Smart City
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सत्यमेव जयते
Ministry of Housing and Urban Affairs
Government of India

UN-HABITAT

SMART CITIES MISSION

LOCALIZING SUSTAINABLE DEVELOPMENT GOALS

Smart Cities Mission, India: Localizing Sustainable Development Goals

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The data used for SDG localization is provided by the Smart Cities Mission, Ministry of Housing and Urban Affairs, Government of India (as on 31st May, 2023).

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SMART CITIES MISSION

LOCALIZING SUSTAINABLE DEVELOPMENT GOALS

Foreword

Hardeep Singh Puri
Minister for Housing and Urban Affairs;
and Petroleum and Natural Gas
Government for India

The arc of India's urban development will determine the pursuit of the country's commitments to the Sustainable Development Goals (SDG). Be it reducing poverty; developing universal access to health, education and digital technology; increasing livelihoods; or optimising energy consumption, cities are both the arena and actor for the attainment of the tenets of economic progress, social equality and environmental sustainability. The fact that the launch of the government's flagship urban missions predate Agenda 2030 and the SDG framework reflects India's commitment towards sustainable urbanisation.

Prioritising circular economy, resilience and inclusion, these programmes echo the centuries-long Indian ethos of environment-friendly and frugal solutions. The Smart Cities Mission (SCM) is one such initiative that offers low-carbon, people-centric approaches for the enhancement of urban infrastructure and services. It has pioneered and mainstreamed the use of digital technologies to improve the quality of life and ease of doing business in urban areas.

“The arc of India’s urban development will determine the pursuit of the country’s commitments to the Sustainable Development Goals. The Smart Cities Mission (SCM) is one such initiative that offers low-carbon, people-centric approaches for the enhancement of urban infrastructure and services.

As this report establishes, the natural consequence of the holistic nature of urban infrastructure development that the mission has promoted is that its projects have developed strong linkages with 15 out of the 17 SDGs. This report precisely demonstrates—through its Output and Outcome Monitoring Framework (OOMF)—how project outcomes have advanced India’s SDG agenda.

I commend the team at the Smart Cities Mission and UN-Habitat India for capturing a unique perspective of the country’s SDG pursuit, i.e., localisation of the Sustainable Development Goals. City managers, practitioners and academics across the world will find that many of the Smart Cities Mission’s projects have set a global benchmark while also being easily replicable and customisable.

I congratulate the authors for producing a compilation that will definitely fill a gap in the literature and substantially add to the discourse in emerging urban regions across the world.

New Delhi
August 2023

Foreword

Maimunah Mohd Sharif
UN Under-Secretary-General and Executive Director
United Nations Human Settlements Programme
(UN Habitat)

Agenda 2030 and the New Urban Agenda together comprise the globally accepted blueprint for sustainable urban transformation. The five pillars of the New Urban Agenda — national urban policy, urban legislation and regulations, urban planning and design, local economy and municipal finance, and local implementation—are the levers of action to transform the 17 Sustainable Development Goals (SDGs) into a reality for our cities.

While cities, sub-national governments, and ministries have sought to measure their performance towards the achievement of the SDGs, they often need support to translate the metrics into strategic plans for targeted action. UN-Habitat has extended its support to cities and other entities in making the leap from assessment to action through several initiatives. UN-Habitat's flagship SDG Cities programme, for instance, enables cities to accelerate the achievement of the SDGs with a course of action starting with baseline assessment and culminating with SDG Cities Certification as a standard for excellence.

The Smart Cities Mission of the Government India, launched in 2015, is unique in having the Agenda 2030 and elements of the New Urban Agenda embedded into the programme. The global agenda for sustainable urban transformation reflects in the objectives, structure, and implementation of the programme. Even though it precedes India's National Indicator Framework for national scale localization of SDGs, the SDGs were built into the monitoring of the programme through the Output-Outcome Monitoring Framework. This framework and the associated data thus give us an invaluable opportunity to localize

“This report may be one of the few international studies to utilize a dataset of the scale offered by SCM for the localization of SDGs. I hope it sets an international benchmark for aspiring urban regions across the world that may learn and benefit from this work.

the SDGs at the level of a national programme being implemented across 100 cities.

The process of writing this report began with the constitution of an expert committee comprising of experts from UN-Habitat and the Smart Cities Mission unit at the Ministry of Housing and Urban Affairs (MoHUA) of India. The committee mapped 213 output and outcome indicators to the SDGs and the associated targets. The following SDGs were chosen for an in-depth review: SDGs 6,7,8,9,11 and 17. The result is this spectacular effort that brings to the global arena the learnings from across 100 cities in India. It may also be one of the few international studies to utilize a dataset of such scale for the localization of SDGs at the level of a national mission.

I am grateful to the Honourable Minister for Housing and Urban Affairs Shri Hardeep Singh Puri for his vision for sustainable urbanization in India that enabled the collaboration between the Ministry and UN-Habitat. Further, I am grateful to the Smart Cities Mission Director Shri Kunal Kumar and his entire management team for the support extended towards the realization of this report. I hope it sets an international benchmark for aspiring urban regions across the world that may learn and benefit from this work.

Measuring impact is key in our efforts to implement the SDGs. We cannot achieve our goals, if we do not know where we stand and what gaps exist to reach them.

Nairobi
August 2023

Foreword

Manoj Joshi
Secretary
Ministry of Housing and Urban Affairs
Government of India

India's G20 presidency, with the theme 'One Earth-One Family-One Future', comes at a crucial juncture in the implementation of Agenda 2030. The disruption caused by the Covid-19 pandemic dealt a severe blow to our collective efforts to achieve SDGs by the end of this decade. It is thus critical to chart ways to accelerate the progress towards the SDGs, particularly for the Global South which is disproportionately impacted by the consequences of the pandemic.

This report demonstrates the remarkable story of a national urban mission which navigated the challenges of the post-pandemic world to reach the lives of over 100 million urban dwellers in India, particularly in intermediary urban regions. An initiative which predates SDGs, the Smart Cities Mission has translated the vision of sustainability into action with means of implementation that cities across the world may find useful.

The pursuit of SDGs is an integral part of the vision with which Government of India has driven the programmes for urban transformation in India. SCM is one of the flagship urban missions of MoHUA that have sought to address the different dimensions of SDGs with local action driving convergence of technology with investments in basic urban infrastructure. The flagship missions

“This report demonstrates the remarkable story of a national urban mission which navigated the challenges of the post-pandemic world to reach the lives of over 100 million urban dwellers in India, particularly in intermediary urban regions.

of MoHUA include national level programs on sanitation (SBM), housing (PMAY), basic infrastructure (AMRUT), among others. These missions cover more than 4,800 urban jurisdictions in India and have mobilized investments over USD 200 billion.

SDG localization through SCM is an exemplary template for understanding the contribution of cities in India's transformation and the global impact of such programmes. The report demonstrates the value of aligning national missions with SDGs and grounding them in data and monitoring frameworks, ability to adapt to changing contexts, and local empowerment from visioning to implementation that must be replicated across similar contexts.

As the Hon'ble Prime Minister of India Shri Narendra Modi said at the UN Sustainable Development Summit in 2015: "Sustainable development of one-sixth of humanity will be of great consequence to the world and our beautiful planet. It will be a world of fewer challenges and greater hope; and, more confident of its success".

New Delhi
August 2023

Foreword

Kunal Kumar
Joint Secretary and Mission Director
Smart Cities Mission
Ministry of Housing and Urban Affairs
Government of India

The Smart Cities Mission (SCM) is a potential global exemplar of the best practices in the implementation of the SDGs and the New Urban Agenda. Since its launch in 2015 by the Hon'ble Prime Minister Shri Narendra Modi and under the stewardship of the Hon'ble Union Minister for Housing and Urban Affairs Shri Hardeep Singh Puri, SCM has reached the lives of more than 100 million people across 100 cities in India. In other words, SCM has impacted one in every four urban dwellers in India.

SCM precedes the SDGs and Agenda 2030. And yet, it may be one of the few programs in the world that has seamlessly translated the vision of sustainability into action in cities. 15 out of 17 SDGs correspond to the various outputs and outcomes under the programme. SDGs are embedded into the mission's monitoring mechanisms—its Outputs-Outcome Monitoring Framework (OOMF), for example, provides insights into transformations and investments achieved across the various SDGs.

The OOMF indicators precede India's National Indicator Framework for localization of SDGs. However, the 200 odd indicators under OOMF could be mapped to the SDG targets. In fact, they enable a review of the progress of the SDGs at the scale of the mission and

“The Smart Cities Mission (SCM) is a potential global exemplar of the best practices in the implementation of the SDGs and the New Urban Agenda. The mission has seamlessly translated the vision of sustainability into action in cities.

its impact across 100 cities. The dataset is complemented by stories of people and communities from SCM cities which appear across the SDGs chosen in the report for an in-depth review: SDGs 6,7,8,9,11, and 17.

SCM projects are organized across the themes of Liveability, Economic-ability, and Sustainability (LES). Its objectives were translated into investments and implementation through the institutional mechanism of Special Purpose Vehicles (SPVs) which complemented municipal bodies. SCM has thus delivered a blueprint for action for urbanizing cities across the world who can likewise adapt and empower their institutions to achieve the SDGs.

SCM through its institutional innovations and financial instruments has demonstrated a pathway for cities to gradually improve their revenues and enhance their financial autonomy. Further, nearly 66 per cent of SCM cities have a population of less than one million. For several such cities, SCM has turned out to be an important fiscal source to enhance the city’s infrastructure. It is in such arenas that the quest for sustainable urban development will unfold in the coming years. These lessons and experiences from SCM will hopefully inspire emerging urban regions across the world to make cities a better place for their people and communities.

New Delhi
July 2023

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ABD	Area Based Development
AFCS	Automatic Fare Collection System
AFD	Agence Francaise de Developpement
AI	Artificial Intelligence
AMC	Ahmedabad Municipal Corporation
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
AMTS	Ahmedabad Municipal Transport Service
ANPR	Automatic Number Plate Recognition
ATCS	Adaptive Traffic Control System
AVLS	Automatic Vehicle Location System
BOD	Biological Oxygen Demand
BRTS	Bus Rapid Transit System
CCMC	Coimbatore City Municipal Corporation
CCPS	City Card Payment System
CCTV	Closed-Circuit Television
C-Cube	Climate Centre for Cities
CDO	City Data Officer
CEO	Chief Executive Officer
CITIIS	City Investments to Innovate, Integrate and Sustain
CNG	Compressed Natural Gas
COD	Chemical Oxygen Demand
CSR	Corporate Social Responsibility
CSS	Centrally Sponsored Scheme
FSSAI	Food Safety and Standards Authority of India
GDP	Gross Domestic Product
GIS	Geographical Information System
GMIS	Geo-spatial Management Information System
GOI	Government of India
GPS	Global Positioning System
GVMC	Greater Visakhapatnam Municipal Corporation
GVSCCL	Greater Visakhapatnam Smart City Corporation Limited
HDPE	High-Density Polyethylene
HLPF	High Level Political Forum

IC4C	India Cycles for Change
ICCC	Integrated Command and Control Centre
IEC	Information, Education, and Communication
IMC	Indore Municipal Corporation
INR	Indian Rupee
ISCDL	Indore Smart City Development Limited
ITDP	Institute for Transportation and Development Policy
ITMS	Intelligent Traffic Management System
ITS	Intelligent Traffic Solutions
IUDX	India Urban Data Exchange
JICA	Japan International Cooperation Agency
KSEBL	Kerala State Electricity Board Limited
LED	Light Emitting Diode
LES	Liveability, Economic-ability, and Sustainability
MeitY	Ministry of Electronics and Information Technology
MHRD	Ministry of Human Resource Development
ML	Machine Learning
MLA	Member of Legislative Assembly
MoHUA	Ministry of Housing and Urban Affairs
MoSPI	Ministry of Statistics and Programme Implementation
MP	Member of Parliament
MPEB	Madhya Pradesh Electricity Board
MSME	Micro, Small, and Medium Enterprises
NCMC	National Common Mobility Card
NGO	Non-governmental Organization
NMT	Non-motorized Transport
NIC	National Informatics Centre
NIF	National Indicator Framework
NIUA	National Institute for Urban Affairs
NUA	New Urban Agenda
NULP	National Urban Learning Platform
OGD	Open Government Data
OOMF	Output–Outcome Monitoring Framework
PAS	Public Address System
PBS	Public Bicycle Sharing
PMAY (U)	Pradhan Mantri Awas Yojana Urban
PNG	Piped Natural Gas
PPP	Public Private Partnership

PSTR	Partially String Tank Reactor
PV	Photovoltaic
RLVD	Red Light Violation Detection
SANKALP	Saraswati and Kahn Lifeline Project
SBM (U)	Swachh Bharat Mission Urban
SCADA	Supervisory Control and Data Acquisition
SCAF	Smart City Advisory Forum
SCM	Smart Cities Mission
SDC	Swiss Agency for Development and Cooperation
SDG	Sustainable Development Goals
SFDRR	Sendai Framework for Disaster Risk Reduction
SPV	Special Purpose Vehicle
STP	Sewage Treatment Plant
TANGEDCO	Tamil Nadu Generation and Distribution Corporation
TIF	Tax Increment Financing
TULIP	The Urban Learning Internship Program
UNDESA	United Nations Department of Economic and Social Affairs
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
USAID	United States Agency for International Development
USD	United States Dollar
USTDA	United States Trade and Development Agency
VLR	Voluntary Local Review
VNR	Voluntary National Review
WDS	Waster Distribution Station
WTP	Water Treatment Plant
	Units
Km	Kilometre
KW	Kilowatts
kWh	Kilowatt Hour
MLD	Million Litres Per Day
MT	Metric Tonnes
MW	Megawatt
MWh	Megawatt Hour
Sq km	Square Kilometres
Sqm	Square Metres
TPD	Tonnes Per Day
W	Watt

Executive Summary

India is a signatory to the 2030 Agenda for Sustainable Development and has committed to achieving inclusive, safe, resilient, and sustainable communities and settlements. India's urbanisation story is one that is unprecedented with 483 million (34.9 per cent) people living in cities in 2020, and the share is expected to rise to 43 per cent in 2035[1]. Nearly 60 per cent of India's carbon emissions by 2030 will come from "buildings and factories that are yet to be built, and vehicles and appliances that are yet to be bought."[2] India is at an important crossroads where the design of its cities and urban centres may determine how its growth story unfolds.

India's urban agenda is intertwined with its commitments under global mandates, namely, the Sustainable Development Goals (SDGs), the New Urban Agenda (NUA), the Addis Ababa Finance-for-Development Agenda, the Paris Agreement on Climate Change, and Sendai Framework for Disaster Risk Reduction (SFDRR). The country's flagship urban missions—Housing for All, Clean India Mission, Smart Cities Mission (SCM), Atal Mission for Rejuvenation and Urban Transformation (AMRUT), National Mission for Sustainable Habitat, National Urban Livelihoods Mission—have transformed over 4,800 cities and towns. In this report, the transformation of 100 cities across India as part of Smart Cities Mission (SCM) is examined through the lens of SDGs. This report is worthwhile as it documents the entire gamut of social, economic and sustainable impacts of SCM on 100 million urban dwellers in India.

SCM is implemented as part of a federal budgetary provision, Centrally Sponsored Scheme (CSS), which enables the transfer of funds to sub-national and city governments for specific development programmes. The projects are implemented in the selected cities by Special Purpose Vehicles (SPVs) established under the country's corporate governance laws.

The 100 Smart Cities are representative of India's urban geography. The share of intermediary cities, with population between 100,000 to 1,000,000 persons, stands at 54 per cent. SCM offers a unique scale for SDG localization: the mission has undertaken over 7,800 projects across 100 cities since its inception in 2015 and directed an investment of over USD 22 billion. These projects fall under the ambit of area-based developments (60 per cent of total projects) and pan-city smart solutions (40 per cent), which focus on the entire city, so no space is left behind, and all communities benefit from the mission's investments. The largest share of projects and investments are directed towards basic infrastructure and services which seek to improve the liveability outcomes in the emerging urban areas.

SCM is a unique case study of SDG localization. The three pillars of the mission—Liveability, Economic-ability, and Sustainability—are aligned with 15 out of the 17 SDGs. Nearly 44 per cent of the total SCM projects contribute to SDG 11 (Sustainable Cities and Communities). SDG 6 (Clean Water and Sanitation) has the second largest share of projects at 13.3 per cent, followed by SDG 7 (Affordable and Clean Energy) at 8.6 per cent, and SDG 8 (Decent Work and Economic Growth) at 6.4 per cent.

The pillars of Liveability, Economic-ability, and Sustainability (LES) are linked to the 5Ps of SDGs. The three pillars of SCM are further divided into 21 distinct sub-sectors which are monitored using a set of indicators referred to as Output-Outcome Monitoring

Framework (OOMF). The framework tracks transformation across 100 SCM cities through a set of 213 indicators, which also measure the SDG targets and indicators directly and indirectly. 213 OOMF indicators are mapped to 51 out of 169 targets across 15 SDGs.

Six SDGs are selected for in-depth coverage in this report: 6, 7, 8, 9, 11, 17. Five out of the six SDGs –SDGs 6,7,9,11, and 17—are slated for an in-depth review during the 2023 cycle of High Level Political Forum (HLPF), the designated institutional body for the review and monitoring of SDGs globally. The report has adopted a mix of qualitative and quantitative methods for SDG localization. While the relevant OOMF indicators are mobilized for quantitative analysis, city level case studies constitute the qualitative aspect of the report, including voices of the local stakeholders. OOMF indicators precede India's National Indicator Framework (NIF) published by the Ministry of Statistics and Programme Implementation (MoSPI) for SDG localization. There may therefore appear a disjuncture between OOMF and NIF with respect to some indicators. However, the SDGs have remained an integral part of mission management and reporting since the early phase of SCM.

It is noteworthy that the Smart Cities Mission is an ongoing mission with over USD 7.32 billion (out of the total mission investments of more than USD 22 billion since the inception of SCM) worth of projects slated to be completed by June 2024. The outputs and outcomes of SCM projects and their contribution to the SDGs will only grow over time. By 2050, more than 100 out of 135 countries in the Global South are expected to have over 50 per cent of their populations residing in urban areas. Given this rapid urbanization, the SCM serves as a valuable model for integrated urban transformation on a national scale, addressing infrastructure investment challenges in emerging urban spaces. Notably, 66 per cent of SCM cities have a population of less than one million, highlighting its relevance for smaller urban areas, and provide a significant opportunity for the intermediary Indian cities to follow suit for their development trajectory.

Overall, the SCM in India showcases the successful implementation of a national-scale urban mission that aligns comprehensively with global agendas and empowers cities to drive sustainable development. It serves as a living lab people-centric smart urbanization and offers valuable lessons for urban areas in the Global South.

It emphasizes the importance of neighborhood-led planning, decentralized governance, and innovative financing models, and sets a successful precedent for comprehensive, integrated, inclusive, resilient, and digitally transformative process for urban development. The key achievements of the mission are captured in Figure 1.

