for the use of digital methods of transactions.

Bank of Baroda charges 0.75 per cent transaction charge on transactions that are lesser than Rs 2,000. The electronic money transfer has proved beneficial to around 400 traders who reside in Dhasai, making it the first village in the country to adapt to the new system.

Is the country taking a note of this revolutionary example set by rural India?

Nagpur set to become smart, safe and clean

Come this November, the Orange City of India — Nagpur — is all set to launch Smart City projects worth Rs 520 crore to make the city not only smart, but also safe and clean.

The Nagpur Municipal Corporation (NMC), in a joint venture with the Directorate of Information Technology (DIT), will facilitate the execution work. DIT has already issued a letter of intent to L&T's smart unit to take up the project. L&T will also maintain and operate the smart solution projects for the next five years from the date of completion.

The projects, worth Rs 520 crore, will be part of 'Pan City Development' under NMC's Smart City plan.

According to DIT, it will begin work on a 5.8-km Japanese Garden Square and Khamla Square on WHC Road as a Smart Strip. DIT is planning to replicate such Smart Strips on other streets in a later phase. Simultaneously, for the safety of the city, DIT will start installing around 3,800 CCTVs in over 700 locations in and around the city, covering an area of 446 sq km.

For better connectivity, it is expected that 136 Wi-Fi hotspots at all major commercial, educational and medical areas will be installed. In addition, 200 Smart Kiosks to pay bills and avail all government services, 1,200-km optical fibre network and backbone, 10 MBPS Internet facility to all households, and traffic monitoring and controlling systems at 700 locations will be placed.

To make the city clean, GPS and Integrated Radio Frequency Identification (IRFID) tracking system will be installed to monitor collection of garbage from households. Interestingly, IRFID tags on garbage bins will alert the control room in case bins are filled to the brim. Meanwhile, this will be the first time in India that IRFID tags will be put on brooms of sanitary workers to record the stretch cleaned by each individual. In addition, a mobile app to contact NMC for household or area garbage disposal will be released. A hi-tech control room will monitor all solid waste management.

Delhi´s toilet-to-tap project takes off, and it´s a clean and green process

Delhi has not been able to tackle its water crisis, especially during summers. That can be evident from the frequent water cuts that plague the city. However, a Delhi-based company, Absolute Water, is helping the capital make recycle sewage water available for its citizens at affordable rates. The company's 'Toilet to Tap' project is a one-of-its-kind venture that utilises the process of vermi-filtration to convert sewage water into water suitable for potable and non-potable applications.

The company has signed an agreement with the Delhi Jal Board to set up such decentralised sewage treatment plants (STPs) in order to recover usable water from the wastewater generated from different avenues. The plant, located in Keshopur, has a capacity of 100 kilolitres per day and utilises sewage water to make pure drinking water.

Conventional STPs run on the principle of aeration, utilise chemicals and have a significantly high requirement of electricity. However, the company's STP and water recovery system utilise a bio-filter made up of gravel, especially bred worms and bacteria.

These components act on suspended and organic solids in the raw sewage water and biologically degrade it in an environmentally safe manner. Its triple filtration treatment of wastewater reduces significant levels of TSS, BOD, oil & grease and COD up to 90 per cent. Additionally, the plant has a recovery rate of 85 per cent and it can be operated by semi-skilled labour.

Maintenance costs are also low, with only the organic media of worms, sand and gravel requiring replacement at intervals of six to eight months. Each removed batch of media can be used as bio-fertiliser in agriculture. Every element of the STP is reusable, thus making it an environmentally sustainable, economically viable and socially acceptable technology.

The recovered water is of potable quality (as per WHO standards) and can be used for drinking and bathing purposes. The reject from the membrane can also be used as liquid urea due to its richness in nitrogen.

Punjab gets hi-tech electroplating plant to curb water pollution

Getting rid of industrial water pollution in India tops the priority chart of every city administration. However, not all states have tasted success in their initiatives, so far. In a recent workshop conducted by the Ministry of Urban Development, it was conveyed to all the participant states that they must implement state-of-the-art technologies and infrastructure to tackle the issue of industrial water pollution.

In this regard, the Punjab government has adopted an electroplating process based on a latest technology called a “new-generation tricotect instrument”, under which a facility consumes fewer chemicals and doesn’t release wastewater like traditional electroplating plants. In fact, this water pollution-curbing technology is a first of its kind in north India. There is no discharge of chemical-infused water from it, and the plant requires cleaning only after a gap of two years. This means there will be less water pollution when compared with normal plants.

The technology removes iron and zinc from industrial wastewater. The processes can save use of chemicals and metals such as chromium and nickel, traditionally used in electroplating, thereby also lowering the impact on the environment.

Bihar gets its first SCADA-DMS system (& it monitors power)

Power has been identified as a priority sector in Bihar and the state government has taken multiple initiatives to achieve self reliance and 'Power for all' by 2018-19 through capacity addition and strengthening the transmission & distribution network.

This has led the government to implement a SCADA-DMS project which will monitor power, ensure 24/7 availability, eliminate voltage fluctuations, deliver efficient services, and help in indexing of consumers and quick fault identification.

The SCADA-DMS project for Pata city was undertaken by Council's lead partner Schneider Electric and was inaugurated recently by Nitish Kumar, CM, Bihar.

Scope of work

The project's scope includes the data centre, DMS (Distribution Management System) control centre, grid modernisation, automation of existing and new substations, RMU automation, telecom network, integration of GIS mapping, efficient exchange of data from and to customer care, and billing.

The project will modernise Patna's electric distribution network by deploying a Smart Grid and implementing the advanced SCADA-DMS system for managing 53 substations of 33/11 kV, 250+ feeders, 305 Ring Main Units for distribution power reliability and 550 Fault Passage Indicators on the overhead lines.

The benefits include centralised monitoring of all 53 substations across Patna and power outages due to line faults being known instantly at the Control Centre. Interestingly, the project offers visual and audible alarms based on the real-time network condition. In addition, the SCADA will give historical storage of data for long periods for analytics; remote switching operations; reduced power outages and supply of reliable and quality power to consumers.

The project will effectively reduce network losses with feeder reconfiguration and load balancing, optimal network management for network's long life as well as improved safety and reliability of the network.

Benefits

For residents of Patna, the benefits include: quality power and 24/7 availability; no voltage fluctuations; safety and reliability to eliminate accidents; efficient services and billing; modern customer care and billing centre integration; enablement to manage distributed energy resources (rooftop solar/net metering) and enabling customers to participate in demand response.

For the Bihar discom, the benefits comprise reduced power losses (AT&C loss); better financial health; lesser breakdown, better revenue protection and reduced outages

(improved SAIDI & SAIFI), mapping and indexing of consumers; efficient and effective energy control; quick fault identification and resolve to reduce revenue losses from ENS (Energy Not Supplied); modernisation of assets; geographical mapping of network; skilled and trained resources; and capacity to meet rapidly-growing power demand.

