

How will sustainable and inclusive cities in your country look like in 2030?

City and Consumer Learning Unit Project

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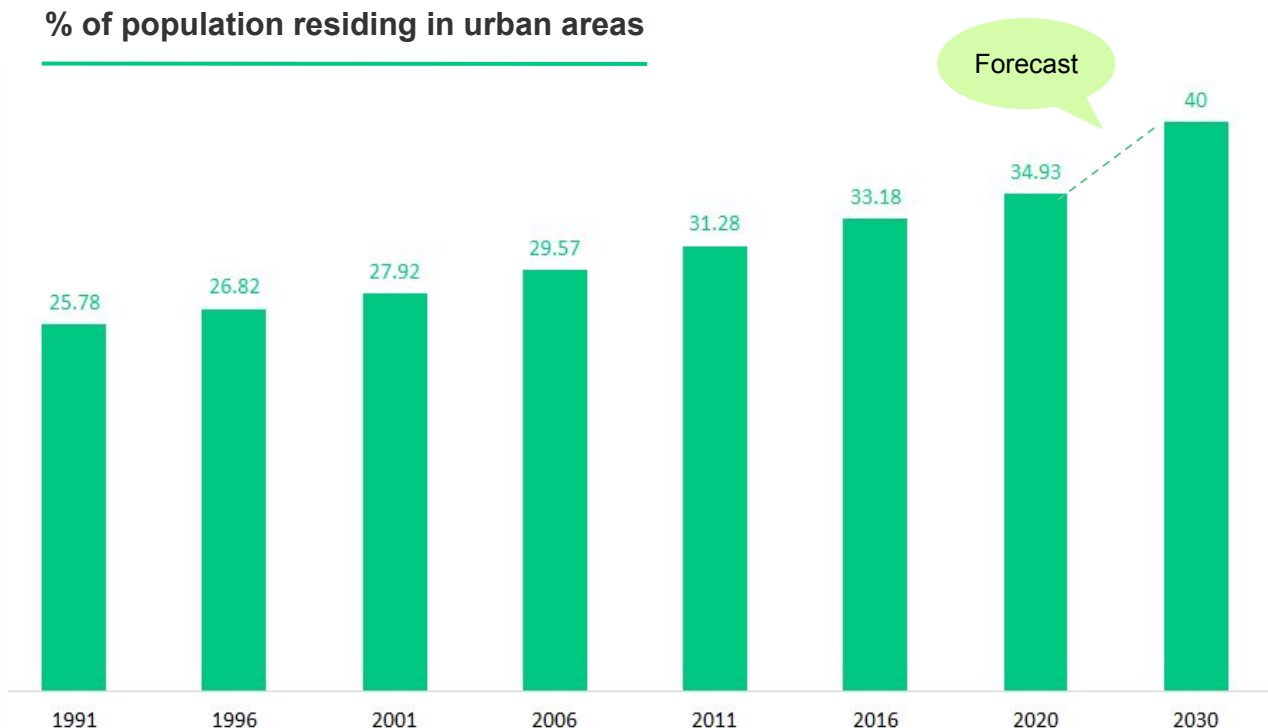


Executive summary

- Fast-changing economical, political and social demographics will urbanize almost two-fifths of the Indian population by 2030
- Inclusive urban planning is a necessity in Indian cities as a huge percentage of people are living in the slums
- Urban resilience to climate change is becoming alarmingly important with focus on basic necessities and services like healthcare, water and waste management.
- Reducing carbon footprint by switching to alternative sources for energy and electricity generation will help conserve resources (fuel, water, land, forests etc) and ensure sustainability
- Building efficient and convenient infrastructure and public transport with greater tech adoption is the need of the hour to holistically include all sections of society

Fast-changing demographics will urbanize almost two-fifths of the Indian population by 2030

- India is rapidly urbanizing with emerging agglomerations and migration to cities being significant factors since the turn of the century
- India's cities will account for nearly 40% of our population by 2030, comprising about 600 million residents
- India will have 68 cities with a population of more than 1 million; up from 42 in 2020
- Number of households to touch 386 million by 2030





Inclusive urban planning is becoming the necessity of Indian cities as a huge percentage of people are living in the slums

Inclusive cities are those that value all people and their needs and contributions equally. The project defined “inclusive cities” as those that ensure all residents – including the urban working poor – have a representative voice in governance, planning, and budgeting processes. Inclusive cities ensure the working poor have access to secure and dignified livelihoods, affordable housing, and basic services such as water/sanitation and electricity supply.

Types of Inclusion

Spatial Inclusion

Urban inclusion requires providing affordable necessities such as housing, water and sanitation. Lack of access to essential infrastructure and services is a daily struggle for many disadvantaged households

Social Inclusion

An inclusive city needs to guarantee equal rights and participation of all, including the most marginalized. Recently, the lack of opportunities for the urban poor, and greater demand for voice from the socially excluded have exacerbated incidents of social upheaval in cities

Economic Inclusion

Creating jobs and giving urban residents the opportunity to enjoy the benefits of economic growth is a critical component of overall urban inclusion.