FIGURE 1: Key achievements of SCM. *Source: SCM.*

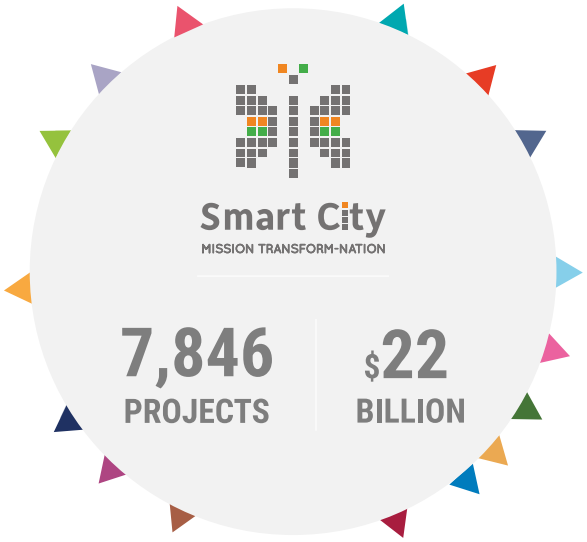
Integrated Command and Control Centres (ICCC): ICCCs in 100 Smart for evidence-based policy and decisions.

Mobility: Over 7500 public transportation buses deployed, including over 2000 e-buses; over 5,000 bus stops developed; over 2,500 km of smart roads constructed.

Public Safety and Security: Over 76,000 video surveillance cameras, 1,844 emergency call boxes, 3,000 public addressal systems, RLVD, ANPR installed across 100 Smart Cities.

National Challenges: Local action for sustainable transformations through "Challenges". Examples: Cycles4Change, Streets4People, Placemaking Marathons, Nurturing Neighbourhoods, Transport4All, EatSmart Cities.

Vibrant Public Spaces: Over 1300 projects to improve public spaces across 100 Smart Cities, 180 waterfront projects across 47 Smart Cities, over 200 markets redeveloped across 68 Smart Cities, 170 projects with focus on cultural heritage.



Assessment Frameworks: 100,000 datapoints across 14 sectors and 250 cities through indices and frameworks. Examples: Ease of Living Index, Municipal Performance Index, Data Maturity Assessment Framework and ClimateSmart Cities Assessment Framework.

Improved Water Supply: Over 6,800 km of water supply systems monitored through SCADA, leading to reduced non-revenue water and leakages.

Economic Hubs: 38 incubation centres/skill development centres developed.

Improved Solid Waste Management (SWM): Increased use of technology for improved SWM across 50 Smart Cities. Over 4,800 solid waste collection vehicles RFID enabled for Automatic Vehicle Location (AVL).

Health: 308 e-health centres and clinics, 255 health ATMs developed.

Education: 6,855 smart classrooms, 40 digital libraries, 1600 Anganwadis developed

PPP: 210 projects worth USD 1.83 billion under PPP across 50 cities.

Streetlights and Electrification: More than 50 Lakhs Solar/LED streetlights installed; 89,000 kms of underground electricity cabling.

Streetlights and Electrification: More than 50 Lakhs Solar/LED streetlights installed; 89,000 kms of underground electricity cabling.

Climate Resilience: Environmental sensors installed; 5,300 personnel and volunteers trained for disaster response.

Affordable Housing and Shelter: 44,054 dwelling units constructed, 6,312 rooms built in community housing projects like Rain Basera, hostels, night shelters, etc.

Endnotes

1 UN-Habitat. 2022. "Word Cities Report 2022". https://unhabitat.org/world-cities-report-2022-envisaging-the-future-of-cities

2 International Energy Agency. 2021. "India has the opportunity to build a new energy future". https://www.iea.org/news/india-has-the-opportunity-to-build-a-new-energy-future (Accessed June 8, 2023)

01
Introduction

1.1 Urban India and Global Implication

India's urbanization is the most significant global event of this century. Almost 11 per cent (498 million) of the world's urban population resides in India.[1] Furthermore, 416 million new urban residents would be added between 2018 and 2050, which is comparable to the combined population of South America today.[2]

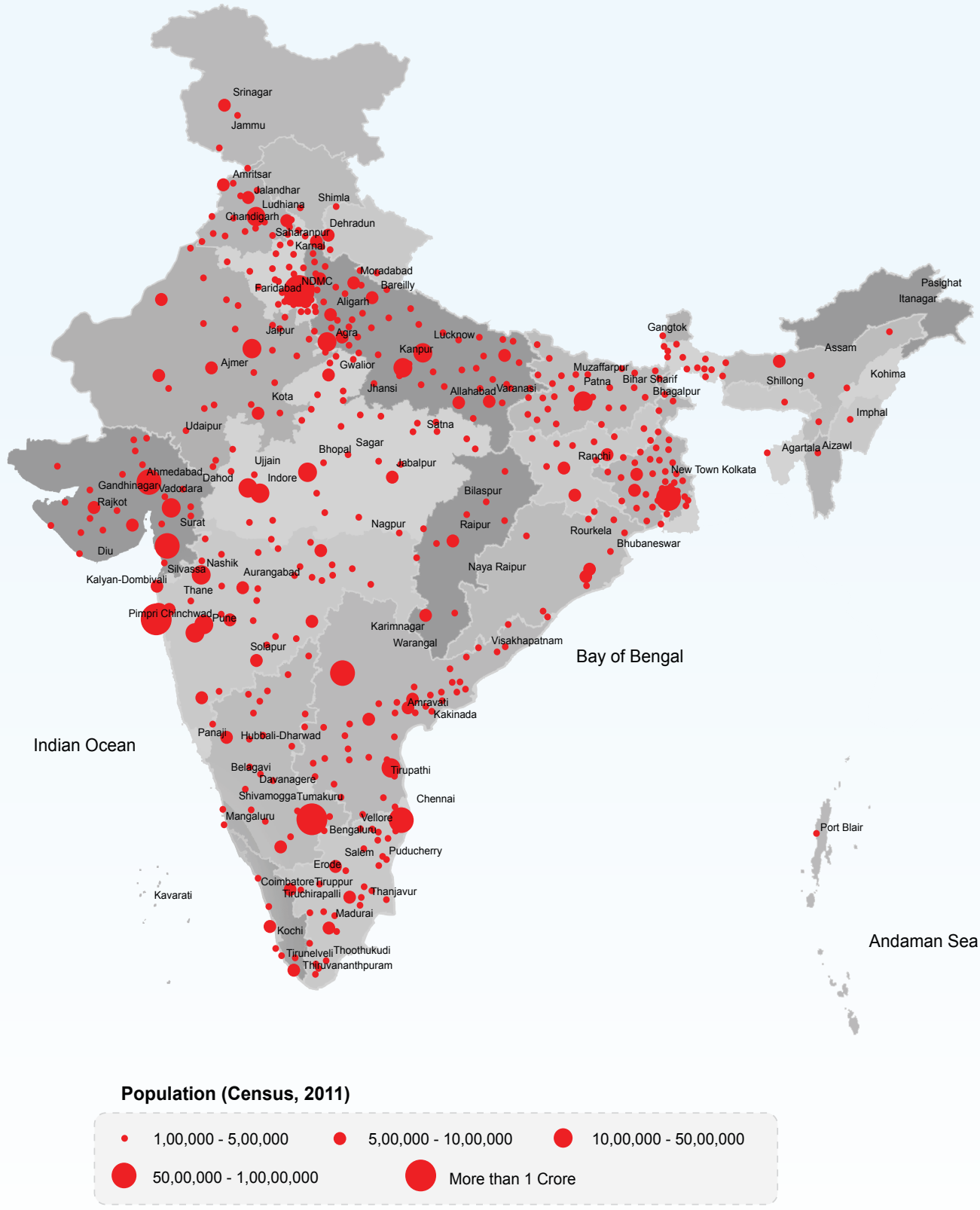
It is the second largest urban system in the world comprised of 7,935 urban settlements.[3] The 53 cities, with million plus population, accommodate approximately a third of the total urban population, and yet the 7,839 small and medium towns with population under 500,000 persons represent the significant bulge of the city system (refer Figure 2). Furthermore, an estimated 180 million persons live in rural areas situated next to India's 70 largest urban centres, that will increase to about 210 million persons by 2030.[4]

The above mentioned numbers are very large in scale. India recognizes that managing the process of urbanization is a necessary prerequisite for its ongoing structural transformations. Cities contribute two-third of the country's GDP today and will be the main economic drivers as India embarks to become a $5 trillion economy. With an unparalleled process of urban transformation, India's urban agenda holds the key to the country's transition into a developed economy.

"India will experience the largest wave of urbanization in the world, over the next two decades. It is a challenge, but also a huge responsibility and opportunity.[5]

Shri Narendra Modi,
Prime Minister, India

FIGURE 2 India – second largest system of cities, globally



Source: Government of India

1.2 India's Development Paradigm and Agenda 2030

India's path to inclusive growth and success of Agenda 2030 are inextricably linked. As a nation poised to be the largest global contributor of a young workforce demographic, amongst the top five world economies, and champion for climate-friendly lifestyles "to protect and preserve the environment", India is committed to "a shared blueprint for peace and prosperity for people and planet."[6789]

With the development motto, "Collective efforts for Inclusive growth" (Sabka Saath Sabka Vikaas), India has converged the "5 Ps"[10] pillars of SDGs through the following development paradigms: Empowered and Resilient India (Sashakt Bharat–Sabal Bharat); Clean and Healthy India (Swachh Bharat–Swasth Bharat); Inclusive and Entrepreneurial India (Samagra Bharat–Saksham Bharat); Sustainable India (Satat Bharat – Sanatan Bharat); and Prosperous and Vibrant India (Sampanna Bharat- Samriddh Bharat).[11]

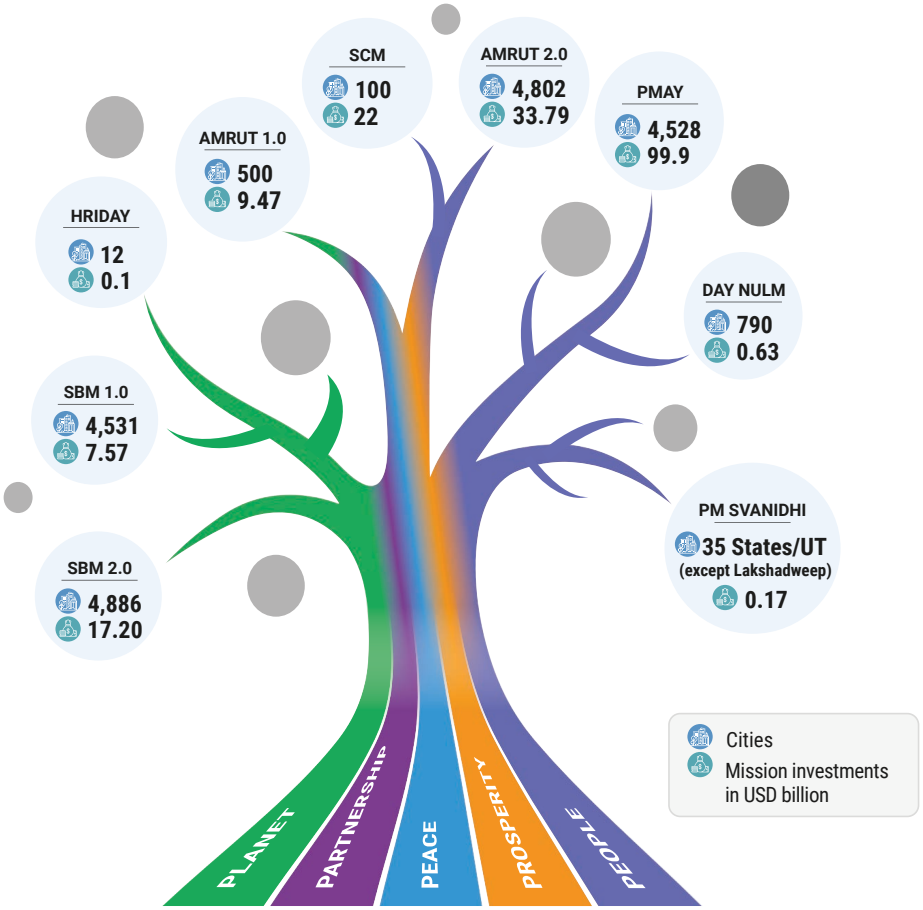
India looks at its urban agenda as a fulcrum to anchor its commitment under global mandates, namely, the Sustainable Development Goals, the New Urban Agenda, the Addis Ababa Finance-for-Development Agenda, the Paris Agreement on Climate Change, and Sendai Framework for Disaster Risk Reduction (SFDRR). India's aims to leverage urbanization to create a distinct identity of cities which provide ease of living, responsible governance, clean and sustainable environment, rapid economic growth and livelihood opportunities for the communities.

Characterised by high-impact programmes delivered at scale, India's urban agenda is the clearest manifestation of the cross-cutting, interdependent nature of Agenda 2030, and the silo-breaking approaches needed to implement the Sustainable Development Goals. Over the past eight years, India's flagship urban missions, namely, Housing for All, Clean India Mission, Smart Cities Mission, Atal Mission for Rejuvenation and Urban Transformation (AMRUT), National Mission for Sustainable Habitat, National Urban Livelihoods Mission, have transformed more than 4,800 cities and towns across the country (refer Figure 3). These missions have adopted a comprehensive, inclusive, participatory and data driven approach for scaling up urban transformation across India's vast system of cities. This report presents a compelling narrative of transformation in India's 100 cities covered under its flagship scheme '**Smart Cities Mission**', when viewed through the lens of SDGs and three outcome pillars–Liveability, Economic-ability and Sustainability of cities.

"India's success in translating the Sustainable Development Goals into action will mean the difference between success and failure for up to half of the global Sustainable Development Goal targets – far more than any other country.[9]

Mr António Guterres,
Secretary-General of the United Nations

FIGURE 3 National urban missions linked to "5Ps" of SDGs.



Note: *HRIDAY, implemented by MoHUA earlier, is now under Ministry of Tourism.*

1.3 Smart Cities Mission- A people centric SDG localization

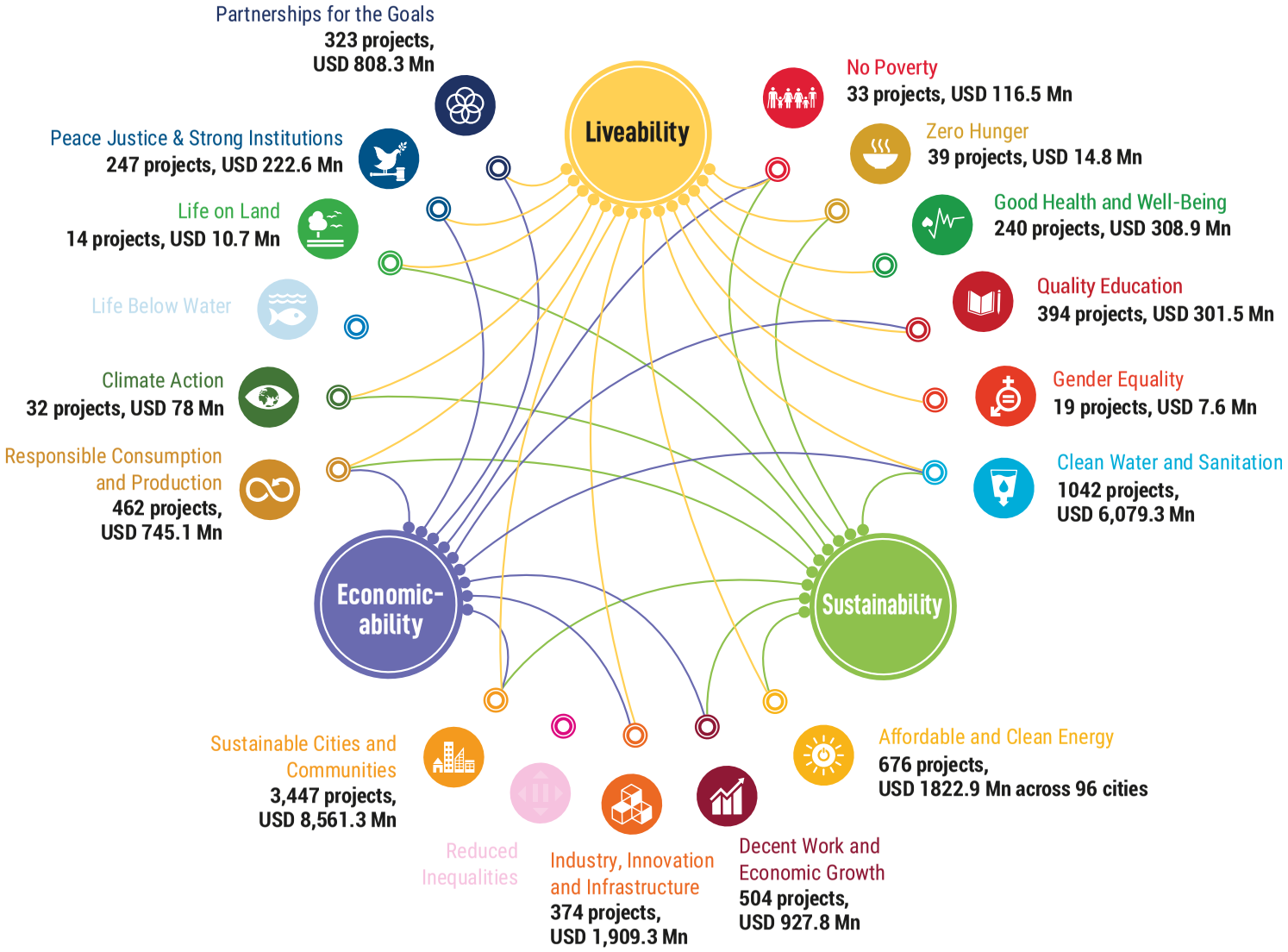
The Smart Cities Mission (SCM) was launched by the Hon'ble Prime Minister of India on 25th June 2015, with an aspiration "to promote cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions"[12].

"The three anchors of the mission, (i) Liveability, (ii) Economic-ability, and (iii) Sustainability, directly interlink with 15 out of the 17 SDGs (refer Figure 4). More than 7,800 projects with an investment of USD 22 billion have been completed or near completion, within a span of eight years – improving lives of over 100 million urban residents – a remarkable feat of scale and pace of urban transformation.

The majority of projects, almost 44 per cent, contribute to SDG 11 (Sustainable Cities and Communities), followed by SDG 6 (Clean Water and Sanitation) at 13.3 per cent, SDG 7 (Affordable and Clean Energy) at 8.6 per cent, and SDG 8 (Decent Work and Economic Growth) at 6.4 per cent."

Inherent to the mission are the core principles of 'Leaving No One Behind and Leaving No Place Behind', globally recognised as the transformative foundation for localizing SDGs. Acknowledging the varying aspirations and diversity of needs of urban residents across cities in India, and the growing inequality within and between cities, SCM is grounded in people-centric integrated approach to planning and implementation.

