Perspective

Issues that matter

Microsoft

Smarter, safe and sustainable cities

Chicago
City saves $400,00 every year after 30,000 employees have switched over to Office 365

Paris
French capital banks on intelligent car sharing to cut CO2 emissions by 75mn metric tonnes by 2023

London
Integrated Transport for London website attracts 2.3 million hits/day by citizens seeking real-time insights to get around the city

Surat
Teaming up with Microsoft's CityNext, it is poised to bring all its services on one virtual platform

Auckland
Web-based apps help citizens access personalised transportation services

Washington, D.C.
A digital alliance empowers unemployed citizens, small businesses, educators and future innovators

IN CONVERSATION

Amitabh Kant
Secretary, Department of Industrial Policy and Promotion, Government of India

M.K. Das
Joint Managing Director, Gujarat State Petroleum Corporation and Former Commissioner, Surat Municipal Corporation

Prof. V. Srinivas Chary
Dean of Research and Director, Centre of Energy, Environment, Urban Governance and Infrastructure Development, ASCI

Creating a real impact for a better tomorrow

Devesh has developed a groundbreaking solution, which at first maps a child's actions, and then analyses that data to create apps and interactive games that enhance learning abilities in dyslexic children. This innovative solution won Devesh's team the Imagine Cup national finals. Imagine Cup, a global technology competition, is a YouthSpark initiative that offers students a platform to use their creativity and knowledge to help address the world's social challenges.

Our YouthSpark programmes are aimed at empowering youth to imagine new possibilities and realise their full potential. We work with governments, academia, nonprofits and businesses to provide youth with the education, skills and opportunities to be successful.

To know more about Microsoft's initiatives, visit **www.microsoft.com/india/about**
Find us on: **www.facebook.com/microsoftindia** and **www.twitter.com/microsoftindia**

Microsoft

Cities look up to a smarter future

With the Union Government underlining its commitment in the 2014-15 Budget to setting up 100 'smart cities' across the country, sustainable urban renewal powered by citizen-friendly technology is back in the forefront of the national agenda. This edition of Microsoft's *Perspective* magazine therefore couldn't have been timelier, for it takes a bird's eye view of how smart technology is empowering cities, in India and around the world, to take on urban challenges that have snowballed because of population pressures and over-consumption of our planet's finite resources.

The highlights of this edition are three interviews with people who have a deep understanding of strategies for the sustainable development of our burgeoning cities. Having been the man responsible for flagging off the Delhi-Mumbai Industrial Corridor, the country's first 'smart city' initiative, the present Secretary in the Department of Industrial Policy & Promotion, Mr. Amitabh Kant, makes a strong case for India adopting a model of developing "compact, dense and vertical cities" powered by digital technology and a well-oiled public transportation system.

Whereas Mr. Kant provides a global overview, Surat's former Municipal Commissioner, Mr. M.K. Das, an expert in urban governance having also held key positions in the Vadodara and Ahmedabad municipal corporations, explains how digital technology has ensured 24x7 water supply to all residents, streamlined public transport and made government appointments transparent by effectively deploying digital technology.

Surat is India's first city to align with Microsoft's global sustainable urban renewal initiative, CityNext. In the words of Mr. Das, the municipal administration took this step to provide citizens with "an additional layer of comfort" by being able to "deliver all our services under one virtual roof, which can be accessed online from any part of the world." And just in case you are wondering what CityNext is all about, turn to the *Inside View* of Microsoft India's Director, Industry Solutions, Vikas Aggarwal on this worldwide initiative that enables city governments to leverage existing infrastructure and smart innovations to engage with citizens and address their aspirations even with their dwindling resources and over-stretched capacity.

An urban renewal expert with years of experience, Prof. V. Srinivas Chary, Dean of Research and Director, Centre of Energy, Environment, Urban Governance and Infrastructure Development, Administrative Staff College of India, enriches this discussion by offering an overview of the many replicable smart technology-enabled solutions developed by city governments to plug leakages in power and water supplies, smarten up traffic management, and make buildings more energy efficient. "Innovation," emphasises Prof. Chary, "is critical to sustainable urbanisation."

This is not just another cliche, but the new global reality. It is evident from the sustainable solutions that city administrations have successfully put in place, which you will find out from the case studies shared in this edition. As countries like India urbanise at a faster pace than ever, the need to make cities smart and sustainable has never been greater. The good news is that we have the technology and the solutions to make it possible. Cities around India and elsewhere in the world have shown how change for the better is the new reality.

We hope you enjoy this issue of *Perspective*. You can also access the online version of the magazine at www.microsoft.com/en-in/about/perspective/

Gauri Arora
Editor, *Perspective*
garora@microsoft.com

Contents

In Focus   04
New Challenges, Newer Opportunities

As India's pace of urbanisation gathers momentum, it is amply evident that resource-constrained municipal administrations can deliver better results by harnessing people-centred technology to do 'more with less' and 'new with less'.

Projections   08
Megatrends Shaping Urban India

What stories do numbers tell about the growth patterns and development challenges of the country's urban centres? The Report on Indian Urban Infrastructure and Services of the high-powered expert committee headed by Dr. Isher Judge Ahluwalia offers some relevant pointers.

Big Challenges
Innovative Solutions   14

As cities grow, so do their problems with urban service delivery. Experiments around the country have thrown up replicable models for sustainable growth.

Your feedback is important to us. Scan the QR Code with your mobile device and tell us what you think about this issue of the *Perspective* magazine.

09

16

29

32

Urbanisation is gradually emerging as the focal point of India's growth and inclusion story

At the centre of India's growth and inclusion story is the theme of urbanisation – both, the scale and speed of which are unprecedented. Estimates suggest that by 2030, nearly 40% of India's total population, some 580 million people, will be living in cities. India will have 68 cities with populations of more than 1 million, 13 cities with more than 4 million people, 6 mega cities with populations of 10 million or more and at least two of which (Mumbai and Delhi) will be among the largest five in the world*. While policy makers and experts see urbanisation as a proxy for development and point out that it is these cities which will become the centres and drivers of economic growth; they are also now unanimous that challenges accompanied with this trend are immense. These include traffic congestion that brings cities to halt; high levels of pollution; overcrowding of hospitals and schools, water scarcity, and all the associated law and order problems. The question we face therefore, is, how will this challenge be dealt with and how will cities meet their citizen's aspirations?
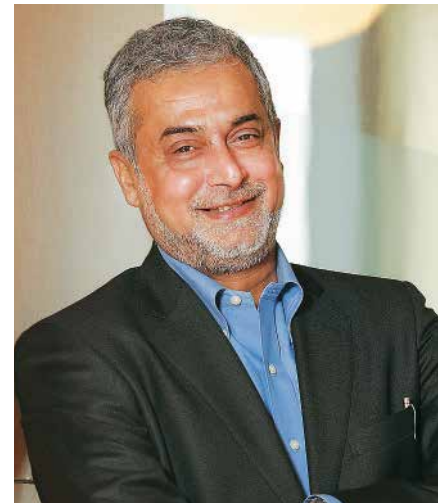
CityNext is Microsoft's response to this challenge. The initiative is premised on the idea that technology based solutions can redefine urbanisation making it smarter and more intelligent. With CityNext, we envision working with all stakeholders – be it urban planners, city governments, policy makers or private entrepreneurs – to provide better, faster and cheaper public services to a greater number of citizens. Our solutions encompass areas such as healthcare, education, citizen safety and traffic management to name a few. And while our global customers stand testimony to how our solutions enhance effectiveness and reduce costs in provision of public services, we have now been working with Indian cities to customise and catalyse smart governance.

In the city of Surat for example, the city's Police Department and Surat Traffic Education Trust – a private and public partnership – are using a Microsoft platform to enhance safety by assisting the city police to proactively monitor, analyse and to respond to security and crime threats. This has significantly reduced response time of law enforcing officers. Ultimately, making the city safer. Similarly, in the healthcare space, CityNext's products like Lync, are capable of transforming outcomes for aging patients who need care delivered and monitored, at home on an ongoing basis and in real time. Similarly, the provision of quality education to a greater number of citizens is of paramount importance – yet problems of access to quality teaching cannot be addressed unless technology is deeply ingrained in education planning and delivery. CityNext solutions provide platforms that make this possible with the ultimate goal of reducing the digital divide and making cities more inclusive.

Finally, we believe that while policy makers have long acknowledged the need for additional investment in urban infrastructure and for that matter urban renewal – they must recognise that the need of the hour is not just urbanisation per se, but smarter urbanisation which leverages technology. Indeed, this goal is at the core of CityNext vision, and we are prepared to partner with these cities as they move towards being socially inclusive, environmentally sustainable and economically viable in the long run.

We do realise that the challenge is big, but with this initiative; we want to convey that we are up for it.