35.2% of the total urban population lives in slums, i.e. nearly one in every six Indian lives in a slum

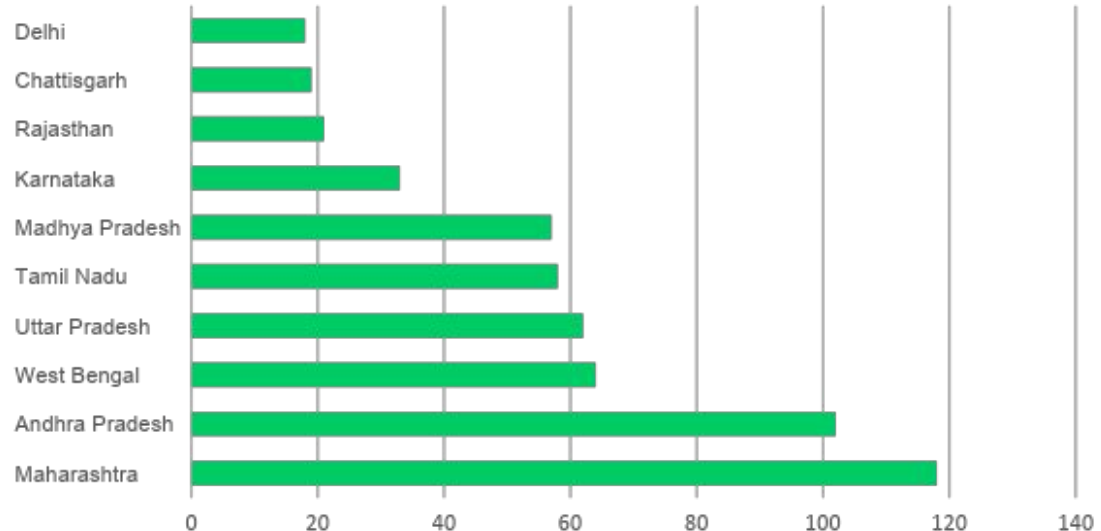
Problems faced by the people living in slums

- Water**
 - 35% of slum household do not have access to treated tap water.
 - 1.2 million slum households drink untreated tap water.
- Education and Children**
 - 86% of street children are illiterate and 40% work in the unorganized sector.
 - 35% of India's street children are dealing in substance abuse.
 - Only 1.4% of the girls reach class 12 in education
 - 29% of the girls are victims to child marriage and this trend is increasing.
- Drainage**
 - 6 out of every 10 slum household without any proper drainage system.
 - Out of the 63% households without proper drainage 44% have open drains and 19% are without any drainage connection.
 - This is why India accounts for more than half of the Global population defecating in the open
- Disasters**
 - The slum population the cities such as are facing serious threats to climate change. The people living in slums are most vulnerable to this.

Slum Household

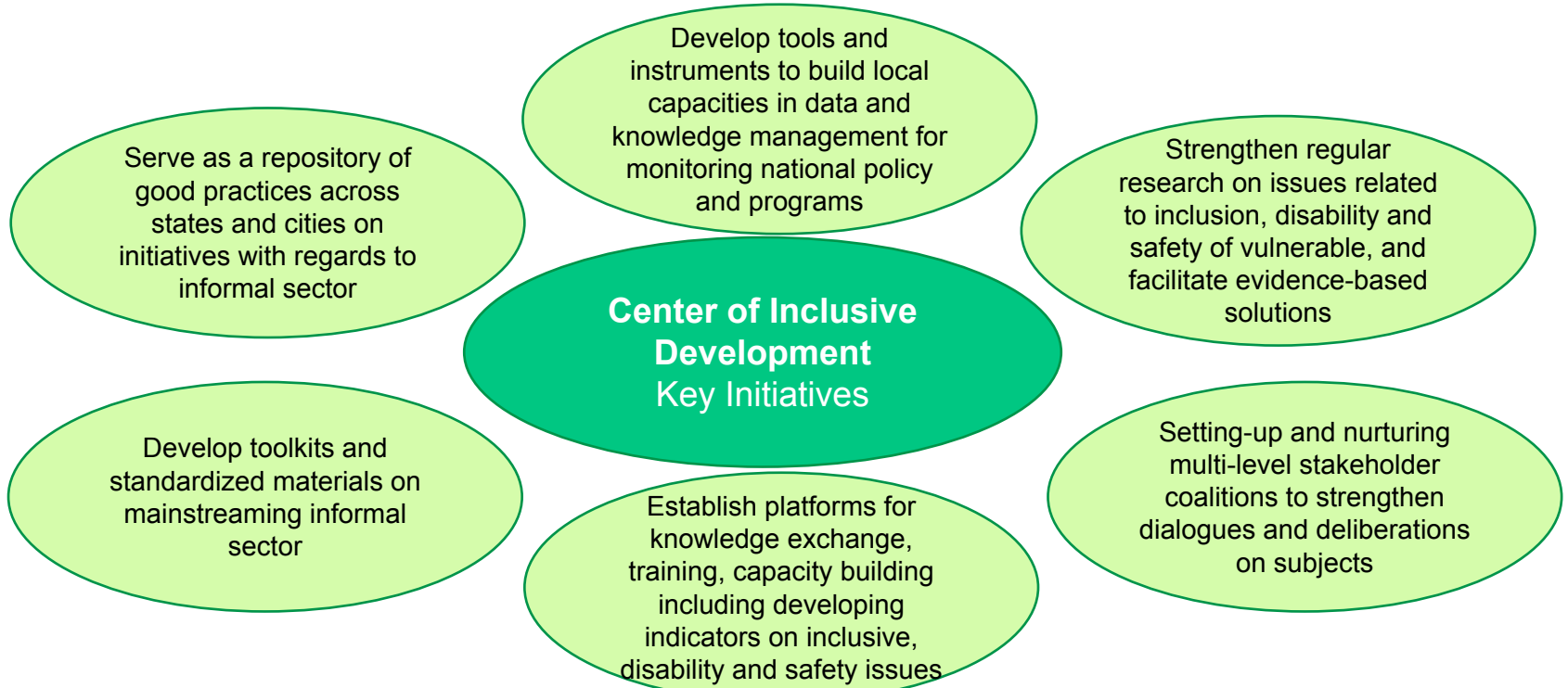
A slum household is defined as a group of individuals living under the same roof lacking one or more of the following conditions: access to improved water, access to improved sanitation, sufficient living area, and durability of housing.