FIGURE 4: Smart Cities Mission aligned with 15 of 17 SDGs. *Source: SCM.*



Note: *Even as projects contribute to multiple SDGs, in this report a project is mapped to only one SDG to which it makes the primary contribution.*

Leaving No One Behind

SCM required people-centric participatory process as fundamental to the design, planning and implementation of the proposals in the 100 Smart Cities. All Smart Cities have constituted a Smart City Advisory Forum (SCAF) composed of multiple stakeholders, which include "the District Collector, Member of Parliament, Member of Legislative Assembly, Mayor, CEO of SPV, local youths, technical experts" and representatives from residents' associations, tax payers' association, slum level federation, women's organizations, youth associations, etc., to enable seamless collaboration.[13]

These local collaborations actively encouraged consultations with vulnerable and marginalized groups, including outreach to ward committees, resident welfare associations, local chambers of commerce, among others. The public engagement strategy effectively deployed a variety of tools for in-person and online engagement, such as, discussion forums, tasks, online polls, public talks, and blogs, demonstrate commitment to inclusion and good governance. For example, the digital platform, MyGov, documented more than 182 discussions, more than 2.5 million comments, 126 polls, across 98 Smart Cities during the first round of the city selection process held as part of the mission.[14]

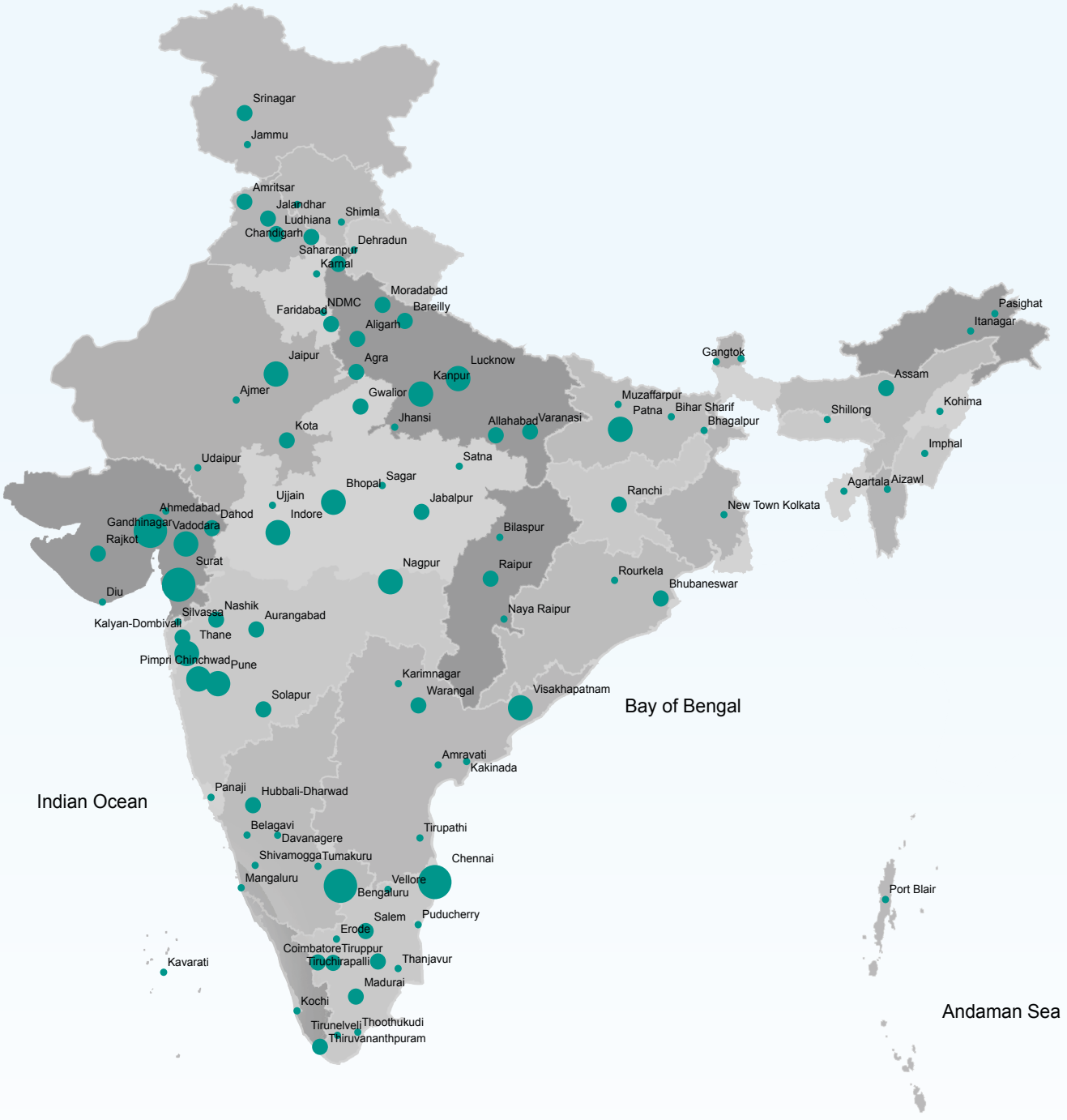
By engaging local communities as co-creators and co-implementors of solutions, the mission has facilitated locally relevant contextualisation necessary for sustainability of projects.

Leaving No Place Behind

The 100 Smart Cities are representative of India's diverse urban system, through a deliberate selection process under the mission, effectively ensuring that small and medium towns also benefited equally as large and metropolitan cities from the transformative technical and financial investments (refer Figure 5). The largest

Image 1: Stakeholder consultation for redevelopment of a municipal school in the city of Visakhapatnam. *Source: Visakhapatnam Smart City.*

FIGURE 5 100 Smart Cities of India



Source: Government of India

representation is of intermediary cities, at 54%, with population between 100,000 to 1,000,000 persons. The smallest city, Kavaratti, an island town has a population of 11, 221 persons (Census 2011), and the largest city is Bengaluru with a population of 8.4 million persons (Census 2011).

A common characteristic of cities in India is a historical urban core, which with time is marked by built and economic dilapidation, and where there is generally an utmost need to upgrade the civic infrastructure. Area-based development projects (refer Chapter 2) under the mission have drawn attention to these neighborhoods where 4629 projects of USD 12.12 billion have been planned and implemented. Furthermore, the mission has productively encouraged convergence with other flagship missions, such as, AMRUT, SBM, PMAY, DAY-NULM, Digital India Mission, among others, to build a cohesive and comprehensive on-ground transformation. This strategy has also brought in up to 34 per cent of funds from other missions and schemes for urban renewal in these marginalized pockets of cities.

With a robust framework for SDG localization (refer Chapter 3), SCM has paved the way as the first national mission that has adopted a (i) comprehensive (ii) integrated, (iii) inclusive, (iv) resilient, and (v) digitally transformative process for urban development. As the mission enters the final stages of implementation, the focus is on completing documentation, dissemination, and institutionalisation of all best practices, templates and innovations engineered for replication across the country.

Image 2: Chappan Dukaan" market into a "Smart Food Street" in the city of Indore. *Source: Indore Smart City.*

Endnotes

1 World Bank staff estimates based on the United Nations Population Division's World Urbanization Prospects: 2018 Revision.

2 UNDESA. 2018. World Urbanization Prospects 2018, https://population.un.org/wup/ Publications/Files/WUP2018-Highlights.pdf

3 This includes 4,041 Statutory towns and 3,394 Census towns. Census of India defines Statutory towns as all places with a municipality, corporation, cantonment board or notified town area committee; and Census Towns as settlements with (i) a minimum population of 5,000; (ii) at least 75 per cent of the male main workers engaged in non-agricultural pursuits; and (iii) a density of population of at least 400 per sq. Km.

4 McKinsey Global Institute. 2020. "India's turning point. An economic agenda to spur growth and jobs.". https://www.mckinsey.com/~/media/McKinsey/Featured%20Insights/India/Indias%20turning%20point%20An%20economic%20agenda%20to%20spur%20growth%20and%20jobs/MGI-Indias-turning-point-Executive-summary-August-2020-vFinal.pdf

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7 The World Bank. N.d. "GDP (current US $)". https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?most_recent_value_desc=true (Accessed June 09, 2023)

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10 United Nations. 2022. "Secretary-General's remarks on the partnership between India and the United Nations on India's 75th anniversary ". https://www.un.org/sg/en/content/sg/speeches/2022-10-19/secretary-generals-remarks-the-partnership-between-india-and-the-united-nations-india%E2%80%99s-75th-anniversary (Accessed June 09, 2023)

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12 Ministry of Housing and Urban Affairs. 2015. "Smart Cities Mission Guidelines." https://smartcities.gov.in/themes/habikon/files/SmartCityGuidelines.pdf

13 Ibid.

14 Government of India. 2016. "Citizens Consultation for the Smart Cities Mission". https://blog.mygov.in/editorial/citizens-consultation-for-the-smart-cities-Mission/comment-page-10/ (Accessed June 09, 2023)

Source: Agra Smart City

02

Policy and Enabling Environment

2.1 Pursuit of Liveability, Economic-ability, and Sustainability

The transformative commitment of the New Urban Agenda (NUA) is propelled by "an urban paradigm shift grounded in the integrated and indivisible dimensions of sustainable development: social, economic, and environmental"[1]. Social sustainability, economic sustainability, environmental sustainability, and spatial sustainability are the four core dimensions of the NUA[2]. The three outcome pillars of SCM—Liveability, Economic-ability, and Sustainability (LES)—intersect with the core dimensions of the NUA, with a cross-cutting spatial framework (refer Figure 6). The policy pursuit of SCM is thus represented by the three pillars and the LES sub-sectors (refer Figure 16) which assimilate the transformative dimensions of the NUA. This chapter (section 2.1) introduces the policy focus of the SCM through the theme of LES where projects demonstrate overarching, cross-sectoral goals that can be achieved through alignments with the NUA. The chapter then goes on to elaborate the levers of action which were used to materialize urban transformations across the 100 selected cities (section 2.2 to 2.4).

Liveability for a whole-of-society transformation

Social sustainability, as included in the NUA, is multifaceted and particularly attentive to the marginalized groups[3]. It includes basic services that respond to the needs and priorities of children, youth, and older persons; endows the youth with knowledge, skills and training and ensures their participation in governance processes; ensures age-responsive policy and planning; seeks empowerment of women and girls through capacity development initiatives; seeks to make information and communication technologies accessible to all; and provisioning of quality public spaces that are accessible to all[4].

The dimensions of social sustainability are reflected in the projects under the "Liveability" pillar of the SCM. The social welfare dimensions of the SCM include a focus on health care and education with special attention given to women, children, and the elderly. Further, basic infrastructure and services form the bedrock of the mission: SCM has helped expand the ambit of drinking water, sewerage, septage, solid waste, and public mobility facilities in the 100 cities. Each of these sectors included attention to the marginalized. For example, pavements or footpaths with tactile tiling for persons with disabilities were provisioned and included as an outcome under the Liveability pillar.

The various "challenges" where cities competed to demonstrate the principles of "Liveability" at the neighbourhood and street scale[5] —Streets for People, Cycles for Change, Place Making, Nurturing Neighbourhood—addressed the NUA's call for "safe, inclusive, accessible, green and quality public spaces, including streets, sidewalks and cycling

Image 3: The pelican signals installed by the city of Bhubaneswar (Odisha) is an illustration of SCM's attention to social sustainability and marginalized groups. *Source: Bhubaneswar Smart City.*

lanes, squares, waterfront areas, gardens and parks, that are multifunctional areas for social interaction and inclusion, human health and well-being, economic exchange and cultural expression and dialogue…"[6]. Moreover, SCM worked as a flag bearer for the expansion of information and communication technologies to the newly urbanizing areas through its Integrated Command and Control Centres (ICCCs) and other digital interventions discussed later in this section.

Economic-ability promotes livelihoods, vibrant and competitive cities

NUA's vision of economic sustainability recognizes sustained and inclusive economic growth with "productive employment and decent work for all" as a way to achieve sustainable urban development[7]. "Cities and human settlements should be places of equal opportunities, allowing people to live healthy, productive, prosperous and fulfilling lives"[8].

The dimensions of economic sustainability are reflected in the projects under the "Economic-ability" pillar of the SCM. The NUA vision of "sustainable and inclusive urban economies" is articulated in SCM projects that focus on the local economy—for example, in Indore in, Madhya Pradesh state, over 10,000 sqm of markets areas were redeveloped with the result that the livelihoods of over 250 vendors were greatly improved (refer section 3.5).[9] Such initiatives which seek to improve the markets and spaces of street-vending proved to be a major fillip to the city economy and identity. Further, the NUA objectives of productive employment and decent work were driven through incubation centres which continue to benefit small and medium businesses in Indian cities outside of the major metropolitan centres.

SCM has added to the booming start-up economy of India by aiding the penetration of such facilities in emerging urban areas. It is a multi-pronged intervention with additional facilities such as mobile applications and dashboard which promote online trading and facilitate product outreach.

Image 4: A dumpsite in a slum in Greater Warangal (Telangana), redeveloped into a child-friendly park as part of SCM's Nurturing Neighbourhoods challenge. The focus on child-friendly infrastructure is a key principle under the social sustainability dimension of the NUA.
Source: Greater Warangal Smart City.

Image 5: An artist's representation of Jinsi Haat in Indore (Madhya Pradesh). Jinsi Haat is the city's first flea market and is a major attraction for the residents of Indore and its surrounding areas.
Source: Indore Smart City.

Image 6: A view of the transformed Jinsi Market in Indore. The redeveloped market today provides employment to over 1,000 persons each day, according to ISCDCL. *Source: Indore Smart City*

Image 7: A mural by SenYenSen Collective celebrates the wetlands in Coimbatore Smart City. *Source: The Hindu/St+art*[10] *India*

Sustainability anchors bio-diversity and resilient urban environment

The NUA envisages cities that "protect, conserve, restore and promote their ecosystems, water, natural habitats and biodiversity, minimize their environmental impact and change to sustainable consumption and production patterns"[11]. It seeks to ensure environmental sustainability by "promoting clean energy and sustainable use of land and resources in urban development", "by building urban resilience, by reducing disaster risks and by mitigating and adapting to climate change", among other initiatives[12].

The dimensions of environmental sustainability are reflected in the projects under the "Sustainability" pillar of the SCM. These include people-led projects for the restoration of rivers and local water bodies (refer Image 8). SCM promoted rainwater harvesting in the selected cities and sought to build urban resilience through structural and non-structural interventions. For example, SCM cities installed environmental sensors for real-time data on their air quality and associated parameters. Other cities installed early warning sensors and public address systems with a focus on building robust emergency response mechanisms. Further, production of clean energy through solar plants and waste-to-energy plants is a key feature of SCM pertinent to environmental sustainability.

Image 8: A river restoration project implemented in the city of Aurangabad (Maharashtra)—it mobilized community participation to restore the health of the river. The Kham river restoration project is the result of a prolonged multi-stakeholder effort to address the problem of river pollution in the city and reverse the environmental damages suffered in the past.[13][14] *Source: Aurangabad Smart City.*

Spatializing transformation for equity within and between cities

The social, economic, and environmental dimensions of the NUA have an implicit fourth dimension: spatial sustainability[15]. It follows from the three principles of NUA: leave no one behind, ensure sustainable and inclusive urban economies, and ensure environmental sustainability[16]. "Governments can achieve spatial sustainability by guiding the physical form of urban environments to create equitable access to jobs, housing and social interactions; enable agglomeration economies and encourage sustainable relationships to ecosystems and natural habitats"[17].

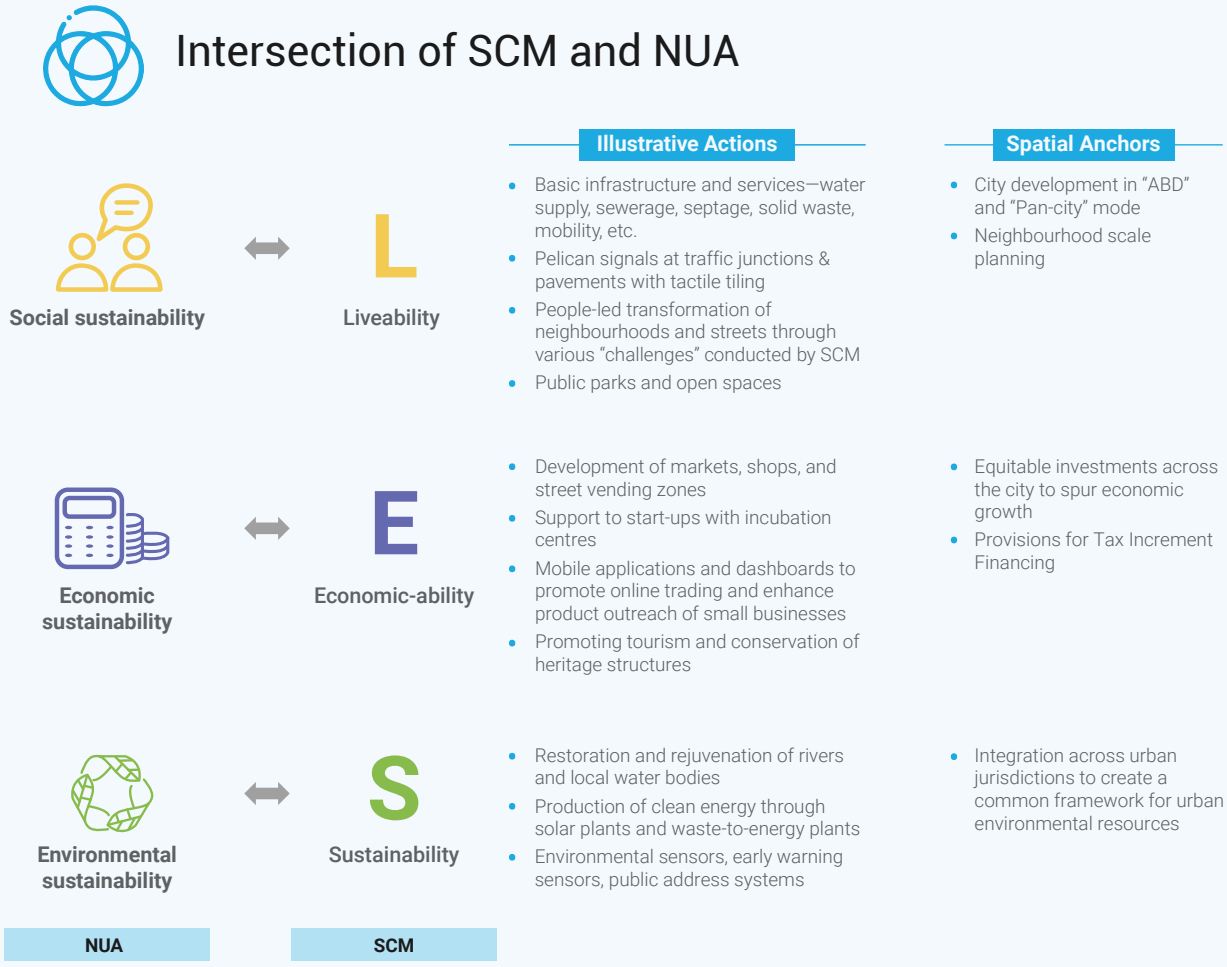
The SCM pillars of Liveability, Economic-ability, and Sustainability include spatial anchors which recognize the need to address the growing inequality within cities. The programme is conceptualized

Image 9: 'Protectors & Providers' by artist Osheen Siva at Chennai Smart City's Kannagi Nagar, a resettlement colony transformed into an "Art District". *Source: Pranav Gohil / St+art India*

as a mix of "area-based development" and "pan-city initiatives" which spatialize urban development interventions. The former includes a minimum contiguous area considered for retrofitting or redevelopment or greenfield development, encouraging development in marginalised pockets of cities. The latter include interventions that optimize impact of network infrastructure. The city level strategies were thus spatially driven. The various spatial interventions under SCM are further elaborated in Figure 8 and section 2.2.2.