Bhaskar Pramanik
Chairman, Microsoft India

* Source: McKinsey's Report - "India's Urban Awakening"

New Challenges, Newer Opportunities

As India's pace of urbanisation gathers momentum, it is amply evident that resource-constrained municipal administrations can deliver better results by harnessing people-centred technology to do 'more with less' and 'new with less'.

Engines of the new economy

We must keep our planet in the pink of health not only for ourselves, but also for the unborn generations. We cannot, for our own good, reverse the progress of urbanisation, but we have to temper it with smart governance, sustainable living and enabling technologies. Do more with less. Create new opportunities with less. These are the new growth mantras for sustainable cities. India, more than any other nation, needs at once to make this critical paradigm shift as it faces up to the multiple challenges of rapid urbanisation.

Cities are the laboratories of the future and the engines of our economies. "What happens in our cities, simply put, matters more than what happens anywhere else," says Parag Khanna, globally acclaimed author and international relations expert in Foreign Policy magazine. "From climate change to poverty and inequality, cities are the problem -- and the solution." Urbanisation, it is now universally acknowledged, is the necessary precursor to economic growth.

Possibilities for entrepreneurship and employment increase when urban concentration takes place, in contrast to the dispersed and less diverse economic possibilities in rural areas. This enables faster inclusion of more people in the growth process and is therefore more inclusive.

India has just 31 per cent of its population living in cities and towns, significantly below the global average of 50-plus (or Mexico's 78 per cent and Brazil's 83 per cent). It is not going to be the same for long. Consider these statistics highlighted in the 2011 report of the high-powered expert committee headed by the noted economist, Isher Judge Ahluwalia.

600 million

India's urban population in 2031, up from the 377 million recorded in the 2011 Census

- The number of metropolitan cities (or cities with a population of one million or more) will go up to 87 by 2031, a significantly higher number than the present 50

- The population of these cities will rise from the present 160 million to 255 million by 2031

- Other cities and towns will see their combined population climb up from the present 217 million to 343 million by 2031

- The urban share of the country's Gross Domestic Product (GDP), which was 63 per cent in 2009-10 (again, below the global average), will go up to a more substantial 75 per cent in 2031

Urbanisation, it is now universally acknowledged, is the necessary precursor to economic growth

Putting people-first

Many high-profile city innovation projects focus primarily on making infrastructure "smart" by embedding sensors and upgrading networking capabilities. This may be a critical foundational step, but limiting the conversation to infrastructure misses an enormous opportunity to unlock the human potential within a city. Because at their core, cities are about people.

Next-generation cities must empower people in government, businesses and the community through innovation to build a more sustainable lifestyle across economic, environmental, and social spheres. A people-first approach means, for instance, helping students achieve more through a 1:1 learning experience, giving isolated populations access to essential government services, providing the elderly with high-quality healthcare in their homes, supporting entrepreneurs to see their ideas come to fruition more quickly, getting commuters home sooner, and giving city employees a real-time, one-city view so they can do their jobs better.

Formidable challenges, which are multiplying at an explosive rate, confront our city leaders today and can negate some of the very elements that make cities attractive in the first place. These challenges are not new, but their scale and intensity are unprecedented. Addressing these issues in the face of financial constraints, expectations of rapid return on investments, and administrative complexity can be even more difficult.

As India steps on the accelerator for faster yet sustainable urbanisation, its municipal administrations and state governments will have to work out ways to address the challenges and proliferate the innovations required to make solutions work. But the propeller of change can only be powered by solutions that put people-first. Smart technology can be the engine of innovation and growth, but the best results can be ensured only when citizens and businesses are at the centre of all development models.

Exploding cities, strained resources

But our cities are also facing daunting issues as the march towards urbanisation unleashes a new wave of challenges; from the need to modernise aging infrastructure in older cities to scaling the demand for natural resources and sustaining the health and safety of their citizens.

The urgency of addressing these issues has never been greater. Addressing the implications of India's urbanisation momentum, the report of the high-powered expert committee states: "This transition, which will see India's urban population reach a figure close to 600 million by 2031, is not simply a shift of demographics. It places cities and towns at the centre of India's development trajectory. In the coming decades, the urban sector will play a critical role in the structural transformation of the Indian economy and in sustaining the high rates of economic growth."

Because cities are at the centre of the country's future growth story, their collective health will have a telling effect on the state of the nation. Their economic growth momentum cannot be sustained if urbanisation is not actively facilitated, nor can urban poverty be effectively addressed if the needs of the urban poor are isolated from the broader challenges of managing urbanisation.

Smart, sustainable cities are equally critical to the health of the rural economy. The report of the high-powered expert committee explains how: "The fortunes of the agricultural sector are crucially linked to the manner in which growth in the industry and services sectors unfolds. People living in rural areas typically tap the opportunities that cities provide for employment, entrepreneurial avenues, learning, and monetary repatriation."

87 Projected number of metropolitan cities of one million people or more in India by 2031

500 New cities that India needs to develop to assure a good quality of life to rural migrants

75% The share of cities in India's Gross Domestic Product in 2031, up from 63% at present

Every minute, 30 Indians are leaving their native villages and move to urban centres to build a new life full of opportunities. We have little time to prepare for the inevitable strains that this rapid, and mostly unplanned, move towards higher levels of urbanisation will place on the infrastructure of our cities. Our urban planning, infrastructure development and public service delivery mechanisms must be geared to address this challenge.

And we cannot go back to old solutions. These will have to be technology-enabled to make a meaningful difference to our expanding cities. To quote the high-powered expert committee yet again, "India cannot afford to get its urban strategy wrong, but it cannot get it right without bringing about a fundamental shift in the mindset which separates the rural from the urban."

Being a late urbaniser India has clear advantages. The late management guru C.K. Prahalad had estimated that India urgently needs to develop 500 new cities to accommodate its rising mass of urban settlers and offer them a higher quality of life. Otherwise, every existing city will become a vast slum by the time India turns 75 in 2022. This development imperative is both a challenge and an unprecedented opportunity to learn from the mistakes of infrastructure-challenged cities, and create new smart and sustainable cities.

Existing cities and towns, meanwhile, have to confront the stark realities of aging infrastructure, new hazards to public health and safety, and the inherent uncertainty of natural disasters, climate change, and global and national economic forces. City leaders must meet these growing demands with tight budgets and greater citizen expectations while working across a complex mass of agencies used to work in silos. ◼

Megatrends Shaping Urban India

What stories do numbers tell about the growth patterns and development challenges of the country's urban centres? The Report on Indian Urban Infrastructure and Services of the high-powered expert committee headed by Dr. Isher Judge Ahluwalia offers some relevant pointers.

Slow but steady expansion

Available estimates suggest that by 2031, India's urban population would climb up to 598 million, or just short of 40 per cent of the total population. The urban population, according to UN projections, is likely to cross that of rural India by 2045.

The number of 'metropolitan cities' with a population of one million or more has gone up from five in 1951 to 50 in 2011, and is expected to go up to 87 by 2031. The existing 50 metropolitan cities, which include eight with a population of five million or more, account for 42.3 per cent of the total urban population of the country. The 'Big Eight' are Mumbai, Delhi, Kolkata, Chennai, Hyderabad, Bangalore, Ahmedabad and Pune, the last two being the latest entrants.

The number of 'metropolitan cities' with a population of one million is expected to go up from 50 in 2011 to 87 by 2031

Not yet a migrant magnet

Rural-urban migration has contributed a little over 20 per cent to the growth of urban areas in India. The migration from villages has been largely to the metropolitan cities, and the small and medium towns, whose growth rates have actually slowed down.

The percentage may go up substantially if, according to the projections in McKinsey's 2010 report on the country's urbanisation prospects, over the period 2010-2030, urban India creates 70 per cent of all new jobs and these jobs are twice as productive as employment opportunities in the rural sector.

Rural-urban migration has contributed a little over 20 per cent to the growth of urban areas in India

An emerging GDP driver

In industrialised economies, economic activity in urban areas accounts for as much as 80 per cent of the GDP. The urban share of economic activity in less-developed economies is typically around 50 per cent. In India, in 1999-2000, cities and towns contributed 51.7 per cent to the GDP, and the share was estimated to be around 62 per cent in 2009-10.