Highest Slum Population in lakh



National Institute of Urban Affairs has initiated Center of Inclusive Development to leverage its expertise to build inclusive cities

CID is envisaged as a platform that will collate, mine, spatialize and share data on urban informality and formality with cities and urban practitioners for effective decision-making.



Inclusivity can be catalyzed in cities with appropriate measures

Adopting multi-sector solutions for a multi-dimensional issue

This implies combining **spatial approaches** (access to land, infrastructure, and housing) with **social interventions** (inclusion of the marginalized, community-driven development, investment in crime and violence prevention) and **economic measures** (jobs and opportunities for all, education and skill building)

Sequencing, prioritizing and scaling up investments

While a multidimensional, integrated approach is recommended, it is not always possible to implement operations that target all aspects of inclusion at once. Interventions may need to be **sequenced and scaled up or down** based on context, priorities and needs.

Harnessing communities' potential as drivers of inclusion

Local communities are in an ideal position to plan and prioritize their own needs. Based on the success of community-driven approaches, **communities' participation** in planning, implementing and sustaining the benefits of **urban interventions** is viewed as a key success factor.

Combining 'preventive' and 'curative' solutions

Approaches like slum upgrading have improved living conditions for many, they still remain an **'after-the-fact'** solution aimed at fixing the existing housing stock. There is a need to combine preventive approaches that allow **proactive planning** for future growth with upgrading.

Strengthening capacity at local level

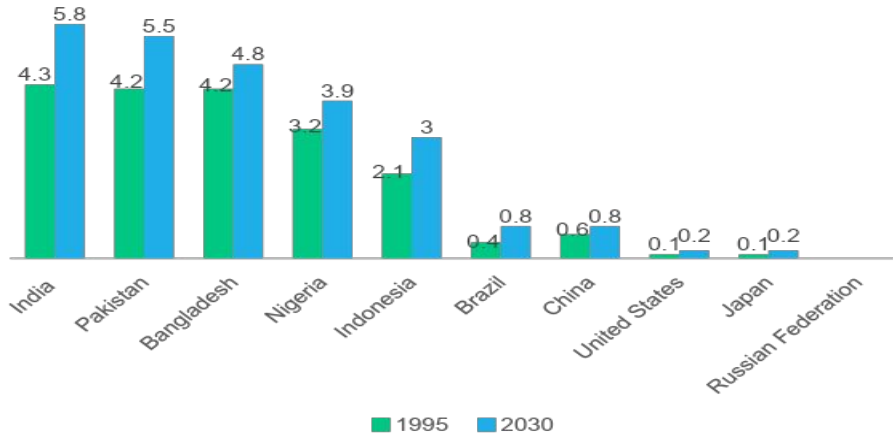
Higher levels of government and international agencies are only as effective as the local institutions they support. It is important to ensure that local governments have the **political backing, devolved powers**, necessary tools and resources to make urban inclusion a reality.

Fostering Partnerships

A multi-dimensional approach calls for multi-partner interventions, Collaborating with other **international development** organizations and bilateral donors will emphasize the need to promote inclusion globally, and will make it easier to adapt best practices to different local contexts.

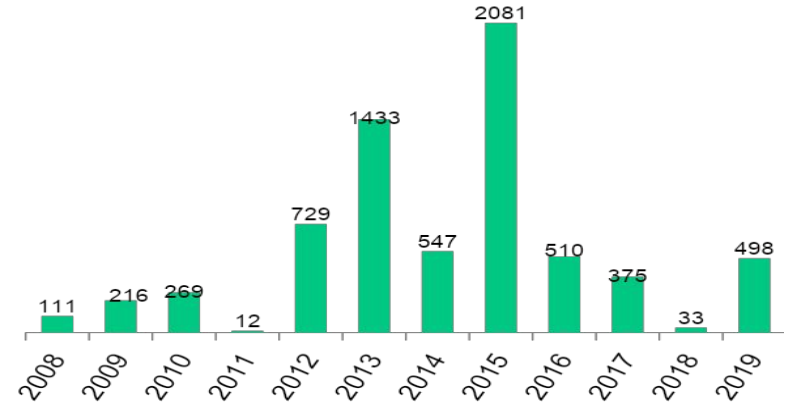
Climate change has adverse impacts on health and economy suggesting the need to make cities resilient

Loss in work hours due to heat stress
(% of total work hours)



- India has suffered the highest loss as compared to other countries which indicates large heat stress in India
- Heat stress has increased in the last two decades and is expected to increase for the next decade too

No. of deaths due to heat wave across India



- Deaths due to heat waves have increased over the years with an increase in the average temperature
- Temperatures could rise by 4.4 C by 2100 thus making it necessary to take appropriate measures



Lack of inclusivity in the urban health care system must be addressed through proper mapping and partnerships

Current Challenges

- With rapid urbanization, there is a burden of diseases like malaria, dengue due to lack of sanitation
- Populations such as transgenders, PwDs, elders have very little or no access to the health care services
- Implementation challenges faced by NUHM such as the issue of timings and locations of health services
- Primary health care facilities still remain inaccessible to urban poor due to lack of adequate services in public centres and unaffordability of private centres
- Overcrowding in public secondary & tertiary health services
- Lack of intra-sectoral and inter-sectoral coordination
- Lack of trained medical practitioners in public hospitals