Image 10: Illustration of "area-based development" in the city of Bhubaneswar (Odisha). The city's "area-based" strategy includes 24 "essential features" of an urban system in a pilot area which will be replicated across the city[18]. *Source: Bhubaneswar Smart City.*

FIGURE 6: Liveability, Economic-ability, and Sustainability—the three outcome pillars of SCM—intersect with social sustainability, economic sustainability, environmental sustainability, and spatial sustainability, which are the core dimensions of the NUA.



2.2 Implementation Mechanism

In this section, the implementation mechanism used to operationalize the overarching themes of Liveability, Economic-ability, and Sustainability are discussed. The NUA refers to five main "pillars of implementation" which are a) national urban policies, b) urban legislation and regulations, c) urban planning and design, d) local implementation, and e) municipal finance[19]. The means of implementation mobilized by SCM are conceptualized in terms of the relevant pillars of the NUA.

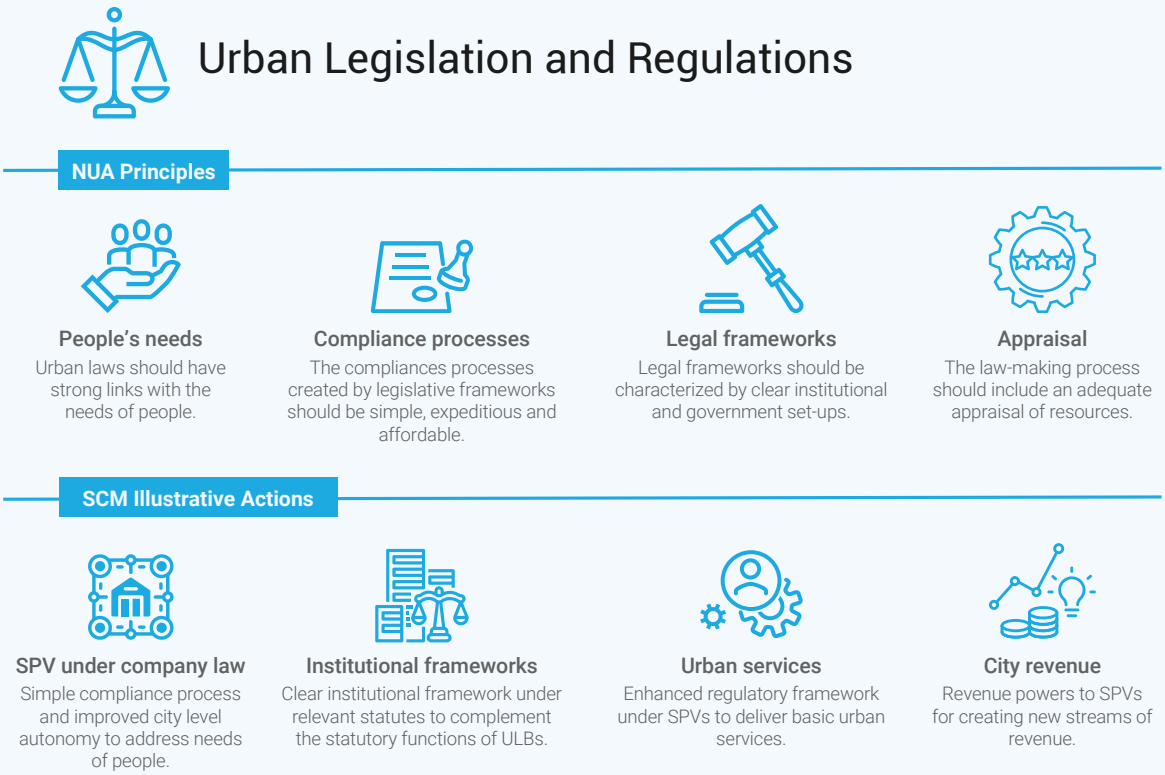
2.2.1 Urban Legislation and Regulations

The legislative domain in India is governed by the federal provisions in the Indian Constitution, the seventh schedule primarily, that divide the legislative subjects between the federal legislature (Parliament of India) and the state legislatures[20]. The seventh schedule includes the "Union List" with entries that constitute the federal legislative domain, "State List" encompassing the states' legislative domain, and "Concurrent List" which includes subjects on which both the parliament and state legislatures could make laws[21].

"Local Government" is an entry under the "State List" of the seventh schedule of the Indian Constitution—making it the legislative domain of the state legislatures. However, the Indian Constitution was amended in 1992 to add the third tier of governance in India's parliamentary democracy by providing constitutional sanctity to the municipal bodies[22]. The legislative domain of the states' is thus subject to the constitutional guarantees provided by the 74th Constitutional Amendment Act[23]. The constitutional guarantees include, for example, direct election to municipal bodies, constitution of ward committees, a five-year term for the elected wing of every municipal body, affirmative action for "socially and educationally backward" groups, among other provisions[24].

SCM is operationalized as a Centrally Sponsored Scheme (CSS)—a federal budgetary provision which enables conditional transfer of funds to the states for specific projects implemented by the states and includes a financial contribution from the state governments (refer section 2.2.4). Establishment of a city level Special Purpose Vehicle (SPV) was a condition for the transfer of funds[25]. SPVs were envisioned to serve as the implementing bodies in the selected cities. Although located within corporate governance frameworks, these SPVs were established pursuant to a resolution passed by the respective municipal body and jointly owned by the respective sub-national government and the municipal body[26]. As an executive body, the resolutions of the SPV's Board of Directors form the basis of all city level regulations and decisions. An SPV's "Articles of Association", the constitution of a company under India's company laws, defines the area of operations and the institutional framework under which regulations are made[27]. The legislative and regulatory apparatus that underlies SCM thus enables autonomous functioning that may be better placed to address the evolving priorities of a city.

FIGURE 7: SCM illustrative actions under the "Urban Legislation and Regulations" pillar of NUA.



2.2.2 Urban Planning and Design

SCM has made an effective contribution to spatialization of urban planning in India. For example, SCM guidelines' prescription for the cities include "promoting mixed land use in area-based developments — planning for 'unplanned areas' containing a range of compatible activities and land uses close to one another in order to make land use more efficient. The States will enable some flexibility in land use and building bye-laws to adapt to change"[28].

SCM made an operational distinction between "Area-Based Development (ABD)" and "Pan-City" initiatives. While the former takes a specified minimum contiguous area of a city for "Retrofitting" or "Redevelopment" or "Greenfield development", the latter "envisages application of selected Smart Solutions to the existing city-wide infrastructure"[29 30]. Each selected city therefore implemented a mix of both ABD and pan-city initiatives. The objective of the strategy was to "create a replicable model which will act like a light house" to other cities as well as areas within the city[31].

The mission provided tools to the selected cities which may ingrain the spatial approach to urban planning in the cities' decision-making processes. Several cities implemented GIS and e-governance based projects which facilitated GIS-based master plan in some cities and also helped enhance the property tax net. Further, the Integrated Command and Control Centre (ICCC) facilitated an advanced dashboard that uses spatial data to do predictive modelling for the cities. These interventions are unprecedented in the Indian context.

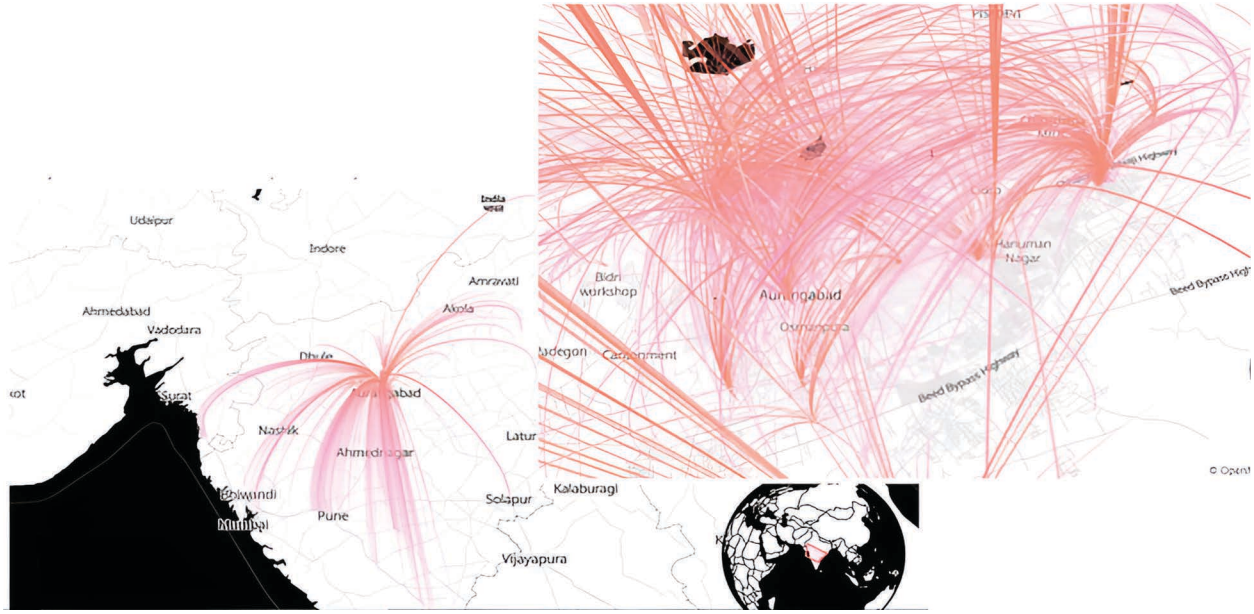


Image 11: SCM sought to ingrain a spatial lens in the city's decision-making processes. Some of the basic spatial tools provided to the cities were utilized during the pandemic. For example, an SCM city used map-based visualizations of movement of Covid positive patients to arrive at "bunching" of cases in neighbourhoods which helped simulate emerging "containment zones"—the efforts of the municipal health teams were directed to such areas.
Image source: Aurangabad Smart City.

Even as SCM prescribed a spatial lens, planning and design were firmly rooted in people-centred approaches. The "challenges" introduced by the mission—Streets for People, Cycles for Change, Place Making, and Nurturing Neighbourhoods—encouraged people-led design interventions to transform streetscapes and neighbourhoods in selected cities.

Image 12: A view of the Mokokchung Road in Kohima (Nagaland). The people of Kohima led the transformation of their street as part of the Streets for People challenge. *Source: Kohima Smart City.*

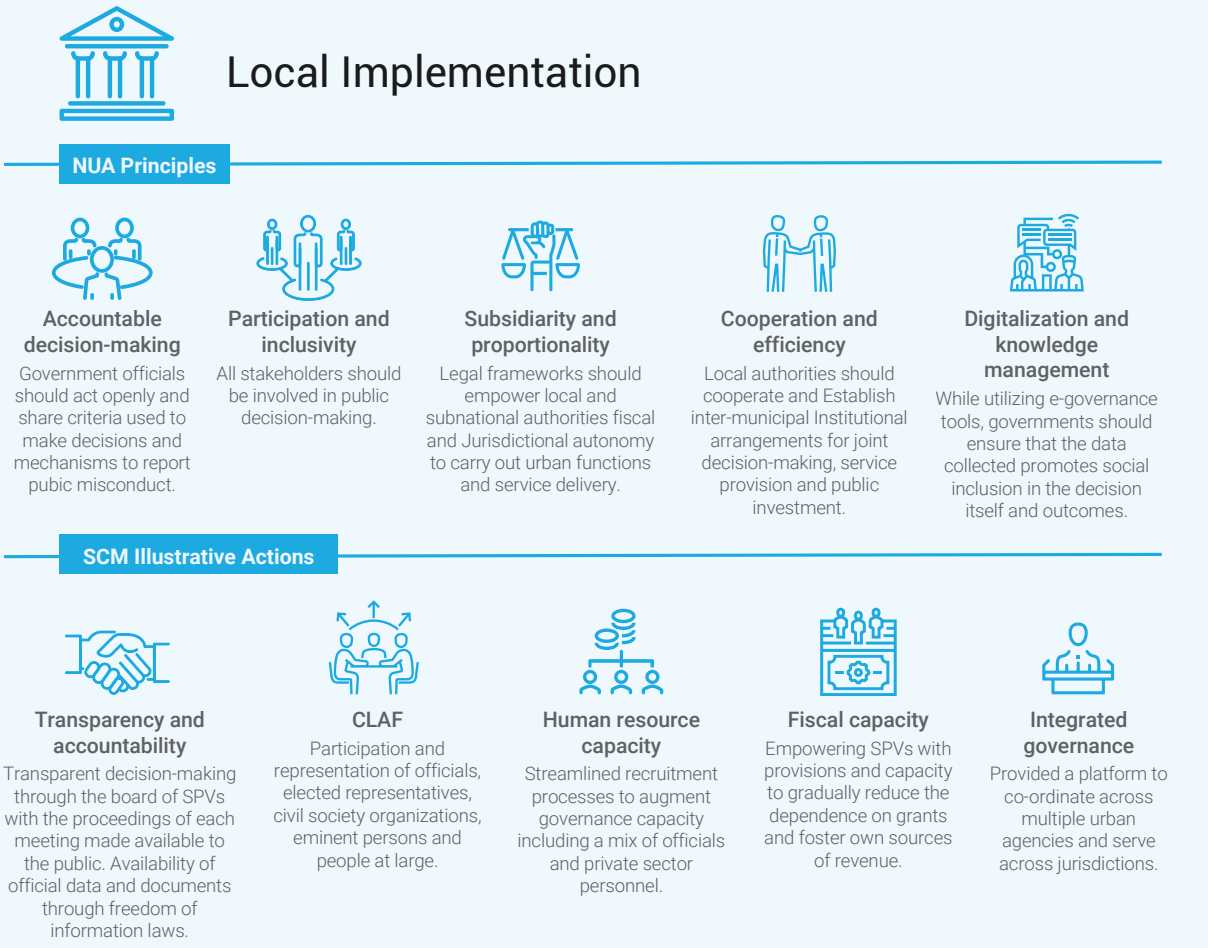
FIGURE 8: SCM illustrative actions under the "Urban Planning and Design" pillar of NUA.

2.2.3 Local Implementation

SCM is being implemented in 100 cities through Special Purpose Vehicles (SPVs) established under the company laws[32]. While the municipal statutes vary across different sub-national contexts in India, in some cases the municipal statutes provide for the establishment of a separate entity for the execution of a scheme[33]. The respective sub-national government and the statutory municipal body of the city together have major shareholding and control of the company. The company structure allows for private sector players or financial institutions to take equity stake in the SPV.

The company is governed by a Board of Directors in accordance with the Articles of Association under the company laws[34]. The Board is led by a chairperson who is appointed by the sub-national government and who is in most cases a senior officer of the Indian Administrative Service (IAS), India's higher civil services. The composition of the Board varies across states; however, it comprises of representatives of federal government, the concerned sub-national government, and independent directors, in addition to the CEO and functional directors[35]. These representatives usually include the Municipal Commissioner, District Collector, Commissioner of Police, Mayor, and other elected members at the city level. The SPV is led by a Chief Executive Officer (CEO) who is required to be appointed for a fixed term of three-years with prior approval of the MoHUA[36]. In practice, the administrative head of the municipal body, who is usually an officer of the IAS appointed by the state government, or another officer of the state civil services usually holds the position of the CEO. The guidelines provide for private sector representatives and experts to be appointed as CEO and some cities exercised the option while appointing the CEO. The SPVs are subject to the procurement norms and other regulations of the sub-national government.

FIGURE 9: SCM illustrative actions under the "Local Implementation" pillar of NUA.



The SPVs are distinct from a municipal body in the following ways. First, the decisions of a municipal body are subject to the general body which is comprised of local elected representatives from each ward of the city[37], including all procurement and recruitment decisions. Project execution therefore require several layers of approval and sometimes leads to delays and inefficiencies. In the case of an SPV, the Board of Directors is the deciding authority which is much smaller compared to a general body and comprises mostly of executive functionaries. This allows the CEO greater autonomy and enhanced speed of execution as compared to the Municipal Commissioner. Second, the SPVs enjoy relatively greater flexibility in recruitment matters which facilitated building of capacity at the local level including a mix of private sector talent and government officers. As the mission guidelines state: "One of the primary reasons for the creation of an SPV for the Smart City Mission is to ensure operational independence and autonomy in decision making and mission implementation."[38]

Further, each SCM city has established a City Level Advisory Forum (CLAF) to enhance the participation and representation of diverse stakeholders in the city. CLAF includes representation from the local government, elected representatives, civil society organizations, and eminent persons from the respective city.

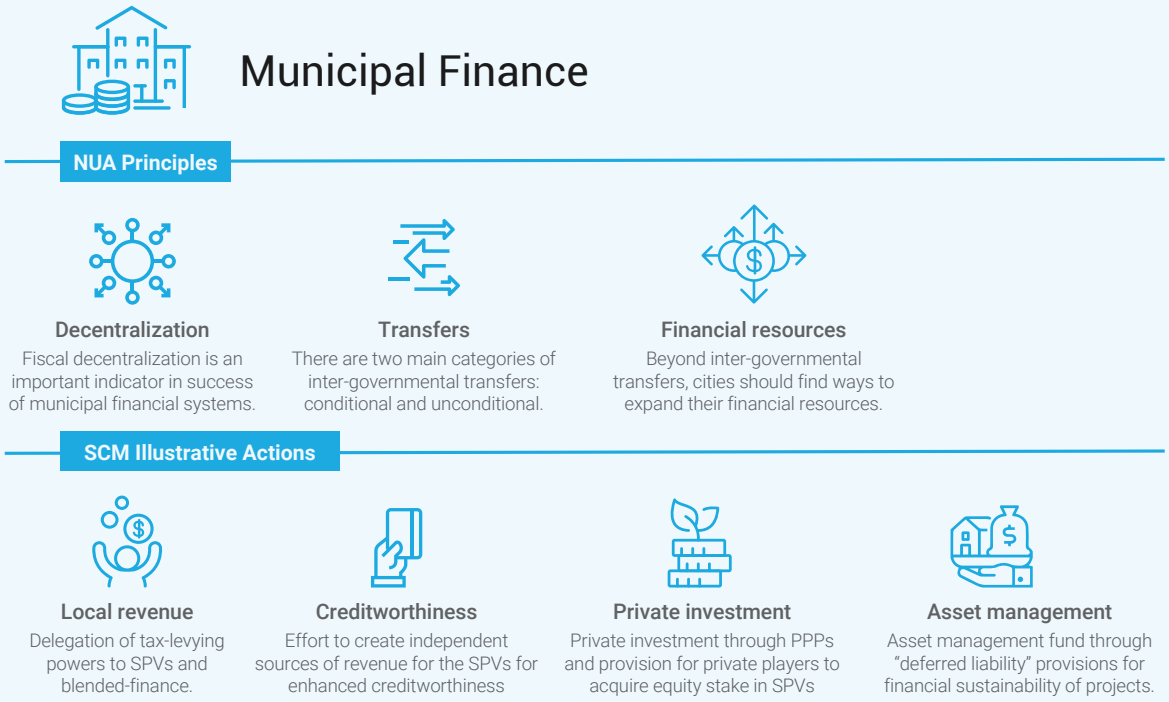
2.2.4 Municipal Finance

SCM is operated as a Centrally Sponsored Scheme (CSS), which is a federal budgetary provision for conditional fund transfer to the states for specific developmental programmes. The fiscal burden under a CSS is shared by the states who contribute to the programme as per a specified ratio. The funds are devolved to the states which in turn transfer it to the respective SPVs, along with the state's financial contribution.