Rising levels of per capita income are associated with higher levels of urbanisation and the relationship is statistically significant. Tamil Nadu is the most urbanised state with 54.4 per cent of its population living in urban areas, followed by Maharashtra (46.2 per cent) and Gujarat (40.3 per cent). The seven states of Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Tamil Nadu and Uttar Pradesh accounted for 62 per cent of the country's urban population in 2011. ■

Note: In India, urban areas are defined as all statutory places with a municipality, municipal corporation, cantonment board, or notified town area committee, and all places satisfying the following three criteria simultaneously: (i) a minimum population of 5,000; (ii) at least 75 per cent of male working population engaged in non-agricultural pursuits; and (iii) a population density of at least 400 per sq.km.
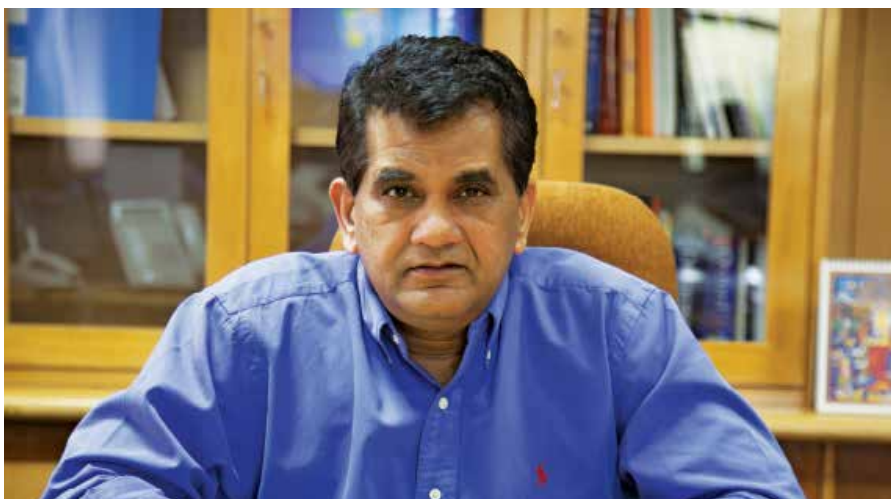
"ICT is as important as power and water for our greenfield cities."

Delhi-Mumbai Industrial Corridor

The government's most ambitious integrated greenfield urbanisation initiative will spur the development of new smart cities along the upcoming Delhi-Mumbai Freight Corridor. Some of the hotspots are highlighted on the map to the right.

Haryana

Dadri

Rewari/ Manesar

Uttar Pradesh

Rajasthan

Boraki

Gujarat

Dholera

Pithampur-Dhar

Madhya Pradesh

Shendra-Bidkin, Near Aurangabad

Maharashtra

Jawaharlal Nehru Port

Dighi Port Industrial Park, Karla, Near Pune

"India needs new cities that are compact, dense and vertical and occupy no more than 10 square kilometres."

Amitabh Kant
Secretary, Department of Industrial Policy and Promotion, Government of India

Spending an hour with Amitabh Kant, one of the country's best-known bureaucrats popularly known as "India's Can-Do Man", means being bombarded with exciting and original ideas. The driver of Incredible India, one of the country's most successful international brand campaigns, he is now the Secretary, Department of Industrial Policy and Promotion, Government of India. Previous to his elevation, he was the Chairman and Managing Director, Delhi-Mumbai Industrial Corridor Development Corporation (DMICDC), the government's most ambitious integrated greenfield urbanisation initiative. The Kerala-cadre IAS officer (1980 Batch) shares his wealth of insights on how it is critical to embed ICT into the new planned cities that are coming up across the country so that they are smart and sustainable.

Why is planned urbanisation so important to India's sustainable growth story?

The biggest challenge for India is to achieve a 9-10 per cent annual growth rate on a sustained basis for three decades and more in order to be able to continually create jobs for its vast young population. Manufacturing alone can be the key catalyst of this level of growth and its most visible consequence will be rapid urbanisation.

Historically, planned urbanisation has been the driver of economic growth. It is not going to be any different for India, which is getting into the process of urbanisation. Every minute, 30 rural Indians are moving into urban centres and if this unplanned migration continues

at the present rate, our cities will see the steady influx of 350 million people by 2030. This number is expected to double to 700 million by 2050. This is almost two and a half times the present population of USA. Urbanisation will be India's biggest challenge.

Rapid urbanisation will inevitably lead to immense strains on our natural resources. Is it the sensible way forward?

Yes, urbanisation is accompanied by a voracious consumption of natural resources. Cities occupy 3 per cent of the earth's land surface, house half of its human population, use 75 per cent of the resources, and account for two-thirds of all energy and greenhouse gas emissions. If developing countries emulate the

model of developed countries, a resource base four times the size of our planet would be necessary to support their growth. Alas, we have only one Earth.

We have no choice therefore but to opt for planned sustainable urbanisation to support such high levels of population growth in our

9-10%
The annual growth rate India must achieve for 3 decades to continually create jobs for the youth

cities and towns. In several emerging economies, urbanisation has helped lift vast segments of the population above the poverty line.

What direction must sustainable urbanisation take in our country? Is there an international model that we can follow?

When America was urbanising, it had land, water and fossil fuels in abundance. It was therefore possible for America to build sprawling cities such as Atlanta. Today, the three natural resources are under severe pressure and cities like Atlanta are luxuries that India cannot afford.

66%

The percentage of citizens who use public transport in Barcelona, a city that could be a role model for rapidly urbanising India

Atlanta is a city made for cars, not for people – 98.2 per cent of its population travels by cars. Its carbon footprint, as a result, is 12 times higher than that of Barcelona, 66 per cent of whose citizens use public transport and 17 per cent either cycle or walk. Cities like Barcelona have to be the role models for rapidly urbanising India.

An efficient public transportation system, which is used by the majority of its citizens, is as much at the core of smart cities as is digital technology, which enables municipal administrations to cut across vertical silos and bring real-time governance to the citizens. India needs a creative and innovative strategy for urbanisation drawing on the best lessons from across the world.

We have fallen far behind China

in the development of new cities. What is the message of China's urbanisation process for India?

Traditionally, India has been a reluctant urbaniser because of the overpowering influence of Mahatma Gandhi's idea of self-sufficient villages on the thinking of successive governments. China believed in the same philosophy and experienced the same level of growth as India till 1974, which is when its leadership realised that no economy can grow entirely on the back of its agricultural sector.

The Chinese leadership recognised urbanisation as an essential feature of economic development and a major component of industrialisation and modernisation. It was this thinking that led China to partner with Singapore to develop the city of Suzhou. Since then, 498 planned new cities have sprouted all over China, spurring the phenomenal growth of the country. Mayors in China have been competing with one another to create new cities and the successful ones have gone on to rise rapidly in the Communist Party hierarchy. Our model of urbanisation, however, has to be based on our inherent strengths. We must create our own unique innovative, sustainable Indian model of urbanisation.

How can we leapfrog over this widening gap with China and transform ourselves from late starters to late bloomers?

India is fairly advanced in the use of technology, which it can use to leapfrog stages of development and embark on a programme of well-planned urbanisation. The country needs new cities that are compact, dense and vertical, riding on the back of a public transport system and ICT, and highly livable like Singapore and Hong Kong. Our new cities must not occupy more than 10 square kilometres.

39.1%

The reduction of waste in Yokohama, Japan, which saved the city $5 billion

What are some of global lessons that we can draw upon as the pace of planned urbanisation picks up in the country?

We have several examples of urban rejuvenation from around the world, but I shall limit myself to mentioning only three. Kitakyushu in Japan was the most polluted city in the world in the 1970s. Industrialisation had played havoc with it, so much so that the colour of the water of Dokai Bay had turned from blue to yellow.

It soon earned the nickname 'sea of death' and the women of the city took to the streets to protest against this degradation. Responding to the agitation, Japan's Ministry of Economy, Trade and Industry launched a programme for the transformation of the city. Today, everything is recycled in Kitakyushu and this significant collective move has helped Dokai Bay regain its original colour.

In Yokohama, also in Japan, a mayor was able to lead his city to reduce the waste it generated by 39.1 per cent. It saved the city $5 billion. From Singapore, I can cite the example of its water management system. Its dual piping system ensures all sewage water gets recycled and reused. Astonishingly, 10 per cent of its recycled sewage water is even made fit for human consumption. Cities have got to be centres of innovation, creativity and sustainable growth.

Dholera,
Gujarat
At 920 sq. km., Dholera will be bigger than Singapore

Pithampur,
Madhya Pradesh
A 22km economic corridor is being developed between Pithampur and the Indore airport

Shendra-Bidkin,
Maharashtra
The Shendra-Bidkin industrial park is being developed on 8,340 hectares

Three of the seven upcoming greenfield cities being developed on the Delhi-Mumbai Industrial Corridor

How relevant is Microsoft's CityNext initiative in this new phase of urbanisation?

An initiative such as CityNext is an important model because it addresses the challenge of integrating different utilities and public safety on one layer of ICT. It also enables real-time flow of information to all stakeholders. And by giving municipal administrations a tool to collect information and analyse data, it can facilitate the process of finding solutions to urban infrastructure problems.