Way Forward

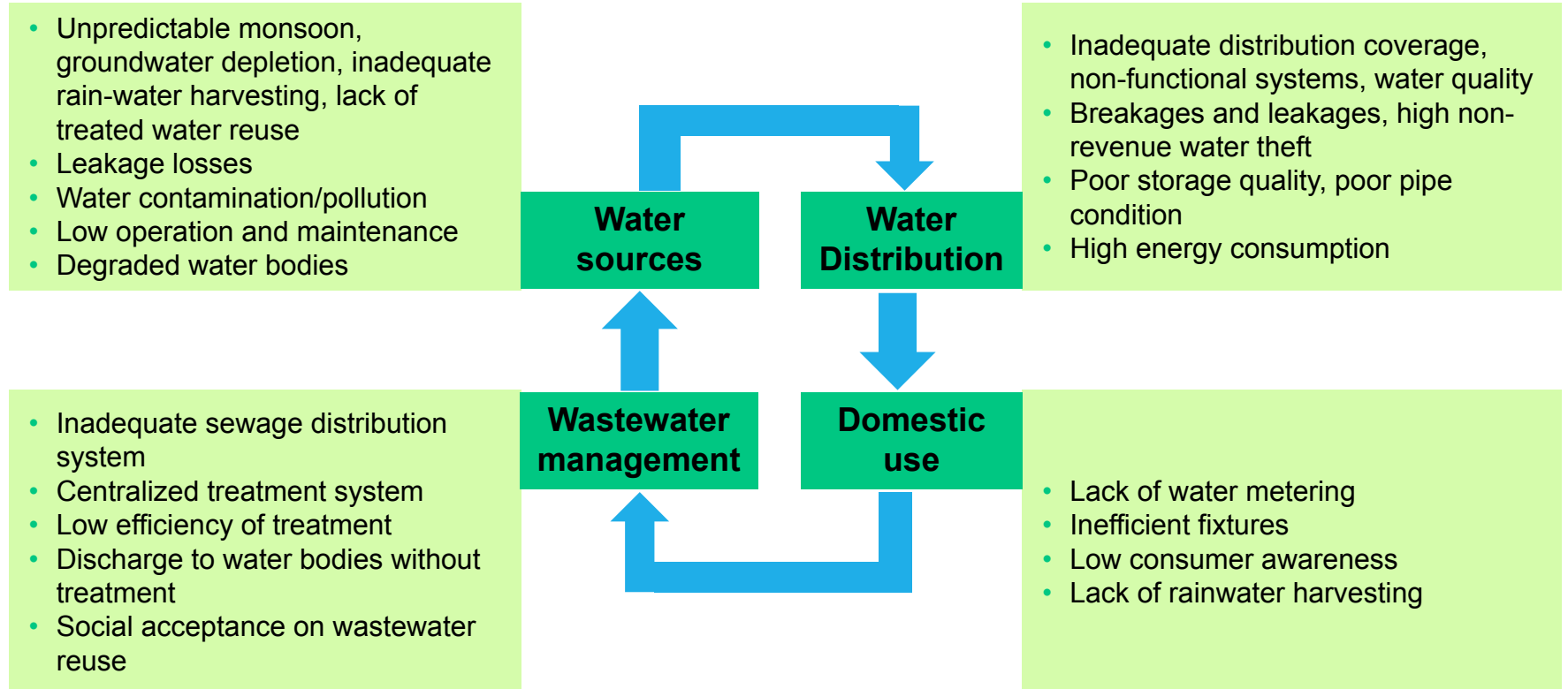
- Mapping of health facilities catering to the needs of urban poor and vulnerable groups
- States must take advantage of the flexibility offered by NUHM to design innovative models, analyze existing models and scale them up wisely
- Setting up a system of comprehensive community and family based primary healthcare with seamless linkages to higher level facilities
- Community awareness in urban community can be generated through Jan Andolan, for improved service delivery and outreach.
- Regulation of the private sector
- Increased partnerships with non-profit organizations and leveraging their reach into communities