However, in addition to assured government grants from the federal and state government, the SPVs could access finance from diverse sources including, private sector finance, debt, and own revenue by levying user charges, taxes, surcharges, etc[39].

Further, the municipal bodies too were required to contribute to the funding from its own sources of revenue. As the guidelines state: "The States/ULBs shall ensure that, (a) a dedicated and substantial revenue stream is made available to the SPV so as to make it self-sustainable and could evolve its own creditworthiness for raising additional resources from the market and (b) Government contribution for Smart City is used only to create infrastructure that has public benefit outcomes."[40] The mission sought to promote the creation of additional revenue streams for the SPV through land value capture instruments, including the concept of Tax Increment Financing (TIF) for ABD areas. This was achieved by enabling the delegation of certain tax levying powers of the municipal bodies to the ULBs.

FIGURE 10: SCM illustrative actions under the "Municipal Finance" pillar of NUA.



2.3 Technology and Innovation

SCM's departure from earlier national programmes on urban infrastructure and services is its emphasis on technology and innovation operationalized through "Smart Solutions"[41]. These interventions envisage "application of selected Smart Solutions to the existing city-wide infrastructure. Application of Smart Solutions will involve the use of technology, information and data to make infrastructure and services better"[42].

SCM pioneered the establishment and use of ICCC system which is often described as the technological "brain and nervous system" of the city[43]. An ICCC has five key components which include a.) bandwidth, b.) sensors and edge devices which generate real-time information, c.) analytics or software which uses the data captured to provide actionable inputs to the city administration, d.) data storage, and e.) the main ICCC platform which anchors different applications pertaining to city services and may be referred to as a "system of systems"[44]. In the absence of real-time information and data, city decision making is often post-fact and in the nature of a response to arising situations. ICCC intends to change this approach to governance with the introduction of "predictive modelling" which will use the data to simulate scenario[45]. For example, it may forecast the emerging land use patterns and the associated real estate dynamics; it may forecast the bus routes particularly prone to crowding and in need of frequency optimization; and so on. All insights pertaining to different city level infrastructure and services are made available at one platform.

ICCC has a promising revenue generation potential. SCM is considering the development of "ICCC-as-a-service (IaaS)" which will extend the benefits of the platform to other public sector services and work as a business model for the SCM cities to generate revenue[46].

While ICCC is a flagship SCM initiative, the selected cities experimented with a diverse array of technological solutions to optimize their existing infrastructure. These included, for example, the SCADA system to optimize water supply, water meters, Intelligent Transportation System (ITS) to improve public transportation service, among others. It is no surprise then that the "Smart Solutions" led pan-city component of SCM received over 45 per cent of the fund outlay[47].

FIGURE 11: A "model blueprint" for technology ecosystem in SCM cities and beyond[48]. *Source: MoHUA*

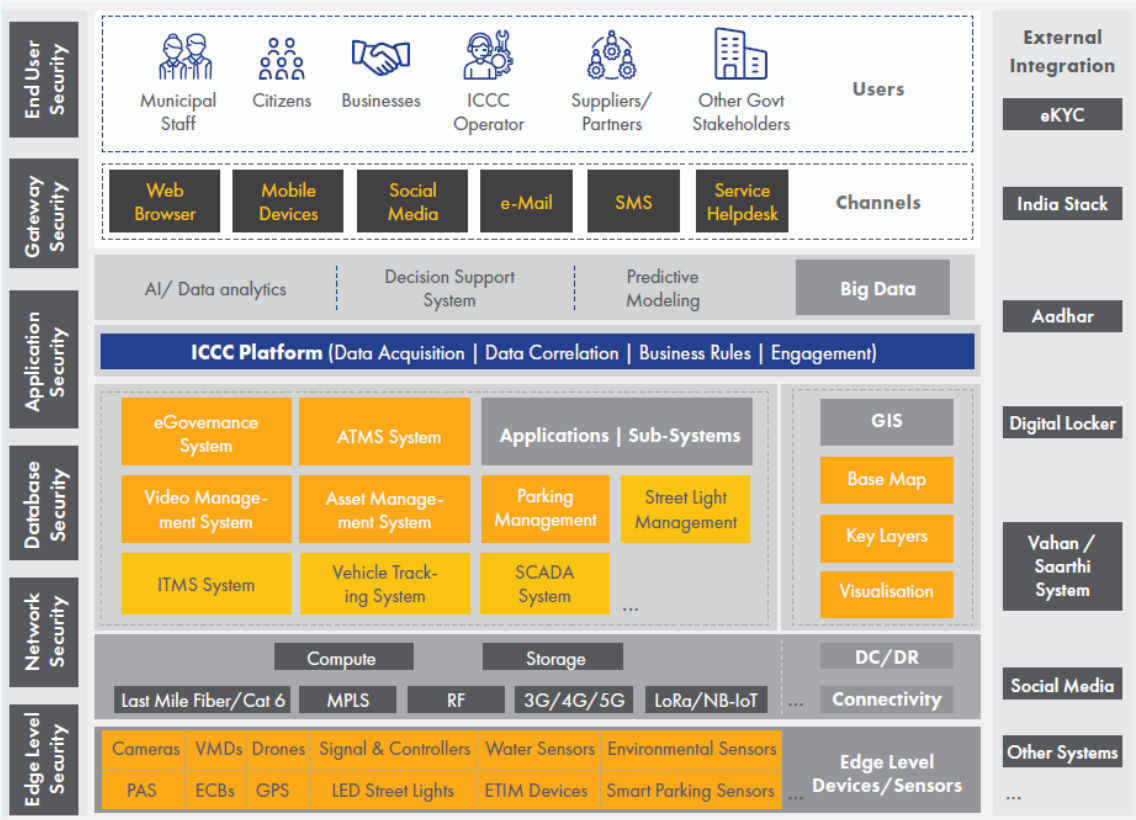


FIGURE 12: SCM interventions derived from the aspects of technology and innovation under the MoHUA.

Technology and Innovation

NUA Principles

Transparency
Open and transparent practices are essential to enable stakeholders and the public to understand the goals of smart city projects.

Capacity building
Using smart technologies in urban development requires national, subnational and local governments to have the capacity to conduct data collection, mapping, analysis and dissemination.

Sensor-based solutions
Cities must have updated governance and financing models to set up shared services across departments integrate data and redesign workflow to fully utilize sensor-based solutions.

SCM Illustrative Actions

ICCC
Open and transparent platform to engage people as part of governance processes

Assessment frameworks
Engagement of city officials for data collection and analysis as part of assessment frameworks—ICCC Maturity Framework, Data Maturity Assessment Framework, etc.

Sensor-based solutions
Deployment of sensors and edge devices to gather data that feeds into ICCC platform for decision making

Satellite imagery
Use of remote-sensing and artificial intelligence in land use management and environmental moitoring

2.4 Monitoring and Reporting

The monitoring and reporting framework of SCM has evolved through the various stages of the programme to capture the delivery of projects in the selected cities. SCM uses a Geo-spatial Management Information System (GMIS) to track the progress of works in terms of the following indicators: project details, budgeted and actual cost, milestones achieved, physical and financial progress, geo-tagged photographs, output and outcome indicators, and linkages to the SDGs (refer Figure 13).

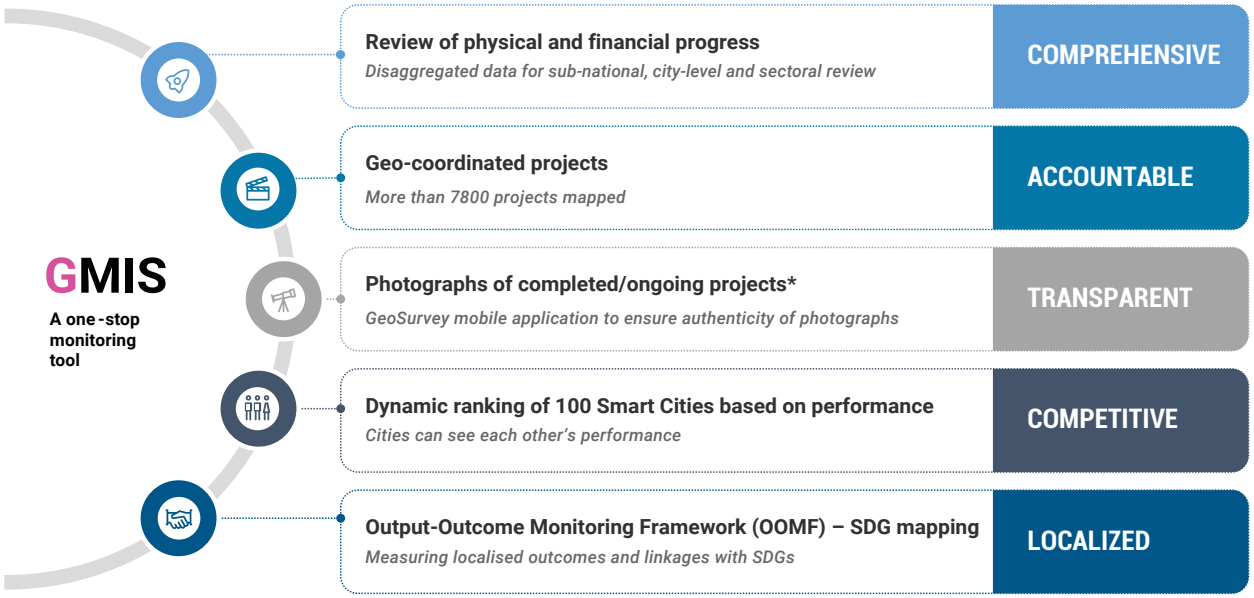
The aim of GMIS is to aid SCM programme management with a comprehensive geo-spatial dataset of more than 7,800 SCM projects. The platform enabled the engagement of officials at multiple levels of governance and served as a streamlined reporting mechanism for the cities. The insights from the monitoring platform enabled "evidence-based governance" in and across SCM cities[49].

Moreover, the GMIS ranks the SCM cities based on an algorithm that incorporated both quantitative and qualitative dimensions of the mission. The algorithm factors in parameters such as quantum of work completed, financial progress, outcome and output indicators and their linkages with the SDGs, engagements with the CLAL and the performance of a city in the people-centric "challenges" launched by the mission[50].

SCM's ownership of the NUA and the SDGs are demonstrated through its policy bent as well as the implementation mechanisms deployed. The intersection of NUA's core dimensions of social, economic, and environmental sustainability with the SCM pillars of liveability, economic-ability, and sustainability stands out in the 21 distinct sub-sectors (refer section 3.1). Further, as this chapter demonstrates, SCM offers suitable illustrations of the principles derived from the NUA, making it an effective case of putting an agenda to action.

The aspects of NUA and Agenda 2030 interwoven into the SCM are made clearer in the following chapter through a localization methodology that draws on indicators under the 21 LES sub-sectors to track the contribution of SCM to the SDGs.

FIGURE 13: Salient features of SCM's Geo-Spatial Management Information System (GMIS) for monitoring and reporting. Source: SCM.



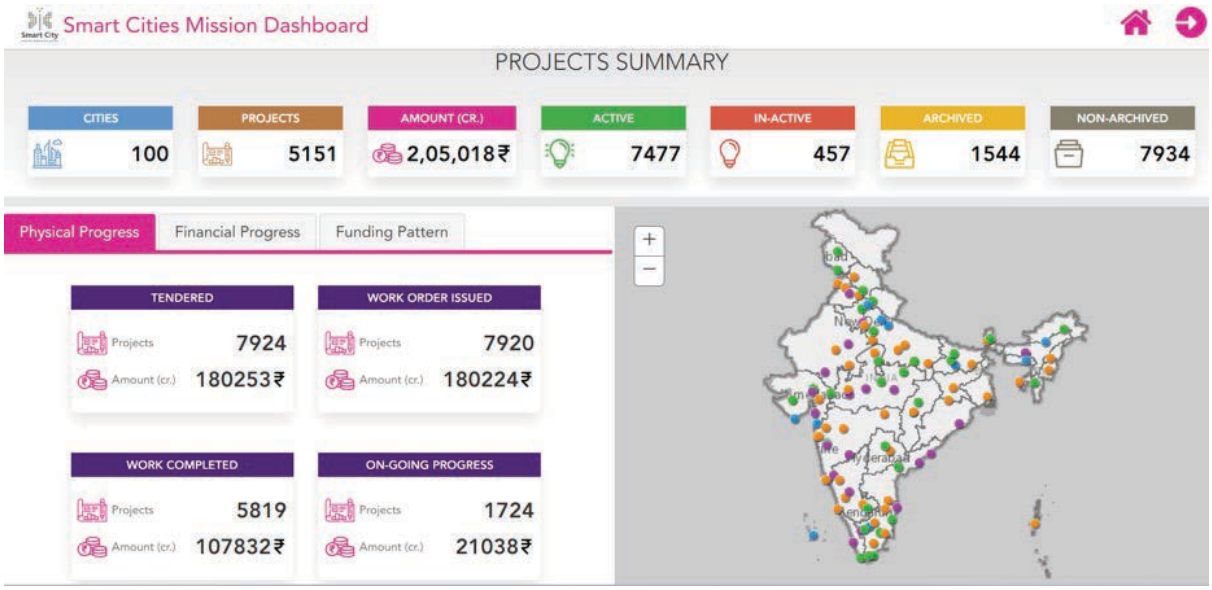


Image 13: SCM's Geo-Spatial Management Information System (GMIS) enabled the mission secretariat to track the progress of projects across the 100 cities in India including spatial data. The portal is linked to the Output-Outcome Monitoring Framework which facilitates SDG wise tracking of projects. Cities are ranked on the basis of their progress in completion of projects, utilization of funds, people's engagement through CLAF, updation of OOMF and linkages with SDGs and participation in various people-centric challenges. *Source. SCM*

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03

Progress on SDG Goals and Targets

3.1 SDG Localization Framework and Methodology

3.1.1 Meaning and Context

The 17 SDGs and 169 targets are the global milestones that guide development policies, programs and projects implemented with collective effort of different levels of government, private sector, and non-government stakeholders to catalyse grounded actions to achieve measurable and transformative local impact. Agenda 2030, together with Paris Climate Agreement, the New Urban Agenda, and the Sendai Framework for Disaster Risk Reduction, among other important global agreements serve as a plan of action for people, planet, and prosperity. The linkages between Agenda 2030 and key international development frameworks are mapped in Figure 14.

SDG localization is an important process to ensure that the global mandates are adequately and appropriately applied to the unique and varying contexts of Member countries. Localization may be seen "not merely as a technical or predefined process, but as a process that is sensitive to local opportunities, priorities, and ideas. It goes beyond adjusting global goals to the local level and calls for co-creating solutions through the generation of genuine partnerships, resulting in more inclusive, needs-driven, local-level responses to global challenges and objectives".[1] Localization of SDGs enables the adoption of these linkages where it matters the most, local policy and action, as a way to drive sustainable transformations.

Furthermore, Agenda 2030 specifies mechanisms for monitoring, review, and reporting of progress pertaining to the SDGs. UN member states submit a Voluntary National Review (VNR) to the UN's High Level Political Forum (HLPF), and more recently, Voluntary Local Reviews to report local implementation of SDGs at sub-national and city level.

FIGURE 14: Linkages between Agenda 2030 and key international development frameworks. Localization of SDGs enables the adoption of these linkages where it matters the most: local policy and action. Source: UNESCAP and UN-HABITAT.

Linking the 2030 Agenda to Key

2030 Agenda for Sustainable Development

SUSTAINABLE DEVELOPMENT GOALS

Aim & Focus

- Overarching global development framework for People, Planet. Prosperity, Peace. and Partnership (5Ps)
- Pledge to leave no one behind and reach the furthest behind first"
- 17 Sustainable Development Goals with 169 targets and over 230 respective indicators
- The SDGs are setting a new standard by being universal, interconnected, and indivisible.

Legal Relevance

- Voluntary, non-binding agreement

Supported By

- 193 UN Member States ratified in September 2015

Implementation Period

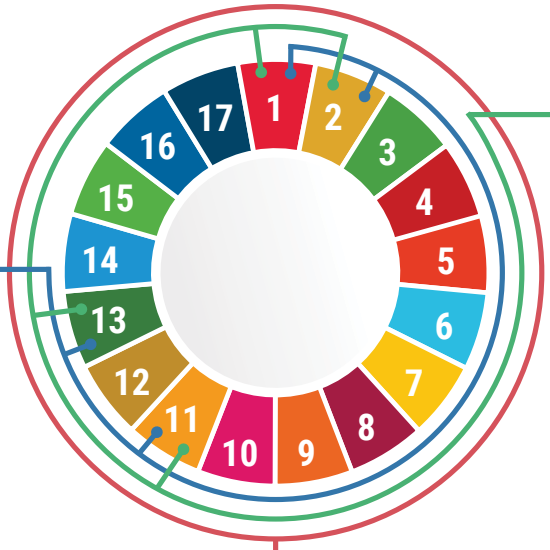
- 2016 - 2030

Follow-up & Review

- The **High-level Political Forum** (HLPF) on Sustainable Development is the central UN platfrom for the follow-up and review process.
- The **Regional Forums on Sustainable Development** is the stocktaking body to assess regional implementation.
- **Voluntary National Reviews** (VNRs) submitted to HLPF serve as the basis for regular reviews and provide a platform for partnerships between the national level, civil society, the private sector and other relevant stakeholders and organizations (Res. 70/1, para 84).
- **Annual SDG Progress Report** supported by the UN Division for SDGs (UN DESA) and the quadrennial Global Sustainable Developments Report conducted by the President of the Economic and Social Council (para. 83)

The **Sendai Framework** and the **2030 Agenda** share the same indicators for **SDG 1.5**, **11.b** and **13.1**

The Sendai Framework is directly referenced in the **2030 Agenda** in several targets and indicators: **13.1.2**, **1.5.3**, **11.b**, and **11.b.1**



Sendai Framework for Disaster Risk Reduction

Aim & Focus

- Increase countries' resilience to disaster
- 7 targets and 4 priority actions across sectors
- 38 respective quantitative and qualitative indicators developed to measure global implementation progress
- Developed to be consistent with SDG indicators that are used for measuring specific targets of SDG 1. SDG 11. and SDG 13

Legal Relevance

- Voluntary. non-binding agreement

Supported By

- 187 UN Member States

Implementation Period

- 2015 2030, with 2005 - 2015 being the baseline

Monitoring & Reporting

- **Sendai Framework Monitor** and **Sendai Framework Readiness Review**
- Progress in implementing the Sendai Framework will be reviewed biennially by UNISDR
- Sendai Framework Voluntary Committments
- **Ten Essentials for Making Cities Resilient** campaign

The **'Ten Essentials for Making Cities Resilient'** campaign from UNISDR aligns the visions of **NUA** and the **Sendai Framework** on fostering urban resilience

The **'Ten Essentials for Making Cities Resilient'** also provides a tool to achieve the **NUA Principle (c)** on "ensuring environmental sustainability"

New Urban Agenda

Aim & Focus

- Framework that sets the global standards of achievement in sustainable urban development
- Focus areas. National Urban Policy.
  Urban Legislation and Regulation.
  Urban Planning and Design.
  Local Economy and Municipal Finance.
  Local Implementation
- Supporting the implementation of the 2030 Agenda through its three Transformative Commitments

Legal Relevance

- Voluntary, non-binding agreement

Supported By

- Outcome document of Habitat III - 167 UN Member States ratified in October 2016

International Development Frameworks

"We are already seeing the consequences of PC of global warming through more extreme weather, rising sea levels and diminishing Arctic sea ice, among other changes."