Greenfield cities that come up in the country will have to embed ICT. It is as important as power and

water. China is already moving in this direction. It is working with Singapore and the Koreans to develop Tianjin, its fourth largest city, into a smart city. We are doing it with our the seven new cities that are coming up on the Delhi-Mumbai Industrial Corridor.

Construction of three of these cities – Dholera in Gujarat, Shendra-Bidkin in Maharashtra and Pithampur in Madhya Pradesh – has already begun. At 920 sq. km., Dholera will be bigger than Singapore! These cities will ride on new manufacturing hubs whose backbone will be the Delhi (Dadri)-Mumbai (Jawaharlal Nehru Port) dedicated freight corridor of the India Railways, which

is expected to become operational within 2017.

Will our existing cities and towns be completely left out of this 'smartening up' process?

Not at all. It is equally important to rejuvenate brownfield cities and smarten them up using ICT in the way China is doing with Tianjin. We can start with the NDMC area of Delhi because it has advantage of having a single agency responsible for all utilities. It can be turned into a smart city on the lines of Barcelona. If we can do it, it can become a demonstration model for the rest of India. And nothing works like a successful demonstration model. ■

Big Challenges, Innovative Solutions

As cities grow, so do their problems with urban service delivery. Experiments around the country have thrown up replicable models for sustainable growth.

24x7 water not a pipe dream

The Challenge

The duration of water supply in Indian cities ranges from an hour to six hours, compared with 24 hours in Brazil and China and 22 hours in Vietnam.

Sixty-four per cent of India's urban population is covered by individual water connections, compared with 91 per cent in China, 86 per cent in South Africa, and 80 per cent in Brazil.

A Solution

It is not impossible for urban local bodies to ensure 24x7 water supply. The Government of Karnataka has shown it can be done. More than 25,000 households now receive 24x7 water supply, thanks to the World Bank-assisted Karnataka Urban Water Sector Improvement Project, which was launched in 2005 at five selected zones in three cities (Belgaum, Gulbarga and Hubli-Dharwad).

The Public Private Partnership (PPP) project included investments to improve the bulk water supply and the appointment of a private operator to construct, operate and manage a 24x7 urban water supply system for two years, after a preparatory phase of 18 months.

Losses, as a result, were reduced from 50 per cent to 7 per cent due to improvements in transmission, distribution and metering.

A similar PPP experiment in Nagpur has ensured 24x7 water supply to 10 per cent of the city's residents. The success of the experiment has encouraged the municipal corporation to extend it to the entire city.

Providing sewerage for all

The Challenge

An overwhelming majority of 4,861 out of the country's 5,161 cities/ towns do not have even a partial sewerage network.

On average, 25 per cent of the population in Indian cities lives in

slums, which lack basic water supply and sanitation facilities; in Greater Mumbai, slum dwellers account for 54 per cent of the total population.

Eighteen per cent of urban households do not have access to any toilet facility and are compelled to defecate in the open.

A City Sanitation Study by the Ministry of Urban Development, Government of India, found none of the 423 cities under its scanner to be 'healthy' and 'clean'. Close to 190 were rated to be in a state of a health and environment emergency.

The lack of waste water treatment, according to estimates, leads to over $15 billion being spent yearly in treating water-borne diseases in India.

In the Ganges Basin, 223 towns and cities generate 8,250 million litres of sewage daily, of which about 2,500 million litres are disposed of without treatment directly into the holy river and 4,250 million litres into its tributaries.

A Solution

Alandur, a residential suburb of Chennai in Kanchipuram district with a population of 150,000, had no underground sewerage until 2000. Almost 80 per cent of households had to depend on septic tanks with soak pits. The urban landscape of Alandur was transformed between 2000 and 2005 by an infrastructure project providing a comprehensive underground sewerage network and sewage treatment plant.

This has been accomplished over five years with direct participation by the people, who funded a substantial part of the project by making income-linked cash deposits. The project involved the construction of a sewer line covering the entire road length of 137km and a pump house, and the installation of 5,650 manholes as well as 23,700 connections to service homes.
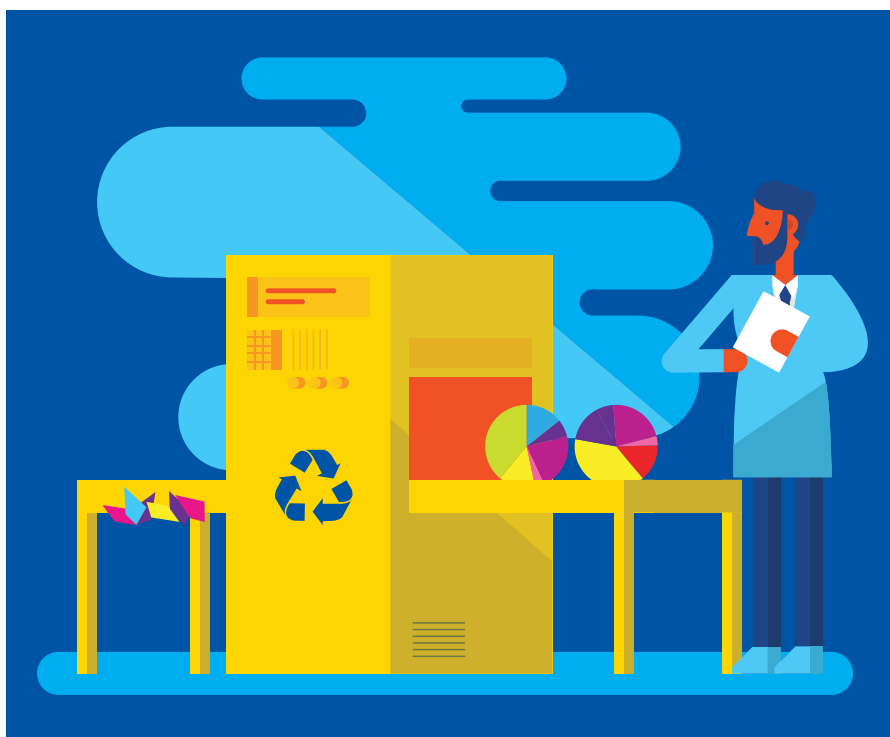
Turning waste into wealth

The Challenge

The Energy and Resources Institute (TERI) has estimated that by 2047, waste generation in Indian cities will increase five-fold to touch 260 million tonnes per year, implying that the present rate of solid waste generation is more than 50 million tonnes per year. Solid waste generated in our cities is likely to rise at the rate of 5 per cent a year.

The waste collection infrastructure of our urban centres, though, is not geared up to face the challenge. Its area of coverage ranges from 70 per cent to 90 per cent in metropolitan cities, but is less than 50 per cent in smaller cities. Worse, less than 30 per cent of the solid waste generated across Indian cities is segregated.

A Solution

Rajkot, Gujarat's fourth largest city, generates about 300 metric tonnes of solid waste daily, which was earlier collected and dumped on the city's outskirts. After the Municipal

Solid Waste Management Rules 2000 were notified, Rajkot Municipal Corporation set up a modern processing plant for solid waste and engaged Hanjer Biotech Energies Pvt. Ltd. to develop and run it.

The state government provided land to the Municipal Corporation, which in turn leased out 30 acres to Hanjer at Re 1 per sq. m. per year. The remaining land was earmarked and used for a sanitary landfill. The project was initiated in 2003 and the plant became operational in 2006.