1. NUHM- National Urban Health Mission

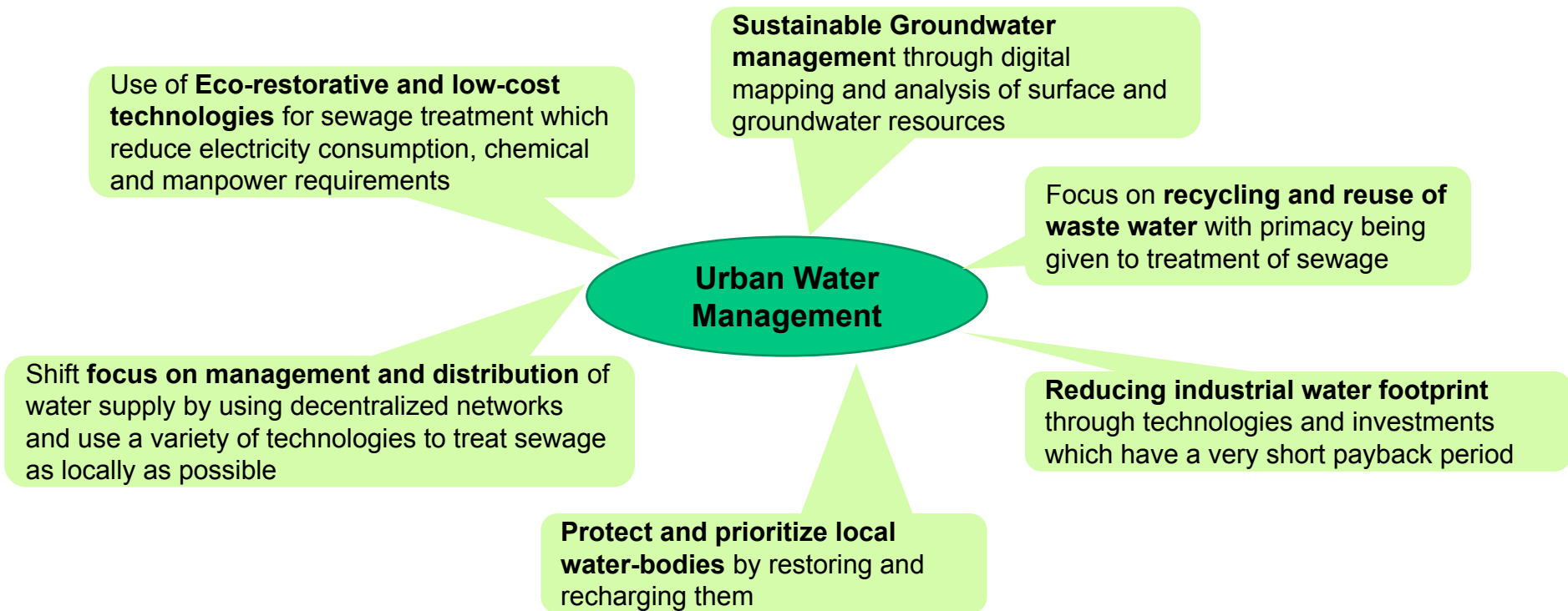
2. PwDs- Persons with Disabilities

Source: Niti Ayog

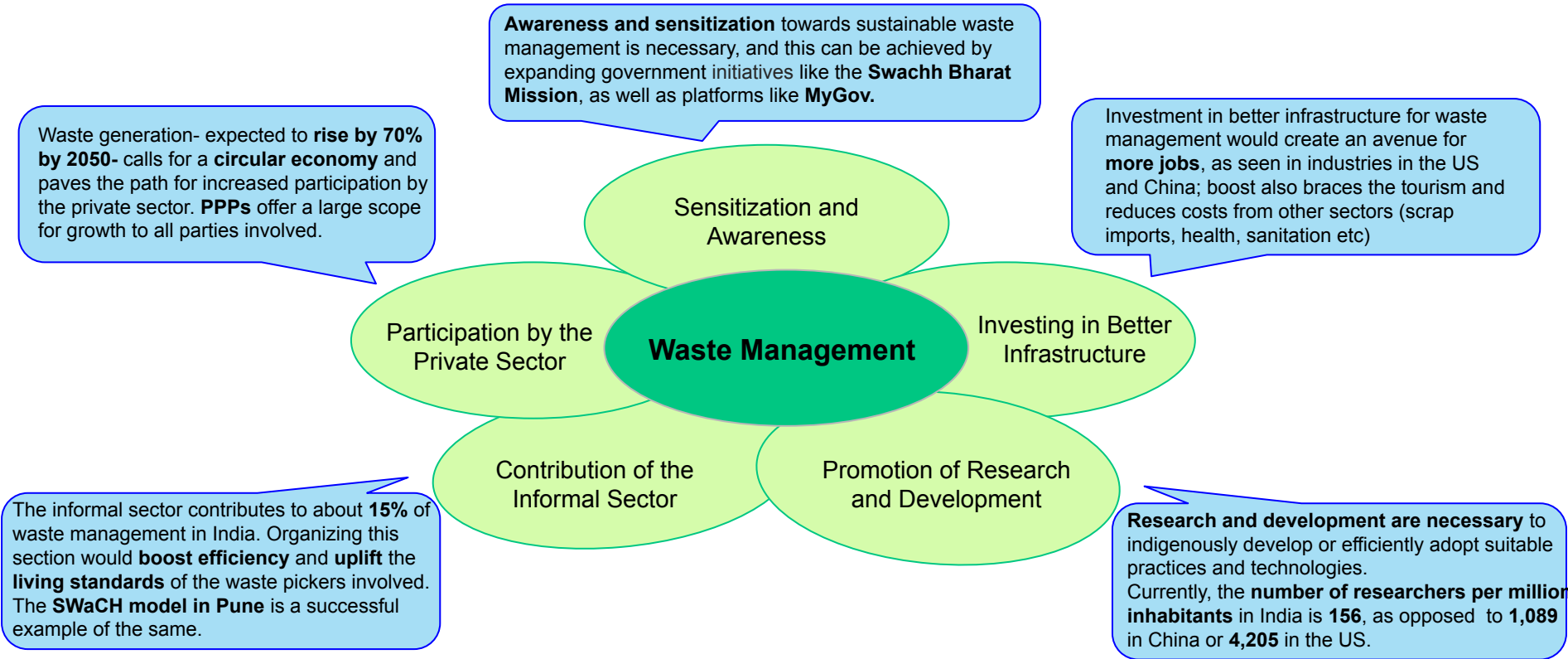
Water scarcity clock is ticking due to the inefficient water management



Urban water management requires a cost-effective model focusing on sustainable management of water resources



A stronger and more robust waste management system is crucial with a focus on reduce, reuse and recycle