Panmao Zhai.
Co-Chair of IPCC Working Group

The **Paris Climate Agreement** is directly referenced in the **2030 Agenda** though **Goal 13 on Climate Action**

PARIS 2015
UN CLIMATE CHANGE CONFERENCE
COP21 · CMP11

Paris Climate Agreement

Aim & Focus

- Keeping global temperature rise well below 2 degrees Celsius above pre-industrial levels, while striving to cap the increase at 1.5 degrees Celsius

Reporting & Review

- All parties of the Paris Agreement are requested to submit revised NDCs every five years that are recorded in a public register on the UNFCCC website

Legal Relevance

- Countries' commitments are called **Nationally Determined Contributions** (NDCs). which become legally binding as countries formally ratify the Paris Agreement (Article 4).

Implementation Period

- 2015 - 2030. with 2005 - 2015 being the baseline

Localization

- The Global Covenant of Mayors for Climate and Energy sets baselines and reports on voluntary climate adaptation and mitigation actions for local governments and cities.
- Global Climate Action on Human Settlements Reporting Stream chaired by ICLEI.
- Cities, alongside civil society, the private sector and financial institutions. are invited to scale up their efforts and support actions to reduce emissions. build resilience and decrease vulnerability to the adverse effects of climate change.

NUA's 3 Transformative Commitments for Sustainable Urban Development

1 Leave no one behind in cities and fighting against poverty

2 Urban prosperity and opportunities for all

3 Ecological and resilient cities and human settlements

Implementation Period

- 2016 - 2036

Monitoring & Review

- The NUA calls for a **quadrennial progress report** on the state of implementation to measure change processes of sustainable urban development
- The **Quito Implementation Platform** includes over 70 voluntary commitments by various partners to implement the NUA

61% of GHG emissions come from countries with urban NDC priorities

2/3 of submitted NDCs indicate specific urban content

3.1.2 The India Model

India has made significant strides towards the adoption, localization, and achievement of the SDGs. The Government of India presented India's second Voluntary National Review (VNR) in 2020, which reported the progress on Agenda 2030 and the 17 SDGs[2]. In 2020-21, India saw improvements in performance indicators under all but six SDGs. While the country is a front runner in the achievement of SDGs 3 (Good Health and Well-Being), 6 (Clean Water and Sanitation), 7 (Affordable and Clean Energy), 10 (Reduced Inequalities), 11 (Sustainable Cities and Communities), 12 (Sustainable Consumption and Production), 15 (Life on Land), and 16 (Peace, Justice and Strong Institutions), it is working to improve its performance under SDGs 2 (Zero Hunger) and 5 (Gender Equality)[3]. Recently, the city of Bhopal in the state of Madhya Pradesh published India's first Voluntary Local Review in collaboration with UN-Habitat[4].

The Ministry of Statistics and Programme Implementation (MoSPI) developed a National Indicator Framework (NIF) in 2018 to localize the global SDG goals to the Indian context.[5] NIF facilitates the monitoring of SDGs at the national level and provides appropriate direction to policymakers and implementing agencies on various schemes and programmes. The framework (NIF 3.0) consists of 286 indicators along with identified data sources and the periodicity of the consultation/review process.[6]

NITI Aayog, the apex public policy think tank of Government of India, undertakes periodic data collection to monitor the progress on SDGs. NITI Aayog co-ordinates with sub-national governments in the spirit of 'cooperative federalism' and is mandated to provide strategic policy inputs to the Government of India.[7] It has developed the India SDG Dashboard, which is a unified data repository of the country's SDG targets that enables the collection and analysis of data at disaggregated levels.[8] The "Indian model of SDG localization" thus rests on four pillars: (a) institutional ownership, (b) a robust review and monitoring mechanism, (c) integration of SDGs in planning and monitoring, and (d) a "whole-of-society" approach.[9]

3.1.3 Report Methodology

The Smart Cities Mission of MoHUA, Government of India, offers a unique illustration of SDG localization. The mission's core pillars of Liveability, Economic-ability, and Sustainability (LES) are well-aligned with the 5Ps of SDGs. The three pillars are further divided into 21 distinct sub-sectors and linked to the Output–Outcome Monitoring Framework (OOMF) (refer Figure 15 and Figure 16). The OOMF includes 213 indicators to monitor the transformation across the 100 cities. Most of these 213 indicators also directly and indirectly measure the SDG targets and indicators. 213 OOMF indicators are mapped to 51 out of 169 targets across 15 SDGs.

The localization methodology adopted in this report included SDG mapping at two levels. First, the cities mapped each city-level project under a specific LES sub-sector with the relevant indicator under OOMF. For each indicator, a primary, secondary, and tertiary SDG target was identified. The primary SDG of an OOMF indicator was mobilized for SDG mapping. India's NIF was used as a reference frame during the SDG mapping exercise. It is important to note that the OOMF indicators precede the NIF. There may, therefore, appear a disjuncture between OOMF and NIF with respect to some indicators. However, SDG mapping of mission projects and investments has continued to be an integral part of mission management and reporting since the early phase of SCM.

Six SDGs are selected for in-depth coverage as (i) Five out of the six SDGs —SDGs 6,7,9,11, and 17—are slated for an in-depth review during the 2023 cycle of HLPF ("accelerating the recovery from the coronavirus disease and the full implementation of the 2030 Agenda for Sustainable Development at all levels")[10], and (ii) direct and indirect linkages to SDG 11 and other urban targets:

The six SDGs are:

i. SDG 6—Clean Water and Sanitation (13.3 per cent of SCM projects and 28 per cent of SCM investments),

ii. SDG 7—Affordable and Clean Energy (8.6 per cent of SCM

projects and 8 per cent of SCM investments),

iii. SDG 8—Decent Work and Economic Growth (6.4 per cent of SCM projects and 4 per cent of SCM investments),

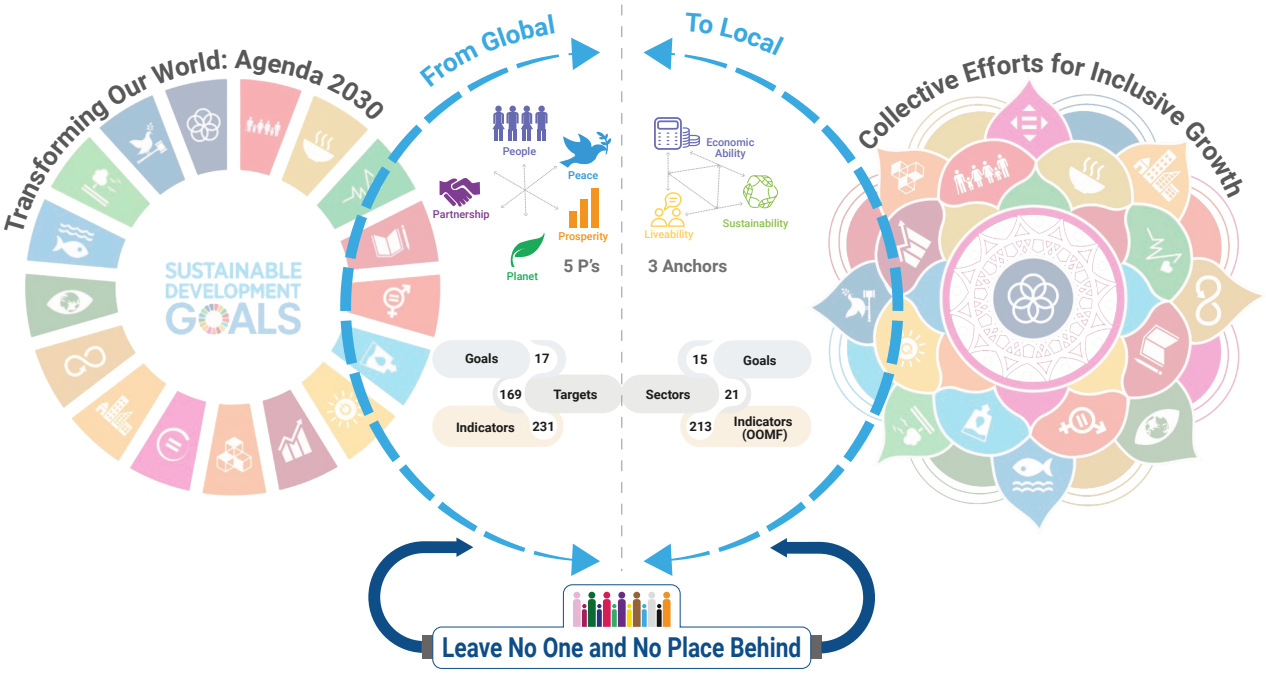
iv. SDG 9—Industry, Innovation and Infrastructure (4.8 per cent of SCM projects and 9 per cent of SCM investments),

v. SDG 11—Sustainable Cities and Communities (43.9 per cent of SCM projects and 39 per cent of SCM investments), and

vi. SDG 17—Partnerships for the Goals (4.1 per cent of SCM projects and 4 per cent of SCM investments).

The localization methodology adopted in this report is a mix of quantitative and qualitative methods. The quantitative aspect uses 125 out of the 213 indicators under OOMF relevant to the selected SDGs. The mapping of the indicators with each SDG is included in Annex I. Out of the 125 indicators, data for 48 indicators relevant to SDG 6 (12 indicators), SDG 7 (8 indicators), SDG 8 (9 indicators), SDG 9 (6 indicators), SDG 11 (11 indicators), and SDG 17 (2 indicators) are used to measure the SDG localization of SCM. The qualitative aspect includes city level case studies of key project interventions and voices of local stakeholders to demonstrate the transformative impact of these projects. The next section provides an insight into SCM using the SDG mapping exercise, which is followed by an in-depth analysis of the selected SDGs.

FIGURE 15: SDG Localization and Smart Cities Mission. *Source: UN-Habitat.*



3.2 Insights into SCM and SDG Localization

FIGURE 16: Projects under SCM are categorised under 21 distinct sectors, with each sector contributing to multiple SDG goals and aligned with one of the three pillars of Liveability, Economic-ability, and Sustainability. Source: SCM and UN-HABITAT.

Note: Of the total SCM projects, 5,366 projects worth USD 12.4 billion stand completed as on 31st May 2023.

* The total figures include 94 SCM projects worth USD 312.9 million that are not tagged to a particular LES sub-sector in the dataset as on 31st May 2023.

The mission's expansive coverage and strong alignment with 15 out of 17 SDGs is made possible by allowing the 100 cities to identify their local urban priorities. Projects under the mission are categorised under 21 distinct sectors, with each sector contributing to multiple SDG goals and aligned with one of the three pillars of Liveability, Economic-ability, and Sustainability (refer Figure 16). The 13 sectors under Liveability Pillar contribute to 14 SDGs with the exception of SDG 8 (Decent Work and Economic Growth), SDG 10 (Reduced Inequalities) and SDG 14 (Life Below Water). Sustainability pillar anchors the sectors important for the environment, ecology, and biodiversity, and thus, the 4 sectors contribute to a total of 8 SDGs, of which SDG 12 (Sustainable Production and Consumption), SDG 13 (Climate Action), and SDG 15 (Life on Land) are most pertinent for the pillar. Lastly, the Economic-ability pillar encompasses 4 sectors relevant for local revenues, financing, and economic development, and mapped to a total of 9 SDGs which include SDG 8 (Decent Work and Economic Growth). The share of projects and investments across the 21 LES sub-sectors is included in Figure 16.

"Public Spaces and Recreation" sector in the Sustainability pillar, is most popular accounting for 17 per cent of the total 7,846 projects and 6.6 per cent of the total investment of over USD 22 billion. Urban resilience, environmental protection, and energy efficiency are the three other sectors in the Sustainability pillar with 4 per cent of the projects and only 3 per cent of investments, cumulatively. It is pertinent to note that greening cities and improving energy efficiency which provide immense environmental benefits and climate action, are also cost effective.

Mobility and network infrastructure has the largest share of both projects and investments. "Smart Mobility", including smart roads, public transport, non-motorized transport (NMT), and pedestrian friendly inclusive infrastructure, had almost 24 per cent of the total projects and highest percentage (21 per cent) share of total investments. "Sanitation: Toilets, Sewerage and Drainage" is third with 9 per cent of total projects and comparatively higher share of investments at 14.3 per cent of USD 22 billion. Similarly, "Water Supply System" sector despite a lower share of projects at 4 per cent has received 13.4 per cent of total investments. "Governance and ICT" includes 8 per cent of the total projects and over 10 per cent of the total investments. The higher share of projects and investments in these sectors cumulatively, implies that cities have focused more on providing basic infrastructure to improve the Liveability outcomes (refer Figure 16).

The mission also facilitated direct and indirect improvements to urban livelihoods and local urban economy. "Tourism development and heritage protection" sector received about 4 per cent of total projects and 2.6 per cent of total investments. Other sectors of economic opportunities for incubation centres and new marketplaces, skilling and ICT technology, and enhancing local revenues, cumulatively, covered 7 per cent of total projects and a comparable investment of 5.3 per cent of total funds.

3.3 Localizing SDG 6: Clean Water and Sanitation

6 CLEAN WATER AND SANITATION

Ensure availability and sustainable management of water and sanitation for all

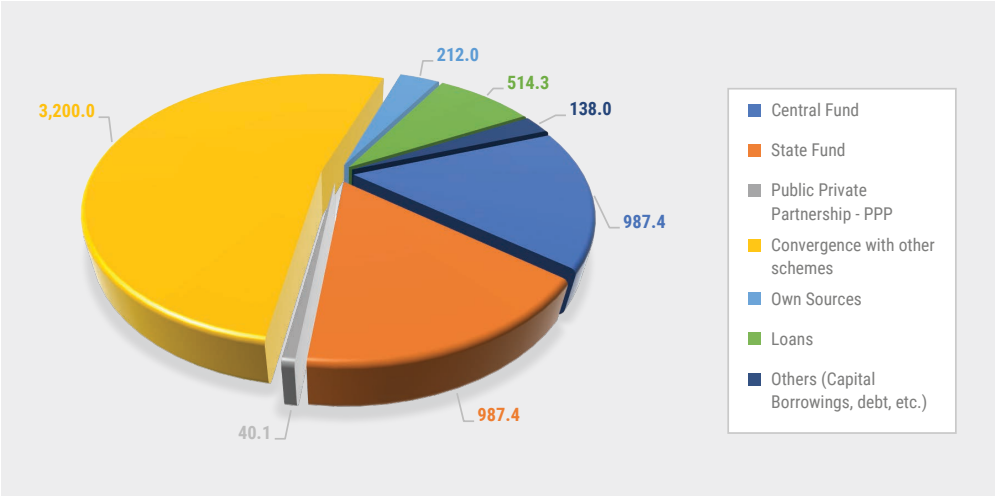
Target 6.1	By 2030, achieve universal and equitable access to safe and affordable drinking water for all
NIF Indicators	6.1.1: Percentage of Population getting safe and adequate drinking water within premises through Pipe Water Supply (PWS) (similar to 1.4.1)
	6.1.2: Percentage of population using an improved drinking water source (Rural)
SCM Indicator 1	Average volume of drinking water treated per day (in MLD)
Indicator Value	3687
SCM Indicator 2	Total length of water supply pipelines laid/capacity augmented (in km)
Indicator Value	13,144
Target 6.2	By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations
NIF Indicators	6.2.1: Proportion of households having access to toilet facility (Urban & Rural) (similar to 1.4.7)
	6.2.2: Percentage of Districts achieving Open Defecation Free (ODF) target
	6.2.3: Proportion of schools with separate toilet facility for girls
SCM Indicator 1	Total number of toilets seats (smart toilets, community toilets, public toilets) constructed in public spaces
Indicator Value	23,480
Target 6.3	By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
NIF Indicators	6.3.1: Percentage of sewage treated before discharge into surface water bodies, 2020
	6.3.2: Proportion of Water Bodies with Good Ambient Water Quality
	6.3.3: Proportion of waste water treatment capacity created vis-a-vis total generation
SCM Indicator 1	Total length of sewerage pipelines laid/augmented (in km)
Indicator Value	5,385
SCM Indicator 2	Capacity of STP augmented (in MLD)
Indicator Value	3,135
SCM Indicator 3	Increase in wastewater treatment capacity (%)
Indicator Value	8%
Target 6.4	By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity

NIF Indicators	6.4.1: Percentage ground water withdrawal against availability
	6.4.2: Per capita storage of water, (in m^3/person)
	6.4.3: Per capita availability of water (in m^3/person)
SCM Indicator 1	Length of water supply system being monitored through SCADA (in km)
Indicator Value	6,853
SCM Indicator 2	Number of households covered under smart water/water meter projects
Indicator Value	3.2 million
Target 6.5	By 2030, implement integrated water resources management at all levels, including through trans-boundary cooperation as appropriate
NIF Indicators	6.5.1: Percentage area of river basins brought under integrated water resources management
SCM Indicator 1	Number of rain water harvesting recharge pits/locations developed
Indicator Value	8,444

SCM prioritized provisions for sufficient water supply, which encompasses wastewater recycling, stormwater reuse, and rainwater harvesting as integral components of city planning. As this section demonstrates, the 100 cities selected under the mission have actively contributed to localizing SDG 6.

A total of 1,042 projects and investment of USD 6.08 billion were directed to improve the efficiency and accessibility of clean water and sanitation across the SCM cities. The projects encompass a wide range of interventions such as the establishment of Sewage Treatment Plants (STPs), Water Treatment Plants (WTPs), expansion of water networks, reuse of treated wastewater, waterfront developments, and integration of Supervisory Control and Data Acquisition (SCADA) systems. Furthermore, over 52 percent of the funds are generated through the convergence efforts with other Centrally Sponsored Schemes like SBM-U and PMAY-U, leveraging synergy across government programmes (refer Figure 17).