In addition, the introduction of new Smart Grid technology starting with the SCADA distribution system will enable future proof smart grid technology such as self-healing, renewable integration, demand response, smart metering and outage management and safe and reliable power to fuel industrial and commercial growth, all leading to satisfied consumers and citizens in Bihar

Mumbai Metro installs structural health monitoring system (it´s India´s first)

Aging, deterioration and extreme events like earthquakes and hurricanes can take a toll on roads, bridges and other structures.

Damage and defects are often invisible.To alert the authorities to potential problems and even impending catastrophic failure, the Mumbai Metro One has commissioned the world's first real-time advanced Structural Health Monitoring System (SHMS) for Asia's tallest cable-stayed bridge across Western Express Highway (WEH).

The system has been supplied, installed and monitored by an Indian subsidiary of a company from Switzerland, Mageba, a world leader in cable-stayed bridge monitoring systems. It monitors the health of the bridge on a real-time basis.

How it works

The bridge's surveillance system is an assembly of 25 sophisticated high-class electronic sensors which are imported from Europe and installed at various strategic parts of the bridge for the purpose of continuously measuring and recording critical physical parameters, and consequently assessing the actual conditions of the structure.
The SHMS generates an alarm if any of the determining critical structural parameters are exceeded beyond the threshold. It makes use of natural frequencies of the cable-stayed bridge to provide valuable knowledge about the structural condition.

The ROBO®CONTROL permanent system is equipped with electronic devices — cable accelerometers, tri-axle accelerometers, inclinometers, displacement sensors, laser deflection sensors, strain gauges, structural temperature sensors, wind direction & intensity sensors, air temperature & humidity sensors and a data acquisition system.

The data is dynamically acquired in order to analyse vibrational behaviour. The data so collected is evaluated online and representative results are transmitted to the monitoring server. The data transmission from the monitoring system is realised via Internet technologies. There will be a permanent control room in the WEH Metro Station for this. However, the system can also be accessed digitally from everywhere in the world.

The technology has been designed by France-based Systra, proof-checked by TUV, Germany; the system supply and construction has been done by VSL, and real-time monitoring is carried out by Mageba.

See how smart sensors are clearing the path for emergency vehicles in Bengaluru

According to a study by Los Angeles-based cardiologists Dr Seymour Cole and Dr Eliot Corday, the chance of survival of a cardiac arrest patient reduces from 42 per cent to 7 per cent in just about four minutes.

A quick emergency response time depends on how soon a patient can be moved to a medical facility.

However, emergency services have been severely constrained in Bengaluru, with the city's traffic situation worsening each year (over 1.5 million vehicles on the road, growing at a rate of 7 to 10 per cent annually). But all that has changed now.

Vigilante Technologies, a Bengaluru-based firm, has developed an Emergency Vehicle Pre-emption System (EVP) that senses the location of emergency vehicles at traffic intersections and clears the path by turning the signal green. The company has installed traffic-sensing devices in more than 300 intersections which will make Bengaluru the first Indian city to be equipped with a traffic pre-emption system.

What is Traffic Pre-emption?

Traffic pre-emption is a system that gives priority to emergency vehicles depending on the location, or the direction in which they are heading. The speed and various other parameters are gathered from sensors mounted on traffic signals. Upon detecting the presence of an emergency vehicle, the sensors trigger the signal to turn green. This ensures that the emergency vehicles like ambulances or fire trucks are able to get a free passage through dense traffic intersections.

How it works

The traffic-sensing devices are installed at every intersection, and another is embedded in the emergency vehicle. Here the installed devices interact with each other. The device at the intersection can detect an emergency vehicle approaching from 800 metres up to one kilometre. Once detected, the signal doesn't immediately turn green. Doing so would result in a chaotic situation.

The entire process is based on an algorithm, and it is designed in such a way that it knows where the ambulance is heading, and the exact time of approach. Various parameters could be attributed to that: speed, direction, latitude, and longitude. The pre-emption can be initiated at a particular distance from the junction. This makes the technology completely user provisional — it can either be run from a local traffic intersection, or remotely from a traffic control centre.

In fact, if there is more than one emergency vehicle at an intersection, the device installed at an intersection is capable of simultaneously handling up to 15,000 vehicles at one time. Provisions can either be made on a first-come-first-serve basis, or a higher priority can be

assigned to ambulances, or to fire response services. All this can be controlled remotely from a traffic control centre, depending on the incident reported. So, if there's a fire incident, high priority can be given to fire response units.

Once the system is set up, the entire operation is automatic — with little or no human intervention. Also, there's no third party involvement of cellphone network providers, or radio network providers.

The technology

The core of the system is GPS-based. Vigilante adds its own proprietary algorithms to make sure that the GPS is as optimised as possible — making the system more efficient, compared to the commercial GPS available on cellphones.

The software has been developed by Global Traffic Technologies, a US-based company having experience in dedicated, priority-controlled signalling equipment. These systems have already been installed in more than 2,800 cities across the world.

Surat Smart City set to take off with 24x7 water, LED lights and ITMS

Come June 25, Surat Smart City Development Ltd (SSCDL) is all set to begin a pilot demonstration of the SMArtCity Centre (SMAC), an Integrated Transport-Mobility Administration Centre (IT-MAC) and a slum redevelopment project on public-private partnership (PPP) basis comprising 4,350 units of affordable housing. The three pilot projects are amongst the six 'quick-win' envisaged by SSCDL.

Meanwhile for SMAC, the Surat Municipal Corporation (SMC) has already roped in IBM to provide the operating system for the centre. SMC has developed a GIS platform with 12-13 layers for the project.

With the implementation of this pilot project, SSCDL will be able to monitor traffic movement, control the smart street lighting system and maintain a bird's eye surveillance of the city from the SMAC. This centre will collect functioning information of all the departments and public on a real-time basis, as far as possible.

Automated sensors and systems will send various data sets to the SMAC, which will be analysed to avail important information to make decisions. It will help all the departments in maintaining civic service delivery standards on a day-to-day basis.

Meanwhile, SSCDL, a Special Purpose Vehicle (SPV), is in the process of preparing a detailed project report as per the implementation plan given in the Smart City Proposal (SCP). As per the SCP, implementation of projects have been prioritised and bifurcated in a phased manner for the next five years from year 2016.

"After finalisation of DPR, tenders will be floated immediately according to the given implementation plan of SCP," says Milind Torwane, Chairperson & Interim CEO, SSCDL.

Other 'quick-win' projects in the pipeline are: fibre-to-home in the Pan-city project, smart (mechanised) parking at different locations, CCTV surveillance project (augmentation of existing facility) and bio-gas generation from organic waste.