The city waste is first brought to the site in dumpers and then segregated. The wet organic waste (20-30 per cent) is transformed into organic compost. The dry organic waste is compressed into high calorific fuel ('green coal') and sold to the cement and paper industries. The recyclable waste (5 per cent), consisting of rubber, plastic, and metals, is sold in the junk market. Only 10-15 per cent of the waste collected is sent to the landfill. From the daily collection of 300 metric tonnes of waste, Hanjer produces 40 metric tonnes of bio-fertilisers, 70 of 'green coal' and 2.5 of plastic.
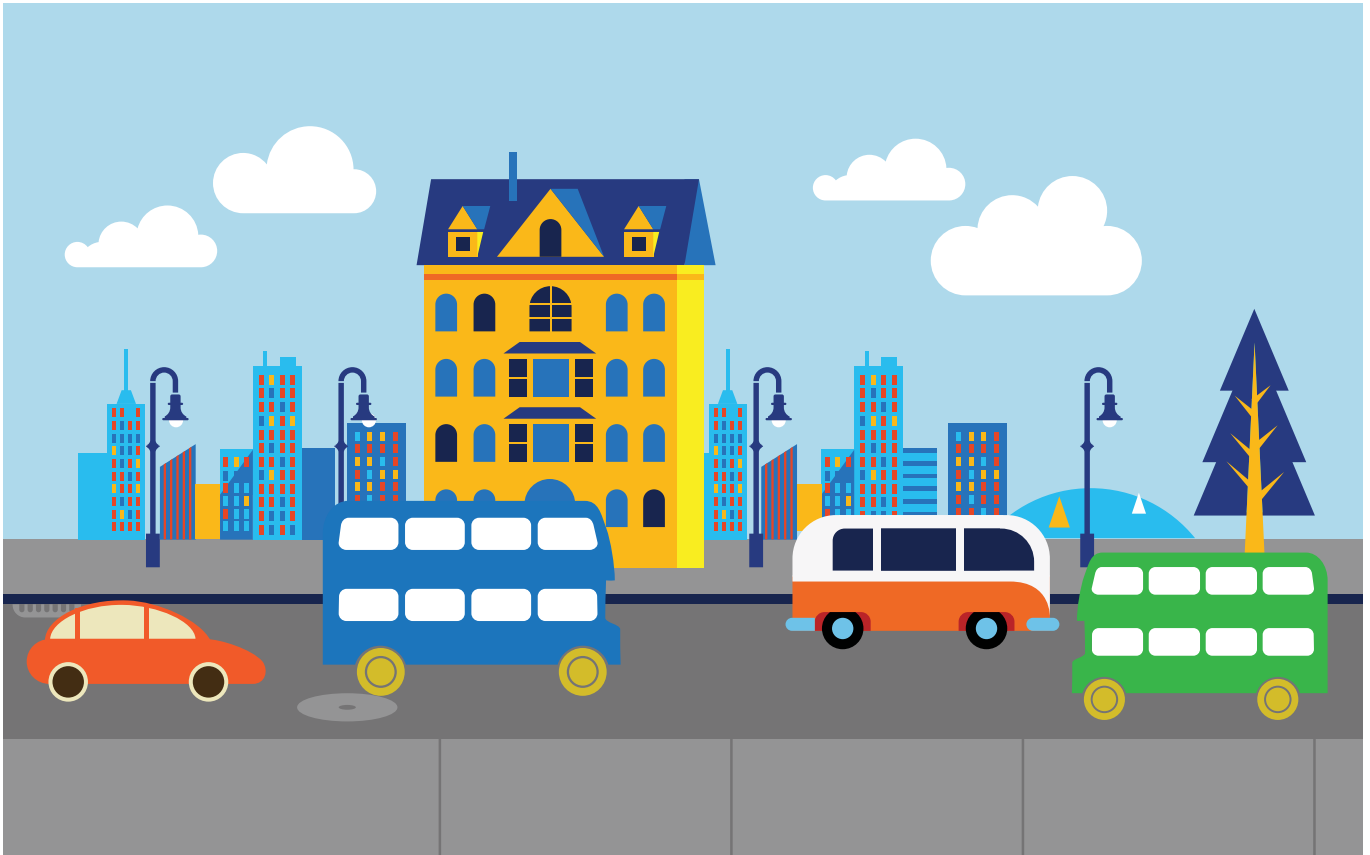
Accelerating public transport

The Challenge

Public services account for a mere 22 per cent of urban transport in India, compared with 49 per cent in lower middle income countries (the Philippines, Venezuela and Egypt) and 40 per cent in upper middle income countries (South Africa, South Korea and Brazil).

Only 20 out of India's 85 cities with a population of 500,000 or more had a bus service when last surveyed in 2009.

The share of two-wheelers in the total fleet of fossil fuel-driven vehicles is a whopping 72 per cent. Their owners can be influenced to make the switch to public transport. With the marginal cost of using a two-wheeler being less than the price citizens pay for taking public transport, moving commuters from private two-wheelers to public transport is a major challenge.

The per capita emission levels in the country's seven largest cities are at least three times higher than the World Health Organisation standard. Of a total of 127 cities/towns covered by the National Air Quality Monitoring Programme, 101 report at least one pollutant exceeding the annual average air quality standard.

Considering that India has fewer cars per capita than developed countries, this must reflect the poor quality of fuel and traffic congestion. The estimated use of fuel by vehicles in 2035 will be six times higher than the 2005 level, which is expected to further worsen air quality.

A Solution

Indore, which did not have a public transport system until 2006, now has a city-wide service with a fleet of 104 buses operating on 24 routes. It is run by a special purpose vehicle, the

Indore City Transport Services Ltd, which has put in place a GPS-driven tracking system to monitor the bus services and has also installed passenger information systems at bus stops to alert users and track the movement of buses.

Surat's bus fleet of 125, established in 2008 and operating on 44 routes, carries 70,000 passengers daily. As in Indore, the operation of bus services in Surat has been outsourced to the private sector. The municipal corporations of the two cities have found innovative ways of investing in the public transport infrastructure, monitoring traffic and ensuring satisfactory delivery of services. ■

Surat's bus fleet of 125, established in 2008 and operating on 44 routes, carries 70,000 passengers daily

Smart Technology
Makes a Difference

India's IT industry has successfully serviced multinational companies across the world and the corporate sector in India to help improve their productivity. It is high time IT is used for improving governance in public service delivery in Indian cities. In the last few years, there has been some progress in using IT in urban management, but ULBs (urban local bodies) are yet to leverage the power of e-governance to the fullest extent.

By doing away with the discretionary powers vested in a few officials, e-governance cuts at the roots of corruption and inefficiency. For example, the Geographical Information System (GIS) can be used to improve urban land management and make it more transparent, as is being done in some cities. Similarly, Supervisory Control And Data Acquisition (SCADA) is being used successfully for better water management in cities such as Hyderabad, Bangalore, Tirupur, and Nagpur. The Global Positioning System (GPS) is being employed to track and monitor bus services in Surat and Indore.

More recently, the Greater Hyderabad Municipal Corporation has started combining the use of mobile phones with Global Packet Radio Services (GPRS) for off-site real time monitoring of the delivery of services such as solid waste management and street lighting, and ensuring compliance with building laws. Since November 2010, using these instruments of high technology, building permissions are being given in the Greater Hyderabad area within four days, and construction is being monitored at intervals of 15 days to ensure compliance.

A number of ULBs have made progress on the basic aspects of e-governance like creation of websites, uploading of information, and payment gateways for property tax and water bills. But states differ substantially in their e-readiness and approach to e-governance. The availability of a support infrastructure, reliability and reach of electricity, telecommunications links, band connectivity, and skills are crucial for making e-governance effective. It needs to be supported by IT literacy with local language content and applications. ◼

Source: Report on Indian Urban Infrastructure and Services of the high-powered expert committee headed by Dr. Isher Judge Ahluwalia

"We have aligned with Microsoft's CityNext initiative to give citizens a new layer of comfort."

SURAT, India's diamond capital, is the first city in the country where Microsoft will roll out its CityNext initiative in partnership with the municipal corporation. Joint Managing Director of the Gujarat State Petroleum Corporation and Former Municipal Commissioner M.K. Das, a Gujarat-cadre, 1990-batch IAS officer, explains how this initiative will impact the lives of the citizens of Surat and enable the civic body to deliver improved services to the people. An IIT-Kharagpur Computer Science and Engineering graduate, Das has been a deputy commissioner with the Ahmedabad Municipal Corporation and during his five-year tenure as Vadodara's Municipal Commissioner, the city government bagged eight national awards.

Surat has experienced phenomenal growth in the past three decades. Has this progress brought about its share of challenges?

Surat is the fourth fastest-growing city in the world. Its population has risen from 7 lakh in 1981 to 50 lakh at present, and just 7-10 lakh of the city's residents have their roots in Surat. The rest are migrants – 25 lakh have come from the Hindi-speaking states – who have been drawn by the opportunities that the city offers. Surat is where 80 per cent of the world's diamonds are processed. Our vibrant city also meets 40 per cent of India's demand for textiles. It is also an economic hub with industries across sectors – power, fertilisers, refineries, steel, paper, sugar, chemicals and pharmaceuticals. Yet, despite this growth, we have been able to address the people's aspirations.

How can you say that?

Janagraha, a well-regarded NGO,

ranked Surat No. 1 on two counts – citizen satisfaction and perception of the local government – in an all-India survey of cities. People complain of unemployment, but we have negative unemployment. People are working double shifts and we have 1.5 lakh to 2 lakh jobs that are waiting to be taken.

No. 1
Surat's ranking on the count of citizen satisfaction in national poll conducted by NGO Janagraha

Our per capita income has been high despite the population growth and we have maintained without fail a 24-hour power supply. The speed at which we deliver public works has kept pace with the city's growth.

15
Number of flyovers and bridges completed by Surat Municipal Corporation in past 12 months

In the past 12 months, for instance, we have completed 15 flyovers and bridges. We have also built over 50,000 houses to relocate families living in poor neighbourhoods, which is why just 6-7 per cent of Surat's population lives in slums. More importantly, Surat has always welcomed outsiders. This is a city where people live and work together in harmony. An indicator of Surat's composite culture is the number of languages – eight, including Oriya and Telugu – in which classes are taught in our 300-plus schools.