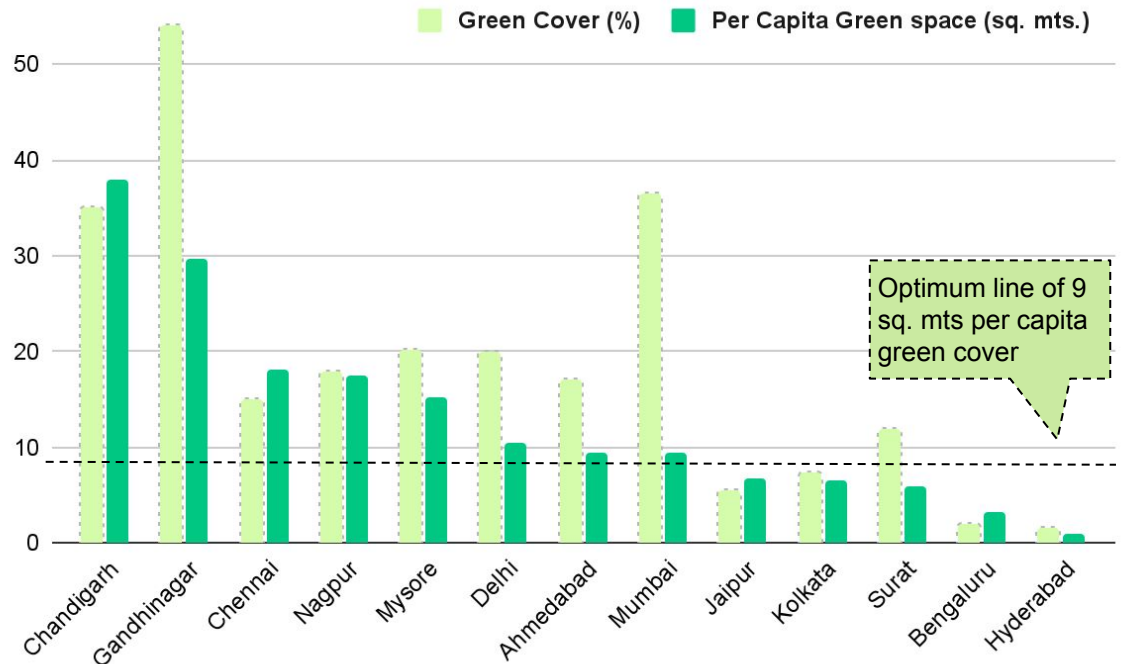
1. PPPs: Public-Private Partnership

Sources: PWC report, 2017; UNESCO Institute of Statistics; Deloitte India Services Sector Study, 2017

Access to nature with green spaces, public parks include senior citizens & children as beneficiaries of urban development

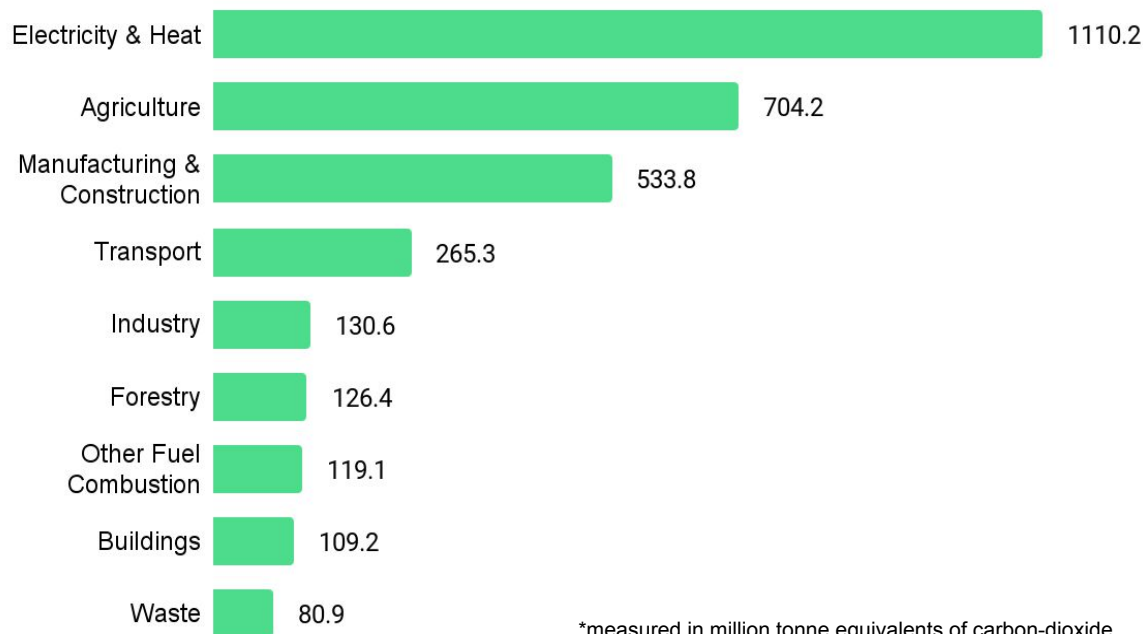
- The per capita green cover is way below or around the optimum of 9 sq. mts in most urban agglomerations
- There are pockets of green cover such as parks, roadside plants, and trees which face a major lack of maintenance
- There is a need to focus on developing and maintaining such urban green spaces (UGS) as play an important role in improving the air quality
- Strategic tree planting following a well thought out landscaping can aid in saving energy and maintaining 'cool-comfort'
- Recreational and fitness activities in green spaces ensure better health and life expectancy of the urban population

Green cover in major cities (as of 2018)



Cities, responsible for 75 percent of global CO2 emissions, need to reduce their carbon footprint in order to attain sustainability

Greenhouse Gas Emissions by Sector, India



*measured in million tonne equivalents of carbon-dioxide

- The world's cities occupy just 3% of the Earth's land, but account for about 70% of carbon emissions
- Ocean surface temperatures have continuously been on the rise and the average surface temperatures during the past three decades is at a peak
- Average sea level has increased at a rate of roughly six-tenths of an inch per decade since 1880, and the rate of increase has accelerated in recent years to more than an inch per decade
- Being a coastal country with an agrarian economy, climate change is an even bigger issue for India and its cities; reduction in the cities' carbon footprint is imperative

Countries across the world are leading by example in taking appropriate steps to move towards a cleaner planet

Cleaner Sources of Energy

With declining costs and improved availability, cleaner sources of energy can cut carbon emissions by 20-55%

Copenhagen launched a cooperative through its own utility to invest in a 40 MW wind farm that attracted more than 8,000 investors in the local community

Efficient Technology

Upgrade domestic technology to low-carbon alternatives: electric/solar heating pumps, high-efficiency air-conditioning etc

In Scandinavian cities, electric heat pumps account for 55% of building heating systems sales, thus eliminating the carbon emissions due to conventional systems

Improved Infrastructure

Roads and public areas should provide the necessary infrastructure for citizens to engage in sustainable practices
LEDs can reduce electricity demand in public spaces by 30% compared to fluorescent lights, and by 80% compared to incandescent bulbs.