As far as funds are concerned, the SPV has already received a Central government grant of Rs 194 crore and a state government grant of Rs 100 crore which will be utilised for Smart City projects under SCP as per mission guidelines.

Meanwhile, work has begun on the use of renewable energy under the SCP. About 25 per cent of the municipal corporation's annual power requirement of 80 megawatt is self-generated through renewable energy sources such as solar and wind.

While the Gujarat government has recommended PricewaterhouseCoopers and Tata Consultancy Engineering for Information and Communication Technology (ICT) based solutions and infrastructure aspects of the smart city project, SMC has also been working with its own consultants such as Multimedia Consultants for water supply and MWH for sewerage management.

According to Jagdish Thadani, Engineer, SSCDL, “Talks are on for consultants for various retrofitting development areas. So far, SSCDL has partnered with Surat Agricultural Produce Market Committee for implementation of a biogas plant on a PPP model.”

Pan and Area-based development

As per the current plan of SSCDL, the SPV has envisaged an ambitious target of 24x7 water supply to the entire city area of 326 sq km by 2020, up from the current 19 sq km. It is expected that the city may see some headway later this month as far as the implementation process is concerned.

Under the Pan-city smart solution, the proposal looks to implement systems and services that cater to transport, mobility and connectivity. These include the Surat Integrated Transport-Mobility Administration Centre, automatic fare collection system, S-Connect Card Management System, fibre-to-home Wi-Fi connectivity and the SMAC.

For Area-based development, retrofitting smart solutions are to be implemented for 24x7 water supply, smart metering and quality, LED streetlights with seasonal timers, use of renewable energy sources, logistics park, incubation centre, skywalks, smart parking, recycle/reuse of waste water and affordable housing under the Smart Cities Mission.

IBM transforms Rashtrapati Bhavan into a smart township with smart city solutions

IBM said that it has deployed Smart City solutions for the digital transformation of the Presidential Estate, which is also known as the Rashtrapati Bhavan.

Spread across 330 acres of land and home to over 5000 residents, the Presidential Estate is adopting IBM's technology and solutions to become future ready. The Intelligent Operations Center (IOC) addresses challenges that are inherent to townships - water supply, security, electrical infrastructure and solid waste management. T

IBM said that the transformation of the estate into a smart township is customized to further enhance the efficiency of critical infrastructure and utilities.

IBM said that its IOC helps collect and make sense of the rich data streaming in from several sources within the Estate to provide actionable insights. It offers integrated data visualization, near real-time collaboration and deep analytics to help enhance the ongoing efficiency that will improve the efficiency of services for its residents.

A Citizens Mobile App, created by IBM IOC, was also launched, which allows residents to report issues using the web and mobile. The data from reported observation will be supplied to city offices, where they can use the insights to make informed decisions.

"Rashtrapati Bhavan is an iconic representation of India's Smart City vision. It is a proud moment for all of us and the beginning of a great journey. We are honored to be their partner in enabling this transformation." said, Vanitha Narayanan, MD, IBM India.

As a part of this strategic engagement, IBM developed the vision and detailed roadmap for the transformation of the Presidents estate into a smart township.

The company has created the business architecture and operating procedures, implemented the technology platform and solutions, and is managing the entire technology deployment.

Smart e-rickshaws deliver affordability & last mile connectivity (City commuters will thank you for it)

Any viable last-mile connectivity option needs to take easy availability, frequency, time and cost incurred in the last mile, ease of walking from the stops/stations, and other factors into account. From that perspective, while feeder services exist in various cities, their services are limited to a few and select stations, and they don't ply at the desired frequency, thereby limiting their use.

This issue will resonate with users of the Metro rail across cities like New Delhi, Gurgaon, Chennai, Bengaluru or Mumbai. While there have been efforts to address this problem, most have been experimental in nature or have been bogged down by legal and safety issues such as in the case of two-wheeler taxi services.

That's where the Smart Electric Transport System (Smart-E), a new e-rickshaw solution, fits in. An initiative of Treasure Vase Ventures (TVV), Smart-E not only aims to solve last-mile connectivity, but also addresses other aspects such as commuter safety, reduced pollution, and empowerment of people from lower socioeconomic backgrounds. The Smart-E is up and operational in the National Capital Region (NCR) since October 2015.

The launch of Smart-Es in Delhi in October 2015 saw commuters availing the transport service regularly and word-of-mouth publicity saw Smart-E gaining popularity. The result was that Smart-E had business development discussions lined up. Six months later, Smart-E expanded its services to Gurgaon.

This is when the Central government saw a viable potential solution in e-rickshaws to reduce the city's pollution and this was instrumental in bringing an amendment to the Central Motor Vehicles Act that same year. It laid down all the necessary rules, regulation and policies to encourage the use of electric vehicles.

Today, Smart-E plies in West Delhi Metro stations, and all through the Rapid Metro stations in Gurgaon. So far 5,00,000 commuters have availed its services. However, with a strong focus on expansion in the NCR region, Treasure Vase Ventures hopes to expand the size of its fleet from the current 80 vehicles to 1,000 and reach a milestone of achieving 100,000 rides a day by the end of 2016. And if talks with other governments prove fruitful, Smart-E will make its debut in five other states.

The Smart-E model is a hybrid between Meru and Uber. The company does not own the asset, in this case, the e-rickshaws. It ensures that the drivers are trained, arranges parking infrastructure, and builds a network of charging stations. The entire process will be micro-

managed — from details such as routes, timings, and even the battery to be used in the vehicles.

Another interesting aspect of Smart-E is that it aligns itself with the 'Make in India' initiative. These electric vehicles are custom-manufactured. They are also equipped with GPS and CCTVs, addressing the issue of commuter safety. The timings of the e-rickshaws are synchronised with the Metro rail timings to minimise waiting time for commuters. The Smart-E operational design has passenger safety at its core, and at no time can more than four passengers ride in a vehicle. The fare too is affordable — Rs 10 for the first pit stop, and Rs 5 for every km, thereafter.

Techno-feasibility

The motor power used in most e-rickshaws is 650 W to 1,250 W. The Smart-E requires four batteries of 12 V with a cumulative battery capacity of 48 V (Amp = 60-100 Ah, kWh = 2.88 to 4.8 Kwh), which costs around Rs 17,000 to Rs 21,000. The battery life is around six months and weight of a single battery is around 20-25 kg. After expiry, the batteries are sold back to the battery dealer and the Smart-E drivers get a rebate of 20 per cent on the newly bought batteries.

In fact, it is expected that within one year, most of the e-rickshaws will start using lithium-ion batteries. At present, Kinetic Green Energy and Power Solution is developing lithium-ion batteries and will soon start its production.