8

Number of languages in which classes are taught in Surat's 300-plus schools

What have you done to use IT solutions to ensure a better quality of life for Surat's residents?

Take our experience with water supply. Few cities can claim to have an ISO-certified water supply system. We can. We have used IT to put in place a system wherein all our water treatment plants are run using Supervisory Control And Data Acquisition (SCADA), without any human intervention. This ensures optimum utilisation of water and minimal wastage. The quality of water supply is also monitored throughout the day. We are confident that we will have no water problem even if 50 lakh more people are added to Surat.

We have also put in place a vehicle tracking system to ensure that our door-to-door waste collection programme takes place without a hitch. We track all waste collection vehicles and if any one of them misses an area, we know immediately. It has greatly improved the efficiency of our waste collection service and has had a positive impact on how the city manages its solid waste output. Similarly, IT has enabled us to put up real-time displays of bus arrival timings at each bus stop. People find this service very useful.

We have computerised all critical operations such as accounts, audit, material management, and so on. All revenue collection is also computerised. Payments to stakeholders are made directly to their accounts, leaving no room for corruption. All recruitments are made in a transparent manner with OCR-based examination and processing, which has not only introduced transparency in governance, but also enhanced the faith of job-seekers in our system. They now believe that a meritocracy is in place. An IT-enabled city needs a tech-savvy population. With this thought at the back of our mind, we have introduced computer software training in all schools.

How are you raising finances for these many development initiatives?

To sustain such a pace of development, the civic body needs to shore up its earnings. We are doing it by increasing our property tax collections. We are in the process of introducing a GIS (Geographical

No. 4

Position of Surat among the world's fastest growing cities, after Beihei (China), Ghaziabad and Sana'a (Yemen)

Information System) enabled mapping of the city to enable a zero-default recovery of property tax. With this system in place, we will have accurate data on each building in the city, which will help us verify the information shared with us by our taxpayers.

Surat is the first city to partner with Microsoft's CityNext initiative. What made you opt for this association? How do you intend to benefit from it?

The idea behind our association with Microsoft's CityNext initiative is to give citizens a different layer of comfort. We have identified areas such as town planning, project management and engagement with citizens where CityNext will benefit the people of Surat. More importantly, CityNext does not require us to create new systems to enhance our engagement with citizens.

It will eventually help us integrate all our services and empower citizens without altering the platform. Earlier, people had to take a break from work and queue up at our various offices just to collect forms. This was a waste of people's productive time and of valuable fuel spent on transport. Now, with CityNext, we can deliver all our services under one virtual roof, which can be accessed online from any part of the world. This takes engagement with citizens to an entirely new level. ◾

"Citizens are no longer prepared to wait in queues for government services. They expect them within an acceptable time-frame."

M.K. Das
Joint Managing Director, Gujarat State Petroleum Corporation and Former Commissioner, Surat Municipal Corporation

"IT-based innovation is critical to sustainable urbanisation."

Cities that have shown the way

Urban India is faced with the urgent need for sustainable growth. In such a scenario, IT-based innovation assumes significance. The highlighted cities have shown how it is possible.

Nagpur

Pimpri-Chinchwad

Navi Mumbai

Visakhapatnam

Hubli-Dharwad

Bangalore

Chennai

One of the country's foremost thinkers on urban management issues, Prof. V. Srinivas Chary is the Dean of Research and Director of the Centre of Energy, Environment, Urban Governance and Infrastructure Development, Administrative Staff College of India. A recipient of the Ashoka Fellowship for his institutional model on the provision of 24x7 water supply, Prof. Chary has led more than 150 research and consulting assignments in the areas of policy formulation, municipal reforms and city development planning. He has also pioneered the National Urban Water Awards, which recognise excellence in urban water and sanitation management by municipalities. Additionally, he also provides capacity building support to urban local bodies across the country. In this interview, he offers his expert take on sustainable urban development and the importance of IT-led solutions such as Microsoft's CityNext.

Urban growth is becoming the most visible feature of the country's development story. How can policymakers ensure this growth is environmentally sustainable?

Effective urbanisation is intricately linked with economic development and social growth. Cities are often called as engines of economic growth, more so for emerging economies such as India. Urban areas, however, are large consumers of energy and are responsible for a significant portion of emissions. Rapid urbanisation has led to increased congestion on roads, increased demand for power, water, sanitation services, education and health infrastructure, and increased demand for investment.

Resource security, be it for water or energy, is important to sustain the urbanisation process. It is important therefore to embed environmental and resource efficiency concerns into urban development policy and plans to make this growth sustainable. We must start the process of environmental advocacy at the policy-making and planning stage itself so that green parameters are reflected in the Master Plans and City Development Plans. Use of innovative ideas, practices and technologies can play a significant role to ensure that urban growth is environmentally sustainable. Today, ICT not only enables better and more efficient service delivery and resource efficiency, but also facilitates better city management. Innovative use of ICT will reduce

India's growth rate has led to a rapid increase in urban infrastructure and buildings. The cities are consuming over 70 per cent of energy and are responsible for 75 per cent of greenhouse gas emissions

energy consumption of buildings, making them green and intelligent. ICT can play a positive role in efficient traffic management, leading to reduction of fuel and emission, efficient water and waste water management, solid waste handling and delivery of other

urban services. Given the pressures of rapid urbanisation in India, it is the need of the hour that cities in India utilise ICT to strengthen their capacity to manage this growth sustainably. They need to become smart and connected cities.

Are there examples of municipal bodies in the country already thinking along these lines?

We have a number of examples to show how municipalities across the country, in places such as Nagpur and Pimpri-Chinchwad in Maharashtra and Hubli-Dharwad in Karnataka, have effectively employed technology and innovative practices and raised public awareness to minimise wastage of water. These measures are not only environmentally sustainable, but because of

Nagpur and Pimpri-Chinchwad in Maharashtra and Hubli-Dharwad in Karnataka have effectively employed technology and innovative practices to minimise wastage of water

Vadodara has shown the way to energy efficiency by introducing smart street lighting

Surat, by using smart technology to control the pumping of water, has reduced energy consumption

The Government of Andhra Pradesh has introduced an Energy Conservation Building Code for all new constructions after August 2013

the reduction of wastage, the municipalities have also been able to charge less for water supply.

Similar instances of successful waste water management can be cited from Bangalore and Navi Mumbai, Chennai and Visakhapatnam. These urban centres have effectively recycled waste water and made it fit for non-potable uses. Vadodara has shown the way to energy efficiency by introducing smart street lighting. Surat, by using smart technology to control the pumping of water, has been successful in reducing energy consumption. All these are replicable models that other municipal bodies can easily implement.

You have stressed on the need to embed environmental concerns into urban development plans. Can you share an example where this is already being done?

The Government of Andhra Pradesh, before the state's bifurcation, introduced the Energy Conservation Building Code (ECBC) for all new commercial buildings constructed in the state post-August 2013. It aims at a substantial reduction in energy usage through improved

> **Buildings consume over 30 per cent of India's electricity production. The good news, though, is that two-thirds of all the commercial and residential high-rises, which will be up by 2030, are yet to be built**

building designs, use of energy-efficient appliances, and better air-conditioning and lighting. This is a significant move and the rest of the country should take note of it because two-thirds of the commercial and high rise residential

buildings, which will be up by 2030, are yet to be built. This situation offers a window of opportunity to introduce far-reaching changes that would work in favour of sustainable urbanisation.

What is the role of ICT in the development of sustainable cities?

In the replication of these sustainable models, Information and Communication Technology (ICT) will have a key role. Successful cities of the future will run on information. ICT enables not only better and more efficient service delivery, and resource efficiency, but also better city management.

Innovative use of ICT will reduce energy consumption of buildings, making them green and intelligent. ICT can play a positive role in efficient traffic management leading to reduction of fuel emission, efficient water and waste water management, solid waste handling and delivery of other urban services. By providing real-time traffic information to citizens, cities can enable them to plan their commute to work or use public transportation. By providing remote healthcare services and extending access, cities can reduce health-related expenses and improve health outcomes. ICT can also enable cities to be safe and secure.

Given the pressures of rapid urbanisation in India, it is the need of the hour that cities in India utilize ICT to strengthen cities' capacity to manage this growth sustainably. This has been termed as Smart and Connected City.

In this regard, Microsoft's CityNext is significant, but its solutions will have to be customised to Indian situations. It can become the platform that integrates various services and solutions provided by different agencies in an urban setting. Cost and benefit optimisation takes place when information sources

are connected and information is shared real time. In addition, it can also become an effective tool for informed decision making.