Copenhagen reorganized its road system to prioritize and encourage bicycle traffic. Now, 62% of their residents ride their bikes, and only 9% drive daily.
Los Angeles has put 1,14,000 LED streetlights in place to date, reducing its annual costs for electricity by \$7.5 million and for maintenance by \$2.5 million

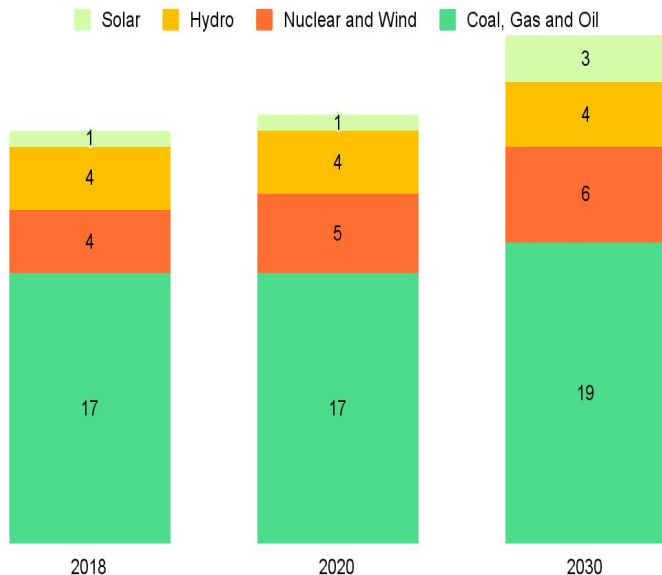
Electrification

- Annual emissions per EV are 3,774 pounds of CO2 equivalent compared to 11,435 pounds by conventional gasoline vehicles.
- The per km cost of a petrol-based vehicle is rs.10, of a diesel variant rs.7 and of an EV only rs.1

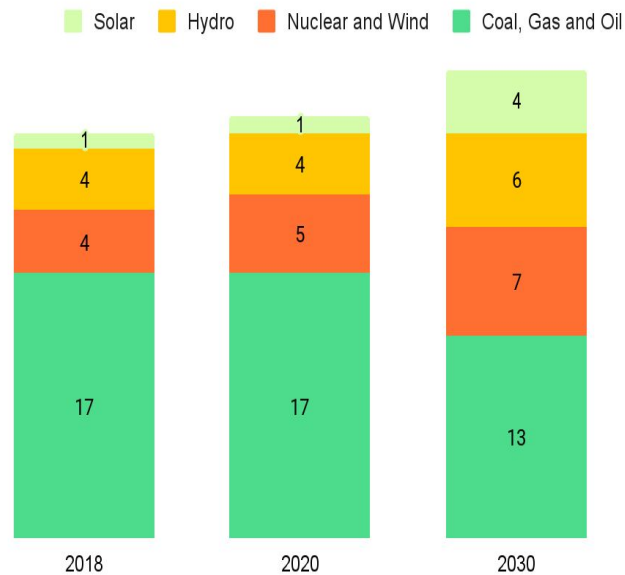
The Chinese and German EV sectors have attracted a total investment of 135.7bn and 71.7bn dollars respectively. The Indian EV sector has also seen a spike in investment, with a CAGR of 138.61% from 2014 to 2019. With schemes like FAME India, the cost of EVs is set to be same as petrol variants in 2 years.

Switching to alternative sources for energy and electricity generation will help conserve resources (fuel, water, land, forests etc)

Electricity Generation by Fuel from Standard Policies

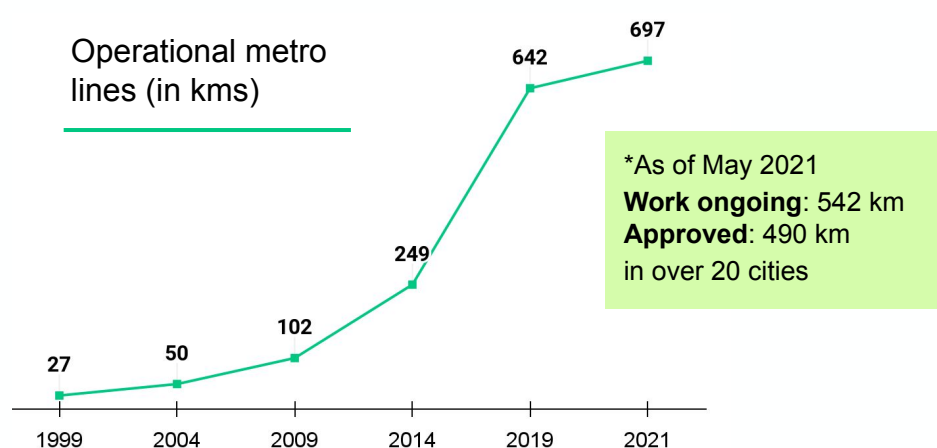
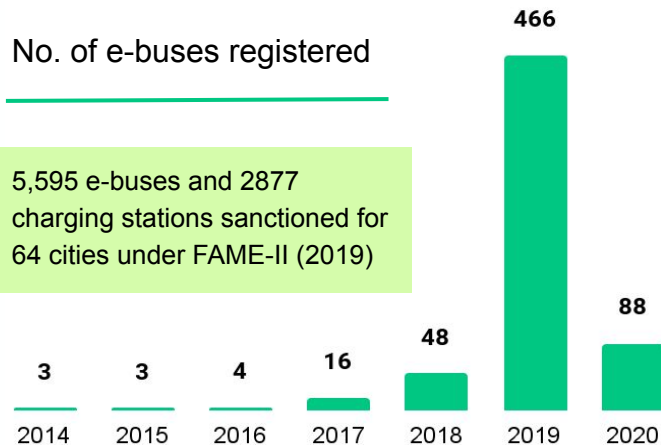