The current batteries can power the e-rickshaws for 40-80 km, per full charge. It takes 6 to 8 hours for fully charging a battery (the capacity of charger is 220-240 V, Amps: 0-30 A, Watt: 0-7.2 KW).

Advantages

These vehicles are environment friendly and are emission free. At present close to 50,000 e-rickshaws ply in Delhi and the NCR region. Considering the distance travelled by a Smart-E in a single day to be 70 km, these vehicles reduce CO_2 emission by 82,198 tonnes annually. The numbers of these vehicles are expected to increase five-fold by 2025; the potential annual saving from reduced carbon emission can increase up to 821,980 tonnes.

As the vehicles run on a battery, noise pollution is avoided. For commuters, as mentioned earlier, these vehicles provide last-mile connectivity from residential colonies to main roads and Metro stations which are not well connected by other modes of transport.

These vehicles are also easily available and are more economical compared to auto-rickshaws and cycle- rickshaws, for distances up to for 2 to 3 km. Most tourist spots like Akshardham, Red Fort and India Gate also have Smart-E connectivity.

Usage of these vehicles can reduce the gas import bill. Conversion of one lakh auto rickshaws to Smart-Es would reduce the country's oil/gas import bills by more than Rs 2.78 billion annually, which can increase to the tune of Rs.13.94 billion annually by 2020.

Bhopal smart city development corp to initiate fast-track projects

Fast track projects focussing PAN city development would be initiated first by Bhopal Smart City Development Corporation Limited (BSCDCL). Company that would drive the Bhopal Smart City project held its first board of directors meeting on Monday.

As many as four request for proposals (RFP) relating to intelligent street lighting, city level geographic information system (GIS), smart city command centre and GPS based tracking of vehicles was approved.

BMC officials expect to finalize and launch two projects by June 25. It would coincide with first anniversary of the launch of Union government's smart cities mission project.

"We are first targeting PAN city projects that would connect people and involve them in smart city mission. By April first week we expect to appoint consultants for and detailing of area based development at Shivaji Nagar," said newly appointed BSCDCL CEO Chandramauli Shukla.

BSCDCL chairman district collector Nishant Warwade, BMC commissioner Tejaswi Naik, BSCDCL CEO and BMC additional commissioner Shukla and two representatives of the urban development department representatives attended the board meeting.

BMC Mayor and Bhopal Development Authority chairman, form the total seven members of the company. An eighth member to be proposed by BMC Mayor would be appointed to the BSCDCL board. The proposal would be formalized in the second meeting of the board.

Madhya Pradesh, Rajasthan set up Special Purpose Vehicles for Smart Cities

Madhya Pradesh and Rajasthan have set up Special Purpose Vehicles (SPVs) for the development of Smart Cities.

"The Ministry of Urban Development has been informed that SPVs have been set up for Jabalpur, Indore and Bhopal in Madhya Pradesh and Jaipur and Udaipur in Rajasthan," an official release said.

These cities are among the first 20 to bag Smart City challenge competition announced on January 28 this year.

The Ministry has also been informed that SPVs for the remaining 15 cities will be formed in the next two weeks, the release said.

The Ministry will release Rs 200 crore for each of the 20 selected cities only after the SPVs are set up.

SPVs are required to be set up under Smart City Mission Guidelines to ensure timely and efficient execution of plans.

Besides mobilising resources from various sources, SPVs will approve, sanction and execute the projects.

Madhya Pradesh has set up a 12-member SPV for each of the three cities, while Rajasthan has set up a 11-member SPV for Jaipur and a 13-member body for Udaipur.

Kohima moves slow- ranks 60- on Smart City drive

With an overall score of 893 out of 2000 points, and categorized as a “slow mover” ranking 60 out of 73 cities in India surveyed for cleanliness, Kohima’s dreams of becoming a Smart City may require a rejig from all stakeholders.

The ranking is part of the ‘Swachh Survekshan-2016’ survey, the results of which were announced by the Urban Development Minister M Venkaiah Naidu today at a media conference in New Delhi.

According to the Ministry, 53 cities with a population of above ten lakhs each and 22 capitals that do not have that much population were selected for the survey.

The survey deployed 25 teams of 3 trained surveyors each to visit 42 locations in each city covering major zones like railway stations, bus stations, religious places, major market places, planned and unplanned residential areas including slums and toilet complexes.

A total of 2000 points at the upper end comes from three sources: Service level status data (1,000), independent observation (500) and citizen feedback (500).

Regarding methodology used for Swachh Survekshan-2016, Naidu informed that out of a total of 2000 points, 60% were assigned for solid waste management related parameters, 30% for construction of toilets and 5% each for city level sanitation strategy and behavior change communication.

Naidu said that all the 73 cities were informed sufficiently in advance so as to make available documentary evidence of their efforts towards improving sanitation and for verification by survey teams. Over one lakh citizens responded with feedback on cleanliness in respective cities making the survey of 2016 “thorough, professional, evidence based and participatory.”

Overall Ranking

Overall, Mysuru in Karnataka remained the cleanest city in the country scoring 1749 points out of 2000, while Dhanbad in Jharkhand came at the bottom with 464 points.

The top performing city in the North-East is Gangtok, at 8th rank, while Imphal at 15 showed the biggest improvement in the region. Arunachal Pradesh capital Itanagar scored the lowest in the NE at 71st position.

According to the scores, 15 cities that scored more than 70% of the total 2000 were categorized as Leaders, 20 cities with scores in the range of 60%-70% as Aspiring Leaders, those with scores in the range of 50%-60% are cities that need to accelerate their efforts and cities that scored below 50% (in which Kohima figured) were named 'Slow Movers' that need to work harder to improve sanitation.

The top 10 cities in terms of sanitation and hygiene are: Mysuru, Chandigarh, Tiruchirapalli (Tamil Nadu), New Delhi Municipal Council, Visakhapatnam (Andhra Pradesh), Surat, Rajkot, both in Gujarat, Gangtok (Sikkim), Pimpri Chindwad and Greater Mumbai, both from Maharashtra.

The bottom 10 cities are: Kalyan Dombivili (Maharshtra), Varanasi, Jamshedpur (Jharkhand), Ghaziabad (UP), Raipur (Chattisgarh), Meerut (UP), Patna (Bihar), Itanagar (Arunachal Pradesh), Asansol (West Bengal) and Dhanbad (Jharkhand).

Kohima: A slow mover

As per data provided on the website (https://gramener.com/swachhbharat), Kohima, with an overall scored of 893, ranked 60 overall.

The ranking of Kohima seems to have suffered most on parameters of service level status. The city scored low in all variables such as Public & Community Toilet Provision, Processing and Disposal of Waste Management.

Out of 400 points allotted for waste management in the form of door to door collection, sweeping collection and transportation, it could score only 95 points, which raises grave concerns for the quality of life people lead in Nagaland State's capital.