How can Microsoft's CityNext become an effective tool for sustainable urbanisation?

I can think of many ways in which CityNext can help the municipal administrations achieve the goal of sustainable urbanisation. It can enable a municipal corporation prevent wastage of water by helping it move from a manual to an IT-enabled control system. Such a smart system would automatically switch off pumps as soon as the tanks are full. Similarly, a city's street lighting system can be made responsive to ambient light, so if the days are long, the lights would switch on later than usual. This doable measure can significantly economise power consumption in urban centres. CityNext, coupled with sensor technology, can help urban local bodies in garbage collection and disposal, safety and security, healthcare management, and so on.

In the same way, we can smarten traffic management to save people's time, prevent wastage of petrol and reduce pollution caused by engines of vehicles idling at traffic lights. This can easily be done by replacing our present static management of traffic lights with a dynamic system, which uses a combination of algorithms and cameras to ensure that each vehicle passes through five or six green lights on one journey. An IT-enabled traffic management system will not only help decrease pollution levels, but also make it possible for vehicle users to save their time and use it productively.

How has your department engaged with municipal bodies and other public service providers to introduce IT-enabled tools into city planning and service delivery processes?

What we now need to do is to develop pilots to test IT-enabled tools such as CityNext. Currently, we are engaged in talks with the Warangal Municipal Corporation to develop pilot apps for seven to ten areas where IT can be used for better management of service delivery. Our objective is to develop a city control centre that will manage all services by cutting across departmental silos. A similar effort is underway to ensure a seamless integration of services for better management of traffic lights in Hyderabad. An integration of IT solutions into city management initiatives has become essential in view of the paradigm shift towards sustainable urbanisation. ■

Transform, Engage, Accelerate – Making cities safer, healthier and more sustainable

Microsoft's CityNext is a global initiative that enables leaders in the government to effectively leverage technology to shape the future of cities, in collaboration with citizens and businesses, with a people-first approach.

By Vikas Aggarwal

More than 50 per cent of the world's population is living in urban areas today. This massive shift towards cities and towns has unleashed a new set of challenges in the shadow of limited economic growth, tighter budgets and austerity measures. These challenges range from a critical need to augment and modernise the over-strained and aging infrastructure to scaling down the demand for natural resources and sustaining requirements of the citizens.

India too is on the cusp of an urban explosion. The unabated pace of urbanisation, propelled by the continuous influx of people from the rural hinterland, has put unprecedented pressure on urban infrastructure and service delivery mechanisms of various agencies. There are similarities in challenges on account of rapidly growing urbanisation between India and developed economies, but the critical difference is the magnitude of the gap. India's urban infrastructure is more strained and in most cases, it is in a dire need of both augmentation and modernisation than in developed economies. To add to the complexity, despite the lower percentage, the real count of the people living in urban areas and those expected to migrate to urban areas is humungous and unparalleled.

This huge gap necessitates judicious and optimal utilisation of resources and calls upon us to transform our infrastructure and operations, engage citizens and businesses, and accelerate innovation and opportunity.

$650 billion
Investment required over the next 20 years to rejuvenate urban infrastructure across India

The High Powered Expert Committee on Urban Infrastructure has noted that the country needs an investment of US$650 billion (Rs 39.5 lakh crore) over the next 20 years to gear up for this emerging urban shift.

The committee, headed by the acclaimed economist, Dr. Isher Judge Ahluwalia, has highlighted the vital role that IT (e-governance and smart technologies) can play to help address the challenges confronting urban planners, administrators and service providers.

Many projects focus primarily on making infrastructure "smart" by embedding sensors and upgrading networking capabilities. Without doubt this is a critical foundational step, but by limiting the conversation to infrastructure, we may be missing an enormous opportunity to unlock human potential within a city. Technology can help in finding innovative and effective resolution, but it is well-known that the engagement and involvement of citizens and businesses is a critical aspect. Thus, the solutions needed

to leverage both "technology capacity" and "human capacity" by taking a people-first approach – empowering citizens, businesses and governments to connect, have an open dialogue and shape the future together by building more economically, environmentally and socially sustainable urban areas. Adoption of a people-first approach would translate into harnessing the capabilities of technology to help students achieve more through a 1:1 learning experience, give isolated populations access to much-needed government services, provide the elderly with high-quality healthcare in their homes, support entrepreneurs to see their ideas come to fruition more quickly, get commuters home sooner, and give city administrators and service providers a real-time, one-city view so that they can do their jobs better.

Microsoft and its global partner ecosystem are uniquely positioned to enable a people-first approach through end-to-end software, devices & service capabilities that meet a range of needs, from the consumer-related demands of citizens to the mission-critical, enterprise demands of city operations. Drawing from experience and insights gained from many years of working with governments worldwide, Microsoft's CityNext offers solutions across key city domains and the strategy for implementing these solutions is anchored around three key pillars: transforming operations and infrastructure; engaging citizens and businesses; and accelerating innovation and opportunity.

Transform operations and infrastructure by improving city functions with innovative partner solutions, leveraging the power of cloud computing to reduce costs and increase efficiencies, empowering employees with enterprise-grade devices and apps, and enabling innovation on your terms with a modern solutions and big data platform.

Engage citizens and businesses by delivering personalised services and applications with a people-centric approach, enabling real-time dialogue via social media, and spurring development of city apps, and economic growth with the open data initiatives.

Accelerate innovation and opportunity through programmes and partnerships that empower youth with 21st-century learning and personal development opportunities, expand digital inclusion with access and skills training, and nurture new businesses and innovators with resources and support to help cities compete in the global marketplace.

Some examples of what Microsoft CityNext can enable:

Cross-city insights for better decisions in the short and long term.

More effective planning and response to keep citizens safe and secure.

Better use of resources through analytics and real-time information.

More efficient infrastructure that attracts businesses, jobs and visitors.

Saving time, money and energy for the priorities that matter most.

Microsoft has identified more than 40 solution areas across eight key city domains

Energy and Water: As populations and commercial activities expand, resource-related issues also increase. Both human and economic health can suffer from a lack of safe, adequate energy and water and from polluted urban areas.

Buildings, Infrastructure, Planning: Buildings consume more than 40 percent of all energy and generate 33 percent of carbon emissions worldwide. Reducing energy consumption and costs is a top economic and environmental priority.

Transportation: Cities with a major rise in their human and vehicle populations experience strains on their roads and public transportation networks as well as long commutes, pollution, and wasted human energy.

Public Safety and Justice: Increasingly, dense urban environments present various hazards to public safety, from petty crime to homicides to mass-scale terrorism. Plus, threats from natural disasters are real and unpredictable.

Tourism, Recreation and Culture: Entertainment, culture, and recreation not only help attract and retain a vibrant city population, they also draw tourists who can drive economic activity and enhance a city's reputation.

Education: Increasing access to higher-quality and diverse forms of education is expected. Yet most cities struggle to provide affordable education that fosters a highly skilled, creative, and employable population.

Health and Social Services: Access to timely, affordable, high-quality health services is a key public concern. Non-communicable diseases present challenging new needs, even as the likelihood of an outbreak of communicable diseases rises.

Government Administration: Citizens and businesses want virtually all city services to be accessible electronically. They are all for their city government increasing transparency and accessibility while protecting privacy and security.

87

The number of metropolitan cities in India with a population of a million or more in 2031, going up from 50 in 2011

It is no longer enough to do more with less. The current and emerging scenarios demand a combination of the power of innovation with breakthrough ideas to do NEW with less—to connect governments, businesses, and citizens with city services through innovation that increases efficiencies, reduces costs, and fosters a more sustainable life for all. Microsoft and its partners are helping cities work within their means by building on existing investments and incorporating new innovations at their own pace, ultimately creating an innovation model that works for today and sustains itself tomorrow.

CityNext enables cities to operate more efficiently and serve citizens as "One City" across eight critical functions: energy and water; buildings, infrastructure, and planning; transportation; public safety and justice; tourism, recreation, and culture; education; health and social services; and government administration. To bring this alive, we have at our command four game-changing emerging technology trends:

Cloud: Through a flexible cloud offering, cities can choose public, private, or hybrid clouds that protect data sources with the privacy, security and control needed for a city to have effective cross-departmental collaboration and

resource sharing. The scalability and cost-effectiveness of cloud services enable financial discipline without cutting essential services.

Mobility: Through mobile devices such as sensors, smartphones and tablets, cities can reach citizens anywhere, on any screen, through the device of their choice. Citizen-centric apps enable people to engage and interact with their city governments directly for services that make life safer and more convenient. Enterprise-grade mobile devices also give employees remote access to systems from any location, improving productivity and responsiveness.

Social Media: Using Twitter, Facebook, Skype and Yammer, cities can open two-way dialogues with citizens and businesses to better understand their needs. Cities also can better protect citizens and take care of their safety concerns using mobile alerts and social channels.