FIGURE 17: Sources of funds for projects under SDG 6. More than half of the funds were mobilized in convergence with other flagship urban schemes (USD Mn). Source: SCM



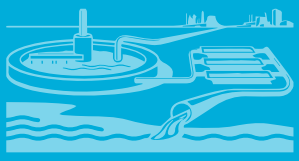
3,687 MLD
of drinking water treated per day (average volume)

13,144 km
of water supply pipelines laid/augmented

23,480
toilets seats constructed in public spaces

5,385 km
of sewerage pipelines laid/augmented

3,135 MLD
of STP capacity augmented



8%
increase in wastewater treatment capacity

6,853 km
of water supply system being monitored through SCADA

3.2 million
households covered under smart water meter projects

8,444
rain water harvesting pits/locations developed

3.3.1 Key Interventions

Enhancing Water Supply: Out of the 100 SCM cities, 95 cities have successfully upgraded their existing water supply networks and expanded water distribution to newer areas within the city. Several cities, including Agra, Bhopal, Chandigarh, Ahmedabad, Pune, Coimbatore, and Surat, have incorporated SCADA technology into their water supply systems. These SCADA systems have been seamlessly integrated into the ICCC, enabling close monitoring and control of water distribution at the city level. Over time, this system will prove effective in reducing non-revenue water by promptly detecting leakages and pressure drops in real-time.

Expanding Provision of Sewage Collection: All SCM cities have prioritized installation of new sewage treatment plants or expansion of existing networks to ensure safe disposal of city sewage. Cities such as Chandigarh and Bareilly have installed SCADA systems integrated with the ICCC to monitor sewerage collection, detect faults, and identify blockages in the system. Additionally, Agra has integrated a vacuum sewerage network into its existing system to enhance sanitation in the old city.

Revitalizing Natural Water Bodies: Cities have implemented projects for restoring and safeguarding lakes, rivers, canals, ponds, tanks, and other water bodies as part of SCM. Noteworthy projects such as Telibandha lake rejuvenation in Raipur, riverfront development in Indore, Kanbargi lake rejuvenation in Belagavi, Kundavada lake redevelopment in Davangere, development of Tolankere lake in Hubballi Dharwad, and revitalization of Atal Sarovar in Rajkot, have successfully restored city water bodies, re-establishing their natural ecosystems.

Construction of Public Toilets: To improve access to sanitation in public spaces and discourage open defecation, cities have built gender-sensitive and universally accessible public toilets. Notably, cities like Agra, Ahmedabad, Chandigarh, Prayagraj, and Thiruvananthapuram have installed self-cleaning systems in these toilets. Additionally, cities such as Indore, Bilaspur, Jhansi, Raipur, and Srinagar have constructed “SHE lounges” and “Pink Toilets” exclusively for women, enhancing safe access to improved sanitation facilities.

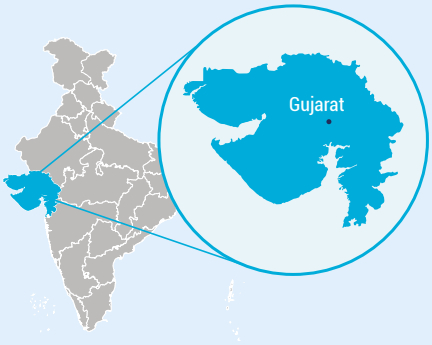
Image 14: A glimpse of the Telibandha lake rejuvenated by Raipur Smart City (Chhattisgarh), using an organic method involving the use of floating plants. *Source: Raipur Smart City.*

Image 15: A "Smart Toilet" installed in Prayagraj Smart City for exclusive use by women. SCM cities prioritized the commissioning of gender-sensitive and universally accessible public toilets. *Source: Prayagraj Smart City*

3.3.2 City Spotlight

Ahmedabad

Gujarat, India



Ahmedabad, the largest city in the West Indian state of Gujarat with a population of 5.57 million, has invested USD 103.3 million in 19 projects to improve its water supply network. These projects include the integration of SCADA systems, implementation of smart toilets, sewage treatment plants, stormwater drain networks, and smart meters. These initiatives contribute to multiple targets established to achieve Goal 6.

For example, by implementing sensor-based monitoring, Ahmedabad has significantly improved the efficiency of its existing water supply network. This has resulted in an additional supply of more than 50 MLD water, benefiting an additional population of 150,000. Moreover, this has led to electricity saving of over 11 lakh units per year.

In addition, the city has enhanced access to improved sanitation and hygiene by installing sustainable, smart, and self-cleaning toilets, which incur low operation and maintenance costs.

24x7 Water Supply and Network Efficiency: The key objective of the project in Ahmedabad was to enhance the efficiency of the water supply system through SCADA integration and continuous monitoring. This resulted in reduced volume of non-revenue water, reduced energy consumption, and improved water quantity and quality. SCADA systems were implemented in four French wells, three WTPs, and 148 Water Distribution Stations (WDS).

Integrating the system with the Integrated Command and Control Centre (ICCC) enabled effective data analysis. The analysis revealed that initial energy usage for distribution exceeded the required amount by 40 per cent. To address this, pumps with a total capacity of 23 MLD were refurbished, resulting in energy savings of more than 1200 units per day. Over the past 6 years, more than 27 lakh units of electricity have been saved.

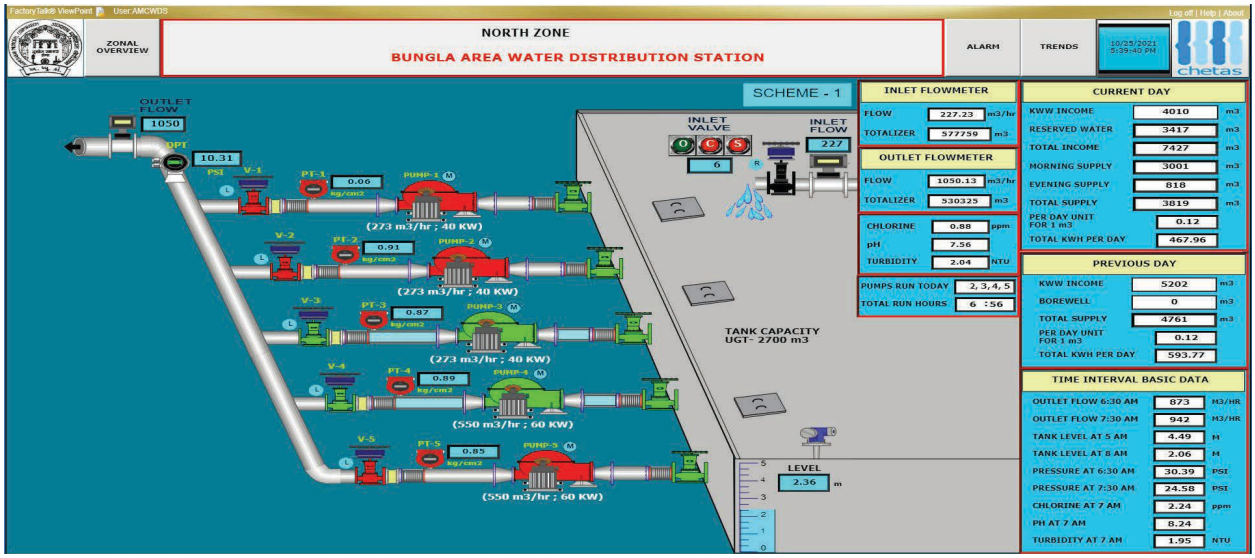
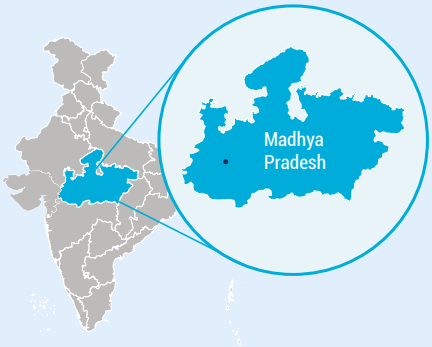


Image 16: A view of the SCADA Dashboard in Ahmedabad Smart City. Integration of SCADA systems in the water supply network of the city has resulted in reduced volume of non-revenue water, energy consumption, and improved water quantity and quality. *Source: Ahmedabad Smart City*

Self-Cleaning Toilets: Smart community toilets were installed to offer people a safe, accessible, clean, and hygienic public toilet facility. With 60 smart toilets installed throughout the city, over 7,800 litres of water have been saved within a span of 30 months. The toilets are equipped with automated sensor-driven flushing and cleaning, consuming only around 2.5 litres of water per use, as opposed to the 7-8 litres consumed by traditional toilets.

> **Installation of Smart Toilets across the city is one of the most unique projects undertaken by Ahmedabad Municipal Corporation, especially in the sanitation sector. This is a PPP project where a local business owner has been involved in creating a public toilet facility which does not only provide sanitation infrastructure but also generates revenue. This project is also an example of how local entrepreneurs can be involved in creating basic infrastructure for the city.**
>
> **Mihir Patel**
> CEO, Ahmedabad Smart City



Indore

Madhya Pradesh, India

The city of Indore in central India, with a population of 19.6 lakh (Census 2011), has implemented 15 innovative projects as part of SCM to address water supply and sanitation needs. The projects include installation of new STPs, WTPs, construction of public toilets, waterfront developments, and rainwater harvesting systems—all aimed at ensuring clean water and sanitation for all residents. Public participation in project identification, design, and maintenance has contributed to the sustainability of these initiatives, which have successfully addressed multiple targets under SDG 6.

Landscaped open spaces along the waterfronts has provided the city dwellers with recreational opportunities. With community involvement, lake restoration has improved water quality, and established thriving aquatic life in the river. Removal of unauthorized encroachments and rehabilitation of affected slum dwellers has revitalized the river's surroundings. Additionally, the rehabilitation and development of commercial establishments, such as the old fruit market located at the river's edge, has contributed to the area's growth and increased property values.

Riverfront Development from Rambagh Bridge to Krishnapuri: Indore has successfully reclaimed eight land parcels along the Saraswati river for riverfront development. A pilot stretch has been developed as part of SCM including the construction of retaining walls to ensure that the flow of the river remains unobstructed. Monitoring systems are put in place to prevent sewage and untreated water from entering the river through smaller drains and *nallahs*. The reclaimed land parcels were transformed into well-designed spaces, featuring pedestrian walkways, lighting, and beautifully landscaped green areas. As part of this initiative, 500 unauthorized structures were removed, and 1,000 slum dwellers were provided with improved housing facilities. Overall, this pilot project has contributed an additional 0.4 sqkm of green space to the city, enhancing the overall aesthetics and liveability of the area.

> **"Kahn and Saraswati riverfront project contributed to improved flood management and overall ecological health of the rivers, added a vibrant public space to the city's landscape, and, most importantly, enhanced the quality of life of people inhabiting the banks of the rivers.**
>
> **Divyank Singh**
> CEO, Indore Smart City

Image 17: Indore Smart City constructed retaining walls alongside a pilot stretch of Saraswati river to ensure unobstructed flow of the river and implemented measures to prevent sewage and untreated water from entering the river through smaller drains and nalahs. The riverfront development has added 0.4 sqkm of green space to the city. *Source: Indore Smart City.*

Saraswati and Kahn Lifeline Project (SANKALP): The city of Indore has made a significant achievement in addressing sewage disposal through a collaborative effort involving Indore Smart City Development Limited (ISCDL), Indore Municipal Corporation (IMC), and other flagship urban schemes. The city used to release over 205 MLD of sewage from 5,500 households directly into Kahn river, Saraswati river, and a network of 25 drains without any treatment. To tackle this issue, Indore Smart City prepared a sewerage network plan using GIS-based terrain modelling. A gravity-based network spanning over 360 km was laid out, eliminating the need for pumping, and seven decentralized STPs were strategically placed in low-lying areas.

The project has successfully prevented the discharge from more than 7000 black and greywater outfalls into the city's water bodies, diverting them to the municipal sewerage network. As a result, the water quality has improved, with Biological Oxygen Demand (BOD) levels reduced from 120 units to 5 units and Chemical Oxygen Demand (COD) levels reduced to 50 units. The dissolved oxygen levels in the water bodies now measure at 4mg/litre, indicating a healthier aquatic ecosystem.

Public participation and raised awareness on safe sewerage disposal are some of the key achievements of the project. To sustain the momentum and ensure replicability, the Indore Municipal Corporation has formed the "*Nadi Swachcta Samiti*", a self-help group responsible for continuing the project's activities. This initiative has fostered strong local partnerships, involving around 150 contractors, 6 CSR partners, and over 600 volunteers from NGOs.

Image 18: The SANKALP project in the city of Indore has prevented the discharge from more than 7000 black and greywater outfalls into the city's water bodies, diverting them to the municipal sewerage network. With the aid of GIS-based terrain modelling, a gravity-based sewerage network spanning over 360 km was laid out, eliminating the need for pumping, and seven decentralized STPs were strategically placed in low-lying areas. *Source: Indore Smart City.*

> **"My house is located along Bhamori nalah, which used to carry sewage and garbage. Earlier, dirty water used to seep into our bore-well and contaminate our drinking water. After my colony was connected to Smart City's sewerage line, the nalah is now completely clean. Now, the quality of borewell water has also improved."**
>
> **Bhamori Kumawat**
> Resident, Indore

3.4 Localizing SDG 7: Clean and Affordable Energy

7 AFFORDABLE AND CLEAN ENERGY

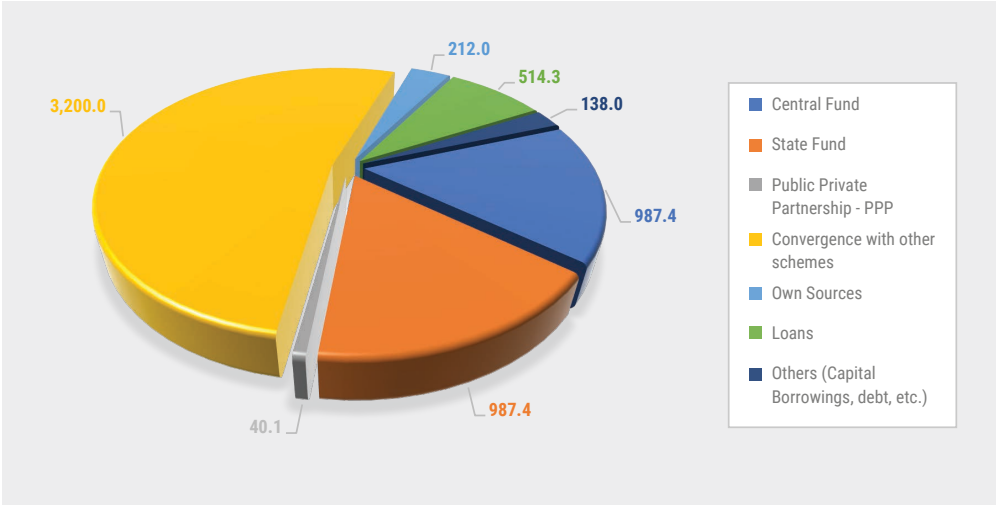
Ensure access to affordable, reliable, sustainable and modern energy for all

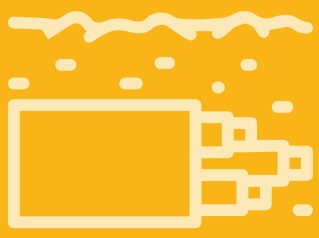
Target 7.1	By 2030, ensure universal access to affordable, reliable and modern energy services
NIF Indicators	7.1.1: Percentage of households electrified (similar to 1.4.3)
	7.1.2: Percentage of household using clean cooking fuel
SCM Indicator 1	Total length of the underground electricity cabling constructed/ upgraded (in km)
Indicator Value	8,183
SCM Indicator 2	Total number of households connected to the electricity distribution network (nos.)
Indicator Value	8,17,546
SCM Indicator 3	Total number of connections into the grid (nos.)
Indicator Value	13,82,170
SCM Indicator 4	Total number of HHs connected to smart meters (nos.)
Indicator Value	5,59,248
Target 7.2:	By 2030, increase substantially the share of renewable energy in the global energy mix
NIF Indicators	7.2.1: Renewable energy share in the total installed electricity generation
SCM Indicator 1	Total capacity of the solar energy installed (MWh)
Indicator Value	97
Target 7.3:	By 2030, double the global rate of improvement in energy efficiency
NIF Indicators	7.3.1: Energy intensity measured in terms of primary energy and GDP, (in mega joules per rupee)
SCM Indicator 1	Total LED/solar street lights installed (nos.)
Indicator Value	27,87,358

SCM cities have successfully implemented projects to improve access to affordable, reliable, sustainable, and clean energy for urban residents. The mission guidelines advocate for cities to ensure that at least 10 per cent of their energy needs are met by solar power, guaranteeing a stable electricity supply. Across 100 Smart Cities, over 676 projects valued around USD 1.82 billion have been executed to enhance energy security.

Cities have adopted diverse and innovative projects, including utilization of solar energy for LED streetlights, installation of solar panels, bio-CNG and waste-to-energy plants, transitioning public vehicles from diesel/CNG to electric vehicles, implementing renewable energy facilities, and establishing efficient energy infrastructure. Approximately, 60 per cent of these projects have been financed through PPP and convergence efforts, as Figure 18 demonstrates.

FIGURE 18: Sources of funds for projects under SDG 7 (USD Mn). *Source: SCM.*





8,183 km

of underground electricity cabling constructed/upgraded

8,17,546

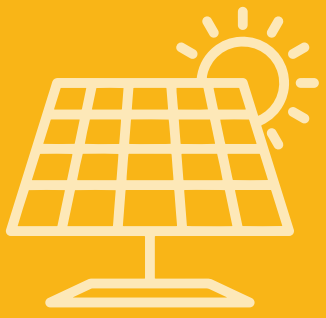
households connected to the electricity distribution network

13,82,170

connections into the grid

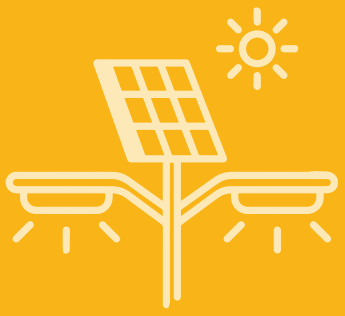
5,59,248

households equipped with smart meters



97 MWh

of solar energy capacity installed



27,87,358

LED/solar streetlights installed

3.4.1 Key Interventions

Enhanced Avenues for Clean and Sustainable Energy: SCM cities across the country have commissioned infrastructure that promotes solar energy. These include solar PV panels, solar floating farms, rooftop solar panels, among others. For instance, Tirupati Smart City has installed solar power projects with a capacity of 11MW to meet the city's energy needs. Similarly, in New Town Kolkata, semi-transparent PV panels with a net metering system have been installed on the rooftops of 14 public buildings and five markets, along with solar panels on a 1.7 km stretch of canal. Additionally, solar-powered LED lights have been installed in 11 parks and playgrounds. As of May 2023, a total of 97 MWh capacity of solar energy has been installed across the 100 cities.