Most appallingly, for sanitation, it could manage only 60 points (out of 300) with provision for community and public toilets suffering the most.

In variables related to communication such as Information, Education and Behaviour Change Communication activities it performed relatively better scoring 30 out of 50.

However, on ranking by independent observers and citizen feedback, Kohima scores improved, bagging the 43 and 33 positions respectively.

Talking to media today, Naidu said the survey was made public in order to foster a "healthy competition among cities" as everything that gets measured gets done and competition makes one strive better.

The stakeholders in Nagaland State should take the words to heart and change their strategy.

Coimbatore Corporation to form SPV to implement smart city projects

The civic body gears up to form a special purpose vehicle (SPV) which will be a public limited company that will plan, appraise, approve, release funds, implement, manage, operate, monitor and evaluate the Smart City development projects. The SPV will have a chairperson who would be the municipal commissioner or the district collector and headed by a full-time CEO who would be appointed. In a meeting held at Chennai on Friday, the city corporation commissioner has been instructed by the central government to form the SPV as soon as possible after which funds would be released by the ministry.

The meeting was held for the 12 corporations from the state that had submitted the smart city proposal. The other corporations who did not qualify in the first round were asked to rework their proposals and submit them.

As per the ministry, Coimbatore's proposal not only gave a new identity to the city but also promoted non-motorised transport and projects that preserved and developed its open spaces. Moreover, it also detailed out the various central government and state government schemes that could be used for implementing the smart city project. Sources at the corporation said that as per the suggestions, Coimbatore's biggest challenge was its traffic congestion and preservation of lakes. With the 35km NMT corridor the traffic issue was dealt with and rejuvenation of lakes was also focused, said a corporation official.

While details about the SPV were not read out, corporation officials have received the guidelines on how to form it. The SPV will have nominees of the central and state government and corporation office. Several stake holders will be involved and corporation could opt for a private public partnership as well but such that 50% of the stakes are with the civic body. Then the company will be registered and detailed project report for the various projects that were listed out will be prepared and tenders will be floated.

"We will form the SPV soon and hold a meeting with the stake holders soon," said the corporation commissioner, K Vijayakarthikeyan. After the SPV is formed, Rs194cr will be sanctioned by the ministry and Rs100cr will be released by the state government. Equal amount will have to be raised by the civic body. After the funds are gathered, the civic body could take loans facilitated by the ministry from world bank or Asian development bank as well or opt for private public partnership.

At the state level as well a State level High Powered Steering Committee (HPSC) will be formed chaired by the chief secretary and a smart city advisory forum will be established at the city level.

Navi Mumbai, third cleanest city in India on its way to become an “Ideal Smart”

Since independence, the decision to build a new city on the mainland across the harbour was for a specific purpose: to decongest Mumbai, an island city whose physical expansion had a limit. It was also earmarked as an alternate haven for the multitudes that thronged to Mumbai from all over India. This decision required the State Government to exercise the matching, politically speaking, hard option to relocate its seat of governance along with all its important offices to this new city, and completely stop the back bay reclamation project in the island city. And with Navi Mumbai Municipal Corporation (NMMC), the following has been achieved:

• High per-capita income and cosmopolitan population
• Higher education institutes- Engineering, Management and Medical
• Major industrial area across Thane Belapur Road
• Biggest trading APMC
• Part of the Proposed Knowledge Corridor
• Two big InfoTech parks and the presence of major players in these parks and outside
• Planned Urban Development
• Picturesque coastal area and the lush Parsik Hill
• Local dialling with the commercial capital

In the first week of December, 2015, the Municipal Corporation of **Navi Mumbai (NMMC)** and European Business and Technology Centre (EBTC) signed an MoU to develop Navi Mumbai as a Smart City. The **Navi Mumbai (South) Smart City Project** to be develop by CIDCO at an investment worth INR. 53,000 crore. The MoU was signed at the launch of the Navi Mumbai (South) Smart City Project by the EBTC Director Poul V Jensen. This involvement the introduction of the **EU-India Smart Cities project** details and innovative programs which will provide a practical platform of support for the smart city project. The Maharashtra Government will this first smart city around 120 sq. km area in Navi Mumbai, and will include brownfield projects (developing on existing facilities) including Panvel, Dronagiri, Kamothe, Kalamboli, Kharghar, Ulwe and Taloja nodes, and a greenfield project in Pushpak Nagar (2.5 sq km) near the airport, before 2019. CIDCO has launched the **Navi Mumbai Smart City Project** with an initial cost of INR. 2,033.14 crore. It has proposed the construction of affordable housing, development of the port city, and the construction of the metro railway network. It will also include the provision of basic infrastructure on an investment of Rs 32,744.26 crore. For this, CIDCO has tied up with other companies such as Accenture, Stockholding Corporation, SAP and Zensar.
The **smart city project** will include 88 sub projects for organisation in areas of e-governance, new technology for waste management, urban renewal and development of gardens and playgrounds with prime insistence on environmental sustainability. "The cities will be ready by 2019 and are being created to cater to the 8.4 lakh jobs that will be created on account of the several infrastructure projects worth Rs 50,000 crore. Many of them are

already past the tender stage," said CIDCO managing director Sanjay Bhatia. The infrastructure projects include the international airport, the fourth container terminal at JNPT, new railways, metro, highways, etc.
Navi Mumbai South, which comprises seven nodes, currently has a population of six lakhs. "The infrastructure (see box) that is being laid out will cater to a population of 20 lakhs, a majority of residents being high net worth individuals. The high point of this financially and environmentally sustainable city will be the quality of life it will offer," said V Radha, the joint managing director, CIDCO.

CIDCO has extensive experience in laying infrastructure and planning townships like Navi Mumbai. CIDCO's work on the smart city project commenced a year ago and several infrastructure projects are well underway. It is time to wait and watch, if the commitments of 2019 are met with

Tiruchirappalli – A journey from “clean city” to “smart city”

Tiruchirappalli also called Trichy is the fourth largest city of Tamil Nadu. The transportation centre of the state, this city has been ranked first among 12 cities selected from Tamil Nadu. Jones Lang Lasalle Consultants have been entrusted with the responsibility of assisting the civic body in formulating the Smart City Challenge Mission Proposal.