Big Data: Through data and analytics, city leaders can gain vital real-time insights from multiple streams, such as traffic cameras, social media, and other public channels, to make more accurate decisions, achieve greater efficiencies and respond faster to emergencies.

By adopting a people-first approach and pursuing strategic partnerships, cities can enable self-sustaining cycles of innovation, opportunity, and progress for years to come. We, at Microsoft, are ready and want to partner with you. Microsoft is uniquely equipped to enable this people-first approach because no other company offers as broad a portfolio of software, devices, and services, or a bigger network of global partners, and a history of successful education and social programmes, all of which, when combined, help cities address what's next. The result is a city that can compete on the world stage as a top place to live, work, and play.

"I truly believe that when people in a city come together to collaborate and innovate", says Laura Ipsen, Microsoft's Corporate Vice President, Worldwide Public Sector, "adding the right technology solutions can liberate resources and solve some of the toughest challenges their cities face."

Let's imagine, and work together on what's next for our cities. ■

**Vikas Aggarwal
Director, Industry Solutions
Microsoft India**

Sustainable Solutions to Urban Challenges

People-centric smart technology solutions can help cities to do 'more with less' and 'new with less'. Four global case studies, from cities as far apart as Buenos Aires and Tianjin, show how these solutions work.

Formidable challenges confront our city leaders today and can negate some of the very elements that make urban centres attractive in the first place. These challenges are not new, but their scale and intensity are unprecedented. Addressing these issues in the face of financial constraints, expectations of rapid returns on investments and administrative complexity can be even more difficult.

Through a people-first approach and strategic partnerships, cities can enable sustainable cycles of innovation, opportunity and progress for years to come, and can compete on the world stage as premier destinations for people to realise their full potential. The good news is that all this is not wishful thinking. Cities around the world have shown it is possible to do 'more with less' and 'new with less'. Here's how they are doing it.

Residents trim energy use by 20 per cent when given real-time consumption data

A demonstration project aimed at reducing energy use in the town of Issy-les-Moulineaux near

Paris, IssyGrid is France's first smart-grid neighbourhood. It is run by a consortium of corporate partners and local utilities that consider energy conservation an opportunity for businesses to address. About 200 test homes and four commercial buildings in the community have been outfitted with energy consumption monitoring devices, with the goal of ultimately expanding the programme to the entire town of 5,000 residents and 10,000 business employees.

IssyGrid collects energy consumption data and processes it in real time by using Windows Azure, the Microsoft Cloud services development, hosting and management environment. This data, once provided to citizens, helps them see how they use electricity. And this knowledge enables them to take specific actions to conserve — by turning off the television when it's not needed, for instance, or lowering the temperature by two degrees.

Such simple actions helped home and building owners lower their energy consumption, and therefore bills, by 10 to 20 per cent. Individuals can take action to reduce their energy use when empowered with information. Conserving energy globally therefore has to begin locally — in the neighbourhood.

Engineering firm automates Tianjin toll collection, achieves zero downtime

China's rapidly growing network of expressways plays an important role in supporting regional economic development, but manual toll collection combined with an increasing volume of traffic had created bottlenecks and hindered efficiency. The challenge was no different in Tianjin, which, back in 2008, had 714km of expressways that faced increasing congestion. That was when Tianjin became one of China's first cities to be selected for the national pilot project to install Electronic Toll Collection (ETC) systems, with Tianjin Expressway Group Company, a Chinese engineering company, in charge of both implementing and operating the solution.

The entire project had to be completed in just three months. To add to the pressure, it also had to comply with a number of specifications and meet the needs of multiple stakeholders, not the least of which were the drivers themselves. The company also faced many technical hurdles.

From its analysis of similar ETC implementations, Tianjin Expressway knew it needed a solution capable of handling a high volume of data resulting from daily traffic that would be in the tens of thousands but could jump to several hundred thousand vehicles during holidays. The company needed a scalable, high-performance solution that could complete transactions within seconds as vehicles move through the toll lanes.

With help from Huajian Warmstar, a Microsoft partner based in Beijing, Tianjin Expressway

designed a solution that includes three separate sites and connects applications from road companies, service providers and a bank. Huajian Warmstar used the Windows Communication Foundation, part of the Microsoft .NET Framework, and optimised the SQL Server 2008 R2 to build a large-scale solution that could reliably perform transactions across multiple applications.

After scanning tags on cars moving through the toll lane, the ETC system sends data to the clearing and settlement infrastructure, which includes three clustered server computers running SQL Server 2008 R2. The system calculates mileage and sends the toll to a clearing system in Beijing, Tianjin, or Hebei province. It processes an average of 300,000 toll collection transactions daily and collects up to two terabytes of data annually.

Smart buildings to help Seattle reduce downtown energy usage by 25 per cent

Seattle, the largest American city on the Pacific Northwest coast of the United States, has been growing rapidly since the 1970s, attracting people who want an exceptional quality of life, plenty of natural beauty, and of course world-class coffee. Accommodating a growing population (4 million and counting in the metropolitan area), however, means providing more electrical power, among the other necessities of life.

But Seattle decided a long time back that it didn't want to invest in building additional expensive and environmentally risky power generation plants; it wanted to make better use of the power it had while driving new

technologies for energy efficiency. The city partnered with Microsoft, Accenture, Seattle City Light, and Seattle 2030 District to launch the High-Performance Buildings Project, a programme aimed at reducing power consumption in commercial buildings.

The Smart Building solution being implemented by Accenture uses Microsoft software and cloud services to gain deeper insight from data generated by building management systems, sensors, controls and meters. Armed with this insight, Accenture is deploying its Smart Building solution in five buildings, with plans to soon expand the programme. The solution is expected to generate savings of 10-25 per cent for both energy and maintenance expenditures, which is significant considering the hundreds of thousands of dollars it costs annually to operate a large commercial building.

Buenos Aires initiative reduces time projects needed to meet requirements by 65 per cent

In 2008, to help sustain and expand the economy of Buenos Aires, home to nearly one third of Argentina's population, city leaders mandated the creation of the Centro de Atención al Inversor (CAI), or the Investor Service Centre, under the jurisdiction of the city's Ministry of Economic Development. And to help ensure that the CAI could accomplish its objectives, its leaders set out to find and implement a business management solution.

"We needed a single, centralised system for managing data and workflows in an accessible and easily customisable fashion," explains Damian Specter, Director General,

CAI. In 2009, the city deployed a customised solution based on Microsoft Dynamics CRM with the help of Accendo, a member of the Microsoft Partner Network — and did it in two months. Since then, CAI team members have used the solution to streamline exploration, development, monitoring and analysis of projects representing investments of 34.7 million Argentinean pesos (US$8 billion).

Specter describes the efficiencies of the new solution: "Without this solution, registering a new project would take 20 minutes; it takes four minutes now. Completing the administrative tasks associated with meeting government and legal requirements for a new project took 90 days in the past; it now takes 30 days. Researching and preparing a report for public and private entities involved with a given project might take three days without the solution — and with it, one. Performing an analysis on the cost/benefit impact of a completed project could take up to a full day before, and now we have that data immediately."

With these efficiencies, CAI employees are free to focus more of their energies on building relationships with business investors — whose projects bring thousands of jobs to the citizens of Buenos Aires and generate tax revenues that help fund education and other vital services. ∎

Microsoft

Creating a real impact for a better tomorrow

Trained under Microsoft's Project Shiksha, primary school teacher Firoz has transformed learning by integrating the use of computers in his daily lessons. Project Shiksha is a YouthSpark initiative that delivers comprehensive IT training to educators to accelerate the pace of IT literacy and enhance the classroom environment amongst government schools in the country.

Our YouthSpark programmes are aimed at empowering youth to imagine new possibilities and realise their full potential. We work with governments, academia, nonprofits and businesses to provide youth with the education, skills and opportunities to be successful.

To know more about Microsoft's initiatives, visit **www.microsoft.com/india/about**
Find us on: **www.facebook.com/microsoftindia** and **www.twitter.com/microsoftindia**

Creating a real impact for a better tomorrow

Supported by Microsoft's BizSpark programme, Krishna has revolutionised agriculture through an affordable, state-of-the-art solution, which helps farmers produce global quality crops. BizSpark is a YouthSpark initiative that provides start-up companies with free software, support and visibility during the first three years.

Our YouthSpark programmes are aimed at empowering youth to imagine new possibilities and realise their full potential. We work with governments, academia, nonprofits and businesses to provide youth with the technology, skills and opportunities to be successful.

To know more about Microsoft's initiatives, visit **www.microsoft.com/india/about**
Find us on: **www.facebook.com/microsoftindia** and **www.twitter.com/microsoftindia**