Electricity Generation by Fuel for Sustainable Development



- As predicted by the graphs, a shift to alternative sources of energy is needed to ensure sustainable growth
- Production of energy from alternative, clean sources opens an avenue for increased public-private partnerships and economic growth as new companies for the same could emerge in the markets
- Governments and local authorities can promote these with incentives like tax reductions, support schemes and awareness drives to urge the public to consume and invest in cleaner sources of energy

An efficient and convenient public transport with greater adequacy and adoption will holistically include all sections of society



- Almost 75% of public transport trips are by bus
- Shifting the fleet to e-buses will reduce CO2 emissions
- By 2025, the E-bus market is estimated to be at 7000 units
- FAME subsidy by the government, 100% FDI policy and support under Make in India scheme to boost growth
- Combustion engine development can thus be leapfrogged

- Rail transport systems are six times more energy-efficient than roads
- The social costs in terms of environmental damage are significantly lower

Metro rail system should be more than just an engineering solution

- Serve as a daily commute for mid-income strata to ease congestion on roads
- Digitizing stations and tracking trains to run an intelligent & efficient system
- Improving reliability by an optimized network with a customer first approach

Integration of various transport modes while giving impetus to shared mobility and non motorized transport is suggested



Integration

- **Coalition of the public, private and social players for effective multilevel governance**
 - Establishing unified transportation agency for efficient use of city spaces, assets, and resources
 - Effective role of the private sector and universities to advance the green economy as a priority
- **Integrating multi-modal transport while effectible using data and tech for planning**
 - Leveraging multiple modes of urban transport for utility with a clear hierarchy amongst them
 - Smart transportation with fleet and traffic management, ticketing, security and real-time info



Shared Mobility

- **Important to ensure that people leave their cars behind and switch shared mobility**
 - Private vehicles have a low asset utilization, high maintenance and a factor in clogging roads
 - The shared mobility market valued at \$1,026 million in 2019, is expected to grow to \$3,953 million in 2025 at a CAGR of 56.8% as ride-hailing services remain ever popular
- **Ride-sharing and ride sourcing through digital tools will help reduce congestion**
 - Growth due to increasing consumer need for flexible and cheaper travel and parking problems
 - Addressing safety concerns in ride source/share can further improve the adoption



Non-motorized transport (NMT)

- **Promoting NMT leverages the healthy and traditional solutions of walking or cycling**
 - The routes should be integrated with public transport and ensure last mile connectivity
 - Focus on proper infrastructure with full accessibility for the elderly and specially-abled
 - Safety for NMT users in vulnerable areas (e.g. inner street, parking lot, subways) through proper lighting, monitoring by CCTV cameras and dedicated traffic signals

The development of infrastructure of smart cities using cost-effective technological tools is a goal that is well within reach

The advent of technologies like 5G, IoT, ML, AI, and hybrid cloud has yielded possibilities for building efficient, sustainable, and user friendly infrastructure. It can constantly communicate with users, and is suited to the dynamic needs of various stakeholders

Applications and Suggestions

Existing developments

Digital Mapping

- Generating three-dimensional information and high accuracy map of any area in various aspects of urban planning
- Aids the understanding of road networks, traffic management, disease patterns, tourist inflow and maintenance of law and order

Mapping of Chandigarh on the basis of the Light Detection and Ranging (LIDAR) technology done in 2021

Control Centre

- Nerve centre of the city, integrating utilities and emergency services
- GPS tracking and scheduling integration of urban transport for real-time information and ease of multi-modal commute
- Traffic signal synchronization through IoT based CCTV cameras, helping to streamline traffic flow and reduce congestion

Integrated Command & Control Centre set up in Chandigarh & Panaji

Integrated Transport

- National Common Mobility Card (NCMC) as an interoperable, open-loop, common payment system for all modes of transport
- Quick e-ticketing and contactless transactions including concessional travel

NCMC in Hyderabad for buses, Metro rail, local trains, rickshaws, and cabs

Smart Utilities

- Smart lights ensure illumination in different locations based on demands, i.e. reduce energy consumption in areas with low occupancies
- Run on solar energy and have the option of predictive maintenance

Tata Communications has deployed smart streetlights in NCR, Ahmedabad, Nashik, and Kolkata



Interview with experts on the role of public transport in sustainable and inclusive cities

“City building needs to transform, planning corridors of public transport through high-density areas, promoting cheap real estate near these corridors and promoting multi-use. Latin American cities like Bogota, Curitiba have led the way in innovating the Bus Rapid Transport System, being the most efficient, cheapest, cost-effective, and democratic way of mass transport. Future should be predominantly based on ensuring accessibility of BRTS to every citizen with 5-7 min of walking and last-mile connectivity. Notable case studies for BRTS can be Ahmedabad, Hubli-Dharwad, and Indore.”

- **Sreekumar Kumaraswamy**, Head- Integrated Transport, WRI Cities India

“Innovation and technology in transport are being done by the private sector and there needs to be a synergy with the government and transport agencies for swift implementation. Acquiring individuals with deep understanding and expertise will help in leading a wave of change in transport agencies/ministries. Creating customer focussed approach, giving good service is the need of the hour in order to engage and include everyone. This can be done through on-demand services, scheduling, routes based on people profile while leveraging the effects of Digital India and the smartphone penetration.”

- **Jaspal Singh**, Ex-Head, India Office, UITP (International Association of Public Transport)