It is the fourth largest municipal corporation and the fourth largest urban agglomeration in the state which is located close to the geographic centre of the state. Each city has to formulate its own unique vision, mission and plan as part of the smart city challenge. Only 24 cities would be eligible for funding in the first year based on their proposals. Tiruchirappalli City has been selected on the basis of basic infrastructure such as water supply, electricity, sanitation, waste management, transport, parking, energy, housing, IT solutions, safety and security. An integrated bus stand, improved underground and storm water drainage system, better public transport system topped the list of requirements from the city’s residents. The smart city vision as described by the city is;
“Transforming Tiruchirappalli, the heart of the state’s transportation network into the ‘Transportation Hub of Tamil Nadu’ with state-of-art infrastructure, enhanced inter and intra city connectivity and excellent quality of life with clean, green, safe and pedestrian friendly environment, taking inspiration from its cultural and historic heritage to create a strong economy based on Tourism, education and industries””

Broad classifications under preferences are as follows:

Area Preference:
• Thillai Nagar, Rockfort – 55%
• NSB Road, Puthur – 20%
• Urayur, Ammamandabam– 20%
• Other Areas – 05%

Pan city solutions:
• Physical Infrastructure – 33%
• Urban Mobility and Public Transportation– 32%
• Waste Reduction – 15%
• Other Sectors – 20%

Areas for retrofitting:
• Rockfort
• Thillainagar
• Gandhi Market
• Urayur
• Ammamandapam

A detailed survey was conducted to highlight issues specific to the above mentioned areas. Respective solutions, efficient and suitable, adorn the proposal brief as submitted by the city.

Ipv6 Smart Energy and Smart City Network in Kolkata

CESC and Silver Spring Networks collaborate to deploy Ipv6 smart energy and smart city network, enhancing reliability and efficiency in Kolkata and beyond.

A collaboration between Calcutta Electric Supply Corporation (CESC Limited) and Silver Spring Networks to deploy an advanced, multi-application smart energy and smart city network in the city of Kolkata is expected to raise the bars for the subcontinent. Gaining mileage from the their successful Advanced Metering Infrastructure (AMI) and Distribution Automation (DA) demonstration project, this collaboration creates a framework to extend Silver Spring's globally proven IPv6 / 6LowPAN networking platform throughout CESC's service territory. The initial phase of the deployment will connect approximately 25,000 customers and automate CESC's electricity distribution grid. Silver Spring's proven-at-scale, standards-based platform will help ensure that CESC is able to provide the highest quality of services to its customers at the lowest risk.
"Silver Spring's multi-application networking platform demonstrated the reliability and high-performance CESC requires to extend our smart energy and smart city leadership and become India's top performing utility," said Sanjiv Goenka, Chairman, CESC. "The versatility and flexibility of Silver Spring's IPv6 networking platform helps enable CESC to reduce costs, improve reliability, and unlock even more benefits for our customers. Silver Spring's proven platform is deployed at utilities around the world and in cities such as Chicago, Copenhagen, Glasgow, Miami, Paris, San Francisco, Singapore, and Washington DC, and we are especially proud to lead Kolkata's critical infrastructure network into the ranks of these iconic locations."

"We are honored to work with a market leader like CESC. Their track record of performance and operational excellence will create a new standard in India and beyond. This program helps benefit all segments of CESC customers through increased grid reliability, improved efficiency, and greater customer satisfaction," said Eric Dresselhuys, Executive Vice President and co-founder, Silver Spring Networks. "Silver Spring's secure and resilient standards-based network will also help CESC achieve long-term success by establishing an open platform upon which additional smart energy and smart city applications and services can be quickly and cost-effectively deployed in the future."
The parties have signed a memorandum of understanding (MoU) to collaborate in offering smart grid and smart city services to other organisations in West Bengal and throughout India. By combining CESC's demonstrated operational excellence and Silver Spring's globally proven technology platform, the parties intend to bring the many benefits of networking infrastructure to an even wider segment of the market.

Silver Spring's IPv6 networking technology allows utilities of all sizes to implement a wide range of smart grid applications using a common network platform. Silver Spring has

pioneered the adoption of IPv6 networking technology, ensuring interoperability to help deliver higher quality, lower costs, and better overall value.

Mall Road, Moti Jheel are hotspots areas for growth in Kanpur'

There are many reasons why Kanpur is the city of promise. It's not just the largest city of Uttar Pradesh, but the fifth largest in India by land area, the 10th most populous urban agglomeration and the second largest industrial city of the Hindi belt in northern India. What's more, it is one among the 12 cities shortlisted from the state under the '100 Smart Cities' mission and is also a major city in the 'Swachh Bharat Abhiyan'.

Umesh Pratap Singh, Municipal Commissioner, Kanpur Municipal Corporation (KMC), shares more on upcoming projects in the city along with other initiatives.

Tell us us about the Corporation's contribution to the Swachh Bharat Abhiyan?

We are contributing to this mission in the following ways:

- Deployment of sanitation workers to clean the *Ghats*, major important lanes and roads through outsourcing.
- Sanitation drives in association with district administration, NGOs and RWAs; to motivate them, cash prizes have been announced.
- Plantation work in green belts, renovation of parks, footpaths and rubbish platforms.
- Proposals to construct 25 community toilets (10 seats each), renovation of dhobi ghats, construction of electric crematoriums to NMCG or GoUP.

Which areas would you list as hotspots of growth within the city? What challenges does a corporation face?

Areas of growth include Mall Road, Naveen Market, Moti Jheel, Ganga Barrage, Ghantaghar and Kanpur South. Key challenges faced by the Corporation include coordination among different departments engaged in development works; non-cooperation of the general public and politically motivated people in some areas; and lack of funds and staff or manpower in planning and executing works.

What are the corporation's efforts towards Clean Ganga? Which projects are in the pipeline?

Continuous efforts are being made by KMC towards Clean Ganga. Eleven volunteers have been given identity cards to educate the people and devotees coming to Ganga regarding pollution, sanitation and safe water.

Projects include:

Projects sanctioned: Sewerage works in Sewerage Distt-I; cost: Rs 370.40 crore; administrative approval awaited; under tendering process; date of completion of project: 45 months from date of approval.

Projects submitted for sanction to NMCG: Sewerage works in Distt-II, Part-A, Zone-1 worth Rs 156.82 crore; and sewerage works in Distt-II, Part-A, Zone-2 worth Rs 155.07 crore

Projects submitted for sanction to SGRCA: Sewerage works in Distt-II, Part-B worth Rs 44.60 crore; sewerage works in Distt-III, Zone-2 worth Rs 294.28 crore; and sewerage works in Distt-III, Zone 3, worth Rs 499.78 crore.

What are the developmental measures undertaken by the corporation for drainage, sewerage and street lighting?

Nallahs and drains of 20.13 km (a total of 61) have been constructed, amounting to Rs 2,3.46 crore. Along with the five sewage works mentioned above, 1,006 new poles and 149 tower poles have been erected in the city to improve the street lighting. Additionally, 9,201 sodium fittings have been installed in different areas on poles with no fittings.

Tell us about any other landmark ongoing or upcoming major infrastructure projects. Of these, are there any tenders to be floated in the near future?

One major upcoming project is the metro rail. Along with this, the Kanpur Development Authority (KDA) is renovating the musical garden. Other upcoming developments by KDA include the riverfront development of Ganga, development of an SEZ on the left bank of the river, beautification and underground parking facility at Phoolbagh and integrated traffic management system in coordination with IITK.

How does the corporation handle solid and waste management?

A solid waste management processing plant of 1,500-tpd capacity has been established under JNNURM. Waste is being collected and transported to this site by KMC.

Tirupati set to be on international map

Five years, after the then Prime Minister Manmohan Singh laid the foundation stone for the Tirupati Airport, mere 14 km from the main city, for the proposed domestic airport seems now all set to handle heavy local and foreign heavy traffic once inaugurated.

Tirupati, which is one of the three cities, shortlisted from Andra Pradesh, under the Narendra Modi government's '100 Smart Cities' mission. The city is likely to get a booster once the new airport gets functional the international status.

The airport, which initially had a single domestic terminal, has been expanded by about 400 acres of land to accommodate the heavy traffic rush. The commencement of international operations will make it easier for pilgrims from neighbouring countries like Singapore, Malaysia and Sri Lanka to travel here, which in turn is expected to contribute to Tirupati's development into a major religious-cum-tourist hub.

Tirupati is one of the most popular pilgrim destinations in the country. The inception of the Indian Institute of Technology and Indian Institute of Science Education and Research in Tirupati has only boosted the scope for international travel and tourism, putting the city of God in the spotlight as a centre of business.

In a day, around 70,000 to 80,000 people visit Tirupati during normal occasions, and around 100,000 people during special occasions. The new building and modern facilities offer ample space for hassle-free passenger movement.

The specs

The terminal area of the airport is 22,000 sq m. "It can handle a capacity of 700 passengers (500 domestic + 200 international) at a time," says TS Chandramouli, Executive Director, Airports Authority of India (AAI).

"There is capacity to park about 350 cars." It has 18 check-in counters and four conveyors - two for domestic, one for international arrival and one at departure. The terminal has two passenger boarding bridges, four escalators and five elevators. At present, 20 movements are taking place at the airport and all the flights are connected to Hyderabad.

Smart concept

The new terminal building has been equipped with modern amenities and the shape of the airport has been evolved and conceptualised resembling an eagle in flight, channelling Garuda, the carrier of Lord Vishnu.

The new terminal has a basement through which baggage is handled. Hence, the movement of tractor trolleys on the air side of the terminal is eliminated. The canopy on the city side is 12-m wide, which protects visitors and passengers from adverse weather

conditions. The roof has a double-skin insulation, which prevents heat transfer from the outside to the interior.

It is a centrally air-conditioned building and energy-efficient electrical fittings such as LED fittings and lux-level sensors and timers for street lighting have been installed. Also, centrifugal chillers, which are the best energy-efficient chillers, and refrigerant of R134a, which is environment-friendly, have been used. Besides, energy-efficient motors have also been used.

"The building is a glazed structure that allows natural light during the day and thus, saves consumption of electricity," adds Chandramouli. This effectively reduces the load on air-conditioning and lighting during the day.

Besides the use of insulated system for the roof, sensor-controlled taps and flushing systems have been installed to control wastage of water. A sewage treatment plant (STP) has been installed to treat the sewage received from the building and the treated water is used for gardening and flushing.

Green initiatives

Knowing that Tirupati expereinces extreme summer temperatures, grass track pavers have been used in the parking lot. Besides, a green area has been developed around the building to reduce the effect of heat.

According to G Prabaharan, General Manager - Engineering, AAI, "Energy-efficient light fittings, motors are used for the conservation of electricity. Also, a building management system (BMS) has been installed to sense and control the usage of electricity for lighting and air-conditioning. New and updated fittings have been installed for fire detection and sprinklers for fire fighting."

Time, cost and clearances

The project has been constructed in 26 months. The cost of construction with infrastructure is around Rs 174 crore.

The land for the new terminal was acquired by the state government and handed over to AAI for development. Environmental clearance from the Ministry of Environment and Forest and the necessary consent from the State Pollution Control Board had been obtained for the construction.

Passenger-friendly

The building is designed to be user-friendly. All the standard equipment as per the norms of Bureau of Civil Aviation Security of India (BCAS) has been installed to ensure the safety of passengers. A sufficient number of escalators and elevators have been built for easy movement and considering the convenience of senior citizens and the differently-abled.

An instrument landing system, air traffic control tower and fire station have been installed to ensure safe landing and movement of aircraft and smooth takeoff without discomfort to passengers. Fire service personnel on duty are deputed to meet any kind of emergencies.

On becoming operational, domestic flights will start operating from the new airport. As construction work has been completed, Tirupati Airport is not far from receiving its international status.

Lucknow goes hi-tech on security

Mahindra Defence Implements Smart Surveillance 2.0 for Lucknow City in record time of six months - New System to enhance safety & Security of Citizens; improve emergency aid infrastructure.

Uttar Pradesh, India's most populated state, is home to a staggering 21 crore residents. According to a report titled Crime in India 2013, which was released by The National Crime Records Bureau (NCRB) in June 2014, Uttar Pradesh topped in the lists of various crimes and violations.

Shockingly, the report also stated that there are merely 78 policemen per lakh of people as against UN recommended ratio of 222 policemen. To add worry to woe, the police force is armed with insufficient and outdated resources that are scattered over the sprawling 2.5 lakh-square kilometre area.

Hence, there was a need for other safety measures to be implemented.

Technology to the rescue

The state government of Uttar Pradesh along with Uttar Pradesh Police conceived the use of latest technologies based on global best practices to design & implement Smart Surveillance for Lucknow City as first step to modernise the police operations for providing better safety & security to its citizens.

On 12 April 2015, chief minister of Uttar Pradesh, Akhilesh Yadav, unveiled Smart City Surveillance project encompasses 70 crossings with 280 cameras installed.

This project is titled *Drishthi* (meaning sight, in Hindi).

Interoperability of technology

Lucknow Police are now integrating CCTV cameras installed by commercial establishments with the Smart Surveillance system to ensure the entire city is covered without excessive financial pressure on the government.

“Maintaining public order, crime control and traffic management on streets would be the key focus of this project. I feel that presence of cameras will gradually bring about a positive change among people,” CM Akhilesh Yadav said, hoping for a behavioural change among the citizens. He also said that the installation of CCTV cameras would not only help in maintaining law and order but also for traffic management and crime control.

Mukul Goel, additional director general for law and order, elucidated that previously, it would have been impossible to survey mass events for lack of enough traffic policemen on the roads. Mobile surveillance vans equipped with night vision cameras have also been deployed as a part of the project and the cameras can extend up to three metres over the vehicle to capture members of a violent mob.

The specs & locales

Mahindra Defence designed and implemented the surveillance network comprising the aforementioned 280 IP CCTVs, ANPRs, Video Analytics, Mobile Surveillance System, Command Control Centre and Data Centres.
These were built with the singular objective of controlling crime in the city. The 70 locations that the project covers in Lucknow includes entry and exit points into the city along with VVIP areas as well as critical and sensitive locations.

While a total of 280 high-resolution cameras have been set up at strategic locations across the city, 40 of these have been installed with ANPR technology. Cameras have been installed with infrared technology that helps automatically recognise number plates. This feature was demonstrated by the issue of electronic challans to traffic offenders on the day of the launch.

Insights

- System involves 280 high end CCTV Surveillance cameras
- Installation at 70 Critical locations across city
- Mobile Surveillance Vehicle with IR PTZ camera installed on 3 mtrs mast & 3G connectivity to control room for display of live feed
- World Class Police Central Command & Control Centre with trained operators.
- Automatic Number Plate Recognition(ANPR) installed at entry/ exit points to city & important areas

Project design based on Global Best Practices and Technology

The benefits

"This [the Smart City Surveillance project] would be helpful in nabbing criminals, defying them and taking action against them. This will also be very useful in managing traffic violations. We have encouraged businesses to setup CCTV cameras and more than 1,000 are already in place.", said Goel.
Speaking of this revolutionary move of surveying traffic, Additional Superintendent, Durgesh Kumar, said "We can track down the vehicle owner responsible for the accident or chain-snatcher on the run with the help of ANPR if we have registration details."

Mahindra Defence along with Cisco Systems, our lead partner, have joined hands in a Rs 44 crore contract to scale this project. Cisco already has implemented a similar project in Navi Mumbai.

Achievements

- Commended as the fastest-implemented Smart City Surveillance project for by an Indian Police department.
- From the day of official launch, 500 electronic challans have been handed to traffic offenders.
- Police Control Rooms have been set up with trained personnel to monitor data captured by the CCTV cameras 24/7.

Additionally, the company's project *Dhrishthi was* selected as the winner for the category "Most Innovative City Surveillance Initiative" by the SWI Awards Jury.

Achievers Speak

SP Shukla, Group President, Mahindra Aerospace and Defence Sector, said, "The Uttar Pradesh police has set a new benchmark in getting this world class technology system operational in just six months with support from Mahindra Defence as its implementation partner. This project has been an important part of the Mahindra Group's initiative to support the government in creating Smart and Safe Cities and we are committed to partnering with the UP Police to ensure smooth running of the system."

Lt Cdr Jasbir Singh Solanki (Retd), Head-Homeland Security and Smart Cities, said, "We worked in partnership with the UP Police to deliver one of the largest and fastest Smart City Surveillance project, which has come to be viewed as a success story for the Homeland industry. This model can also be adopted by various police departments across India in order to create a safe and secure environment in our cities."

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Vice President - Ascends Pte Ltd (Fully Owned by Govt. of Singapore - (2008-11) President - Arenes Gold Souk, Gurgaon - (2011-13)
CEO - Wegmans Trustone Group, NOIDA - (2013-16)
CEO - AMRAC Advisor Pvt. Ltd (SEBI Registered AIF-II - (2016) Consultant - Andhra Bhawan, Government of Andhra Pradesh - (2016)
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About the Author:

Rajeev Chadha completed MSc. Electronics (equivalent to BE -Electronics) from Department of Physics & Astrophysics / Hindu College Delhi University and MBA (Finance) from Faculty of Management Studies, Delhi University. Rajeev has over 35 years of unique industry experience spread a cross top MNCs, Public / Private Sector organizations, Central / State Governments, Statutory bodies & Regula tor. Rajeev has provided consulting inputs to top international strategy consulting companies such as Mckinsey, Bain, BCG, GLG, PwC & KPMG a s subject expert in Infrastructure (including Rea l Estate / Smart Cities) and PPP. Rajeev is a renowned expert in Public Private Partnership space in India (a cross sectors). He is a World Bank certified PPP Expert a n d m ember of World Association of PPP Units & Practitioners.

Rajeev has been involved in infrastructure financing & advisory of over 1000+ project aggregating to £30 bn. This includes 50+ PPP Projects. 12 of these PPP Projects are at various stages of project life cycle. Rajeev has worked on range of infra projects across policy advocacy, feasibility studies, project conceptualization & planning, structuring, project mgt., monitoring a d evaluation, mid -course correction, team mgt. etc. He has worked in flagship government schemes, mission m ode projects, real estate (all as set classes), urban development (integrated townships, industrial townships, SEZs), urban infrastructure (water, power, road, sewerage, solid waste management, port, airport etc .)

Rajeev has been involved in many marquee assignments during his career. He joined Punjab National Bank as a Management Trainee in 1986. His first branch as a young Manager received the IBA best branch award in the State of UP. After the Harshad Mehta scam in 1992, Rajeev was posted at the coveted Investment Division of Punjab National Bank. Rajeev was sent as OSD to the Banking Division in 1992 to help Government of India enact the DRT Act and set up Debt recovery tribunals all over India. In 2001, Rajeev was sent on deputation to NCRPB, Ministry of Urban Development as Joint Director (Finance) where he worked extensively to develop Infrastructure in the NCR Region. In 2004, Rajeev joined State Industrial Development Corporation of Uttaranchal Development a s General Manager (Infrastructure Development). Later Rajeev switched to Private sector & worked a s CEO of two Real Estate companies in NCR. Rajeev worked with Ascendas Pte Ltd (fully owned by Govt of Singapore) which is top ranking company in Infrastructure Development in the World.

Rajeev joined PwC in 2017 and was engaged as Program me Manager and Tea m Lea der for Central Program Management Unit a t Punjab Municipal Infra structure Development Company, (PMIDC), Govt. of Punjab to drive/steer three Smart Cities i.e. Ludhiana, Amritsar, Jalandhar in Punjab. In addition to this CPMU he also supported Government of Punjab in mission m ode projects such a s AMRUT, Swachh Bharat, E -Governance and various other transformational projects across Punjab. Rajeev has done pioneering work in project finance being a tra ined professional banker. He was involved in m any Municipal strengthening assignments during his tenure at NCRPB, YAP II, and SIDCUL. At Punjab National Bank, Rajeev appraised several Infrastructure Projects and one of the first PPP projects in India , namely DND (Delhi-NOIDA-Delhi) Expressway. Rajeev ha s extensively dealt with Multilateral agencies such as World Bank, ADB, JBIC and DFID etc. Currently, Rajeev is supporting multiple Smart Cities in India taking leadership in Project Management of Infrastructure and Real Estate Development Projects, Public Private Projects and Financial Advisory to Smart City SPVs. Till date Rajeev has provided inputs to 35 Smart Cities a s Finance & PPP expert.