Reducing Reliance on the Grid: According to the Smart City Mission guidelines, the Area Based Development component aims to source a minimum of 10 per cent of its electricity from solar energy. Thiruvananthapuram has made progress in harnessing solar energy and reducing its reliance on the Kerala State Electricity Board Limited (KSEBL) grid. The city has successfully commissioned an 8 MWh solar plant. Thiruvananthapuram has been recognized as a 'Solar City' under the mission.

Incorporating Wind and Solar Energy as Part of City Master Plan: Surat has developed a "Solar City Master Plan" with the goal of fulfilling 34 per cent of its energy requirements from renewable sources. The city has further implemented a "Wheeling of Power" project, installing wind energy plants that generate 2.1 MW of energy. The

Image 19: A 4-megawatt floating solar plant commissioned as part of SCM in Tirupati (Andhra Pradesh).
Source: Tirupati Smart City

generated energy is utilized to power the smart city ABD area. Additionally, the Surat Municipal Corporation has established an energy efficiency cell responsible for conducting energy audits, promoting energy conservation and renewable energy initiatives, and monitoring electricity usage across the entire corporation.

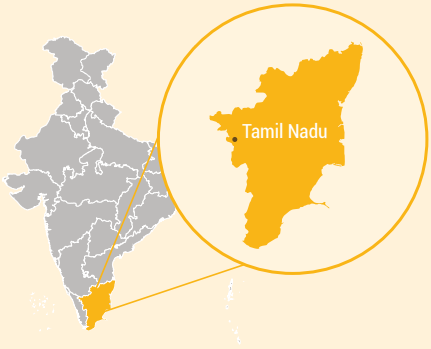
Converting Waste to Energy: Cities have increasingly embraced Waste-to-Energy initiatives, which effectively address solid waste management while harnessing alternative energy sources. Jabalpur Smart City, for instance, has implemented a pioneering Waste-to-Energy project with the goal of utilizing municipal solid waste for affordable energy generation. The first-of-its-kind plant developed in PPP mode in Jabalpur employs mass burning technology, incinerating around 600 tonnes of old, new, and unsorted waste while adhering to industrial standards and regulatory requirements. The plant generates around 11.5 MW of electricity daily, which is sold to the Madhya Pradesh Electricity Board (MPEB) at a rate of INR 6.39 per unit powering more than 18,000 households. This project has reduced carbon emissions by approximately 37,000 tonnes in Jabalpur and saved 4.4 hectares of land that would have been used for dumping waste—a total of almost 2,19,000 tonnes annually.

Image 20: A first-of-its-kind Waste-to-Energy plant developed in PPP mode in Jabalpur employs mass burning technology, incinerating 600 tonnes of old, new, and unsorted waste while adhering to industrial standards and regulatory requirements. The plant generates around 11.5 MW of electricity daily, which is sold to the Madhya Pradesh Electricity Board (MPEB). *Source: Jabalpur Smart City.*

3.4.2 City Spotlight

Coimbatore

Tamil Nadu, India



Coimbatore, an important urban centre in the south Indian state of Tamil Nadu, with a population of over 3 million (Census 2011), has prioritized renewable energy in its Smart City initiatives. Out of the 72 projects being implemented, 17 are dedicated to adding renewable sources of energy. With an investment of approximately USD 13.42 million, Coimbatore has sought to localize the goals of affordable and clean energy. Coimbatore Smart City has implemented energy-efficient measures such as solar plants, LED streetlights, and rooftop solar panels. The city's renewable energy generation capacity includes a hydro-electric plant generating around 60 MW, solar power plants generating 7 MW, wind farms generating over 15 million units, and co-generated power from bio-mass totalling 6 MW, approximately.

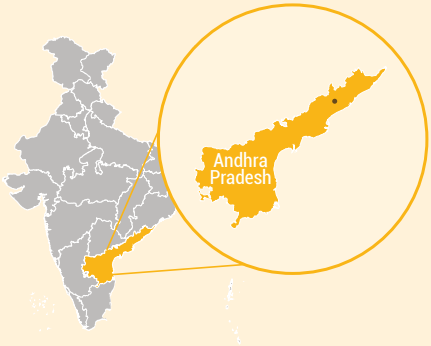
Solar Power Plant at Ukkadamn and Kavundampalayam: Coimbatore Smart City is committed to commissioning sustainable energy sources across the city. The city has installed solar plants to supplement the electricity supply with renewable energy. The Ukkadam plant has a capacity of 3.6 MW and consists of 11,600 solar panels. Built at a cost of USD 2.08 million, it transfers power to Tamil Nadu Generation & Distribution Corporation (TANGEDCO) sub-stations, offsetting electricity bills for high-tension connections to water treatment plants and pumping stations. Furthermore, the Coimbatore City Municipal Corporation has installed a 1 MW solar plant at an old dump yard in Kavundampalayam, comprising 3168 solar panels.

> **"Extensive use of solar panels will help our city transition to cleaner sources of energy. Coimbatore Smart City has made commendable efforts in that direction."**
>
> **Mahi M**
> Resident, Coimbatore

Bio-Methanation Plant: Coimbatore has not only implemented solar power plants but also focused on the waste-to-energy model by installing a bio-methanation plant that relies on Partially String Tank Reactor (PSTR) technology. The plant processes 1 MT of organic waste daily, converting it into biogas used for electricity generation. Currently, the electricity generated is supplied to the workshop and micro-composting centre of the Coimbatore Municipal Corporation, offsetting annual electricity costs. The bio-methanation plant produces approximately 60,000 m3 of biogas and 39,055 m3 of methane annually, generating around 7 KW of electricity per

day. The plant saves up to 2,190 litres of fuel consumption per year. Moreover, the project prevents around 547 tonnes of waste from being dumped and reduces CO2 emissions by approximately 1,505 tonnes per year. The project is supported by the Swiss Agency for Development & Cooperation (SDC), Embassy of Switzerland.

Image 21: The bio-methanation plant commissioned by Coimbatore Smart City produces approximately 60,000 m^3 of biogas and 39,055 m^3 of methane annually, generating around 7 KW of electricity per day. *Source: Coimbatore Smart City*.



Visakhapatnam

Andhra Pradesh, India

Visakhapatnam, the largest city in Andhra Pradesh situated along the Bay of Bengal, has a population of 2.35 million (Census 2011). The city has initiated ten smart projects worth over USD 247 million, focusing on enhancing access to clean and affordable energy as part of SCM. These projects include installation of solar plants, solar rooftops on public buildings, LED streetlights, underground cabling, and smart metering. The city has invested USD 40.73 million to localize the targets under SDG 7.

The Greater Visakhapatnam Smart City Corporation Limited (GVSCCL) has shown innovation and excellence in investing in smart renewable energy generation for long-term sustainability. GVSCCL and the Greater Visakhapatnam Municipal Corporation (GVMC) coordinated to install floating solar panels in the city's water bodies, transformed barren land into land-based solar power generation nodes, and utilized the rooftops of public buildings for solar energy generation.

Mudasarlova Reservoir Floating Solar Plant: GVSCCL has installed floating solar panels covering approximately 20 per cent of the lake's area, spanning 4.4 acres. These solar panels, made of polycrystalline and monocrystalline materials, are suspended on 4 mm HDPE pipes that are vacuumed and foamed. Each panel, measuring 0.9m X 1.98m, generates around 350 W/hr, resulting in an annual electricity production of 3,613.5 MWh. The generated energy is fed into the grid and distributed to the surrounding region.

This project has saved USD 0.28 million annually and prevented over 3,000 tonnes of CO_2 emissions. Additionally, installation of these panels has improved water quality by reducing sunlight penetration and potential algae growth, leading to reduced maintenance costs. The project has also helped reduce evaporation by up to 70 per cent, conserving approximately 190 lakh litres of water each year.

Solar Streetlights: Visakhapatnam has installed solar streetlights across the city, including the 5 km Beach Road and the ABD area. Each streetlight panel generates approximately 44W of power. In total, 380 solar streetlights (6m high) with a capacity of over 0.173 MW and 200 solar post lights (4m high) of 25W have been installed and commissioned. These solar streetlights generate around 189.4 MWh of electricity annually, reducing carbon dioxide emissions by 242 tonnes and saving the city USD 0.015 million.

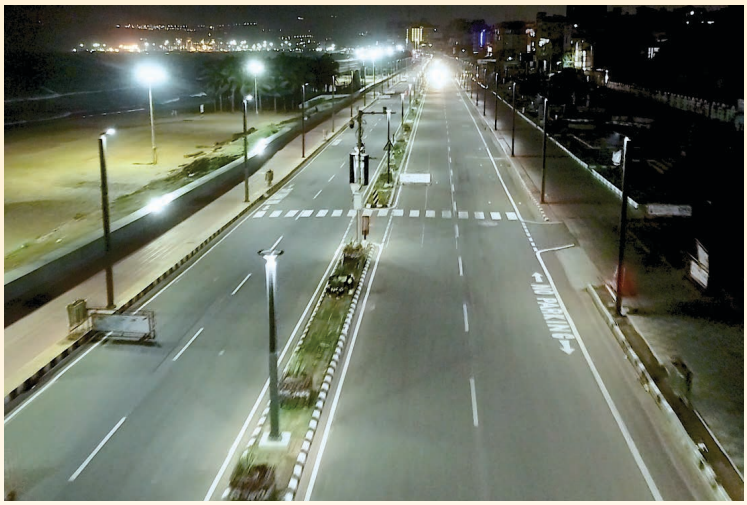


Image 22: Visakhapatnam has installed solar streetlights across the city which generate around 189.4 MWh of electricity annually. Source: Visakhapatnam Smart City.

3.5 Localizing SDG 8: Decent Work and Economic Growth

8 DECENT WORK AND ECONOMIC GROWTH

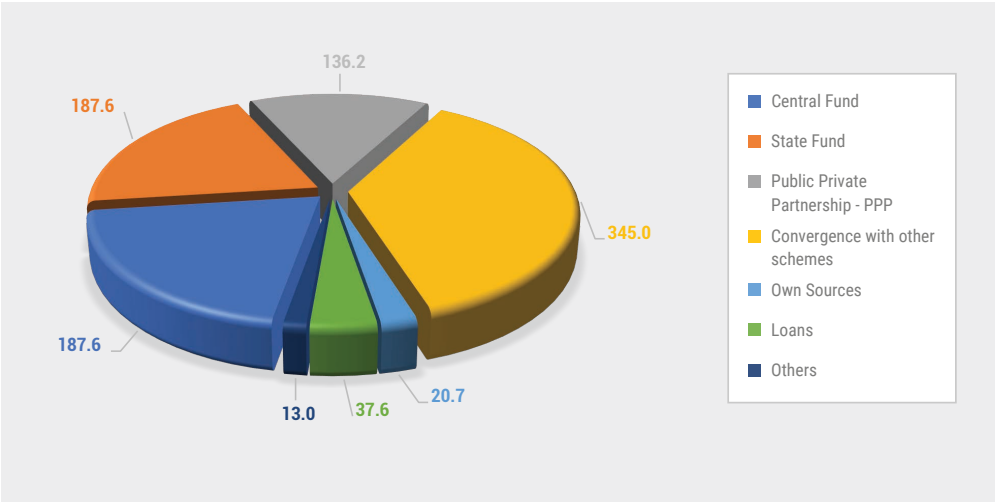
Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

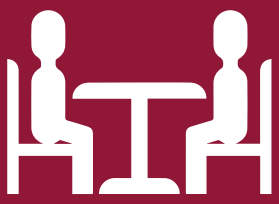
Target 8.3:	Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of MSME, including through access to financial services.
NIF Indicators	8.3.1: Percentage of workers in informal sector among total workers engaged in non-agriculture sector
	8.3.2: Total number of patents issued (granted) (similar to indicators 8.2.2 and 9.5.3)
	8.3.3: Outstanding Credit to MSME (in Rs. crore)
	8.3.4: Number of MSME units registered under the online Udyog Aadhaar registration
	8.3.5: Number of start-ups recognized under Start-up India, (in number)
SCM Indicator 1	Total number of incubation centres developed (nos.)
Indicator Value	20
SCM Indicator 2	Total number of startups facilitated/registered in the incubation centres (nos.)
Indicator Value	550
Target 8.4:	Improve progressively, through 2030, global resource efficiency in consumption and production and Endeavour to decouple economic growth from environmental degradation, in accordance with the 10Year Framework of programmes on Sustainable Consumption and production, with developed countries taking the lead
NIF Indicators	8.4.1: Proportion of waste recycled vs. waste generated
	8.4.2: Per capita fossil fuel consumption (in kg)
SCM Indicator 1	Total waste to energy processing capacity installed (in TPD)
Indicator Value	1,330
Target 8.6:	By 2020, substantially reduce the proportion of youth not in employment, education or training
NIF Indicators	8.6.1: Unemployment Rate (15-24 years)
	8.6.2: Proportion of youth (15-24 years) not in education, employment or training (NEET)
SCM Indicator 1	Total number of skill development centres/ vocational training institutes developed/redeveloped
Indicator Value	16

Target 8.9:	By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products
NIF Indicators	8.9.1: Direct contribution of Tourism to total GDP and in growth rate
	8.9.2: Percentage change in number of visits by tourists (domestic & foreign) over previous year
SCM Indicator 1	Total number of tourist information/facilitation centres developed/installed
Indicator Value	309
SCM Indicator 2	Total number of users of applications/web based/digital intervention (audio/visual) made for tourism development
Indicator Value	6 million
Target 8.10:	Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all
NIF Indicators	8.10.1: Indicator on financial inclusion
	8.10.2: Number of accounts (including deposit and credit accounts) of scheduled commercial banks per 1,000 population (similar to 1.4.5)
	8.10.3: Number of banking outlets per 1,00,000 population
	8.10.4: Automated Teller Machines (ATMs) per 1,00,000 population
SCM Indicator 1	Number of persons using fare collection system, automated systems, smart cards, etc., for public transport
Indicator Value	7,11,193
Target 8.b:	By 2020, develop and operationalize a global strategy for youth employment and implement the Global Jobs pact of the International Labour Organization
NIF Indicators	8.b.1: Existence of a developed and operationalized national strategy for youth employment, as a distinct strategy or as part of a national employment strategy
	8.b.2: Number of person days created under Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), (in lakhs)
SCM Indicator 1	Total number of skill development centres/ vocational training institutes developed/redeveloped
Indicator Value	16

The 100 Smart Cities have collectively undertaken 504 projects valued at USD 927 million to localize SDG 8. These projects encompass initiatives such as establishing incubation centres, micro skill development centres, market area redevelopment, promoting sustainable tourism, and expanding digital financial services. Over 52 per cent of these projects are implemented through innovative funding mechanisms like convergence with other urban schemes and PPP, as demonstrated by Figure 19.

FIGURE 19: Sources of funds for projects under SDG 8 (USD Mn). *Source: SCM.*



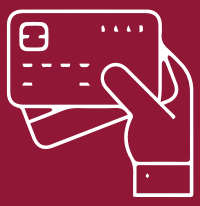


20

incubation centres developed

550

startups facilitated/registered in the incubation centres



711,193

persons using fare collection system, automated systems, smart cards, etc., for public transport

16

skill development centres/vocational training institutes developed/redeveloped

309

tourist information/facilitation centres developed/installed

6 million

users of applications/web based/digital intervention (audio/visual) made for tourism development

3.5.1 Key Interventions

Development of Incubation Centres: The incubation centres developed as part of SCM offer technical and financial support to registered start-ups at affordable rates. They provide modern workspaces, data sharing, workshops, and events like hackathons and boot camps. Additionally, they assist with Intellectual Property Rights and marketing opportunities. The incubation centres established across 15 SCM cities have nurtured over 550 start-ups. These start-ups primarily focus on utilizing emerging technologies such as AI and ML, data analytics, blockchain, and cloud computing to address local challenges in transportation and solid waste management. The largest incubation centres are in Bilaspur, Jabalpur, Bhopal, Surat, and Indore. Over 450 start-ups were incubated under SCM. These start-ups created over 1,500 direct and indirect jobs and raised investments of more than USD 5 million.

Skill Development Centres: Skill development centres offer technical training and educational programs in sectors like manufacturing, entrepreneurship, and community development. They provide various services such as self-help group formation, livelihood resource mapping, community mobilization, and market networking opportunities. Under SCM, 16 skill development centres have been established in cities like Agra, Aurangabad, Gwalior, Indore, Lucknow, Shivamogga, Tirupati, and Varanasi. These centres have benefited more than 10,000 individuals. Notably, the Agra Smart City houses one of the largest micro skill development centres, having trained over 1,500 individuals.

Redevelopment of Market Areas: Market redevelopment projects have transformed markets into modern, pedestrian-friendly spaces with improved infrastructure and transportation access. These projects have attracted new businesses and investments,

Image 23: A view of the incubation centre established in Bhopal Smart City. The incubation centres established across 15 SCM cities have nurtured over 550 start-ups. *Source: Bhopal Smart City.*

revitalizing the market areas. Examples include the Mahila Market in Belagavi, Chappan Dukkan in Indore, and Pondy Bazar in Chennai. These projects have not only improved livelihoods but also preserved social landmarks and the unique identity of the cities.

Tourist Information Kiosks: Tourism facilitation centres in 50 Smart Cities enhance the travel and local experiences of tourists by providing information through mobile applications, digital signage, and virtual reality experiences. These initiatives have improved tourist satisfaction and attracted more visitors. Amritsar Smart City Limited, for example, has installed 29 smart tourist information kiosks at major attractions in the city, catering to over 2,000 unique visitors each month.

Expansion of Financial Services through Smart Cards: Eighteen Smart Cities in India have implemented smart common payment cards in collaboration with financial agencies and banks. These cards enable residents to conveniently pay for various services and taxes such as property tax, electricity bills, water tax, city bus fares, and parking fees. The introduction of smart cards has significantly promoted digital payments, with over 7.91 lakh people utilizing them and other automated fare collection systems in these cities. Since 2015, these smart cards and automated systems have generated an additional internal revenue of approximately USD 6.95 million. Notable examples include Bhubaneswar's Odyssey Card and One Raipur Smart Card.

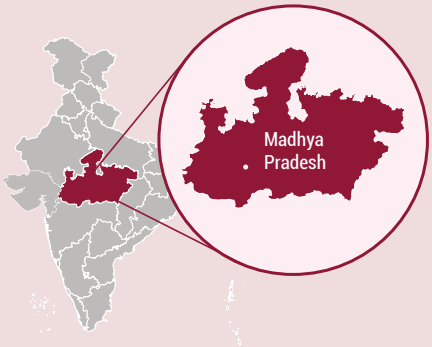
Image 25: Eighteen Smart Cities in India have implemented smart common payment cards in collaboration with financial agencies and banks to promote digital payments and improve access to financial services. These cards enable residents to conveniently pay for various services and taxes such as property tax, electricity bills, water tax, city bus fares, and parking fees. *Source: Surat Smart City.*

Image 24: A dedicated food-street in Belgavi (Karnataka), with over two dozen shops developed to provide livelihood opportunities and create a vibrant public space for co-mingling of communities. This SCM project has provided a first-of-its-kind market to the city and has boosted the local economy. *Source: Belgavi Smart City.*

3.5.2 City Spotlight

Indore

Madhya Pradesh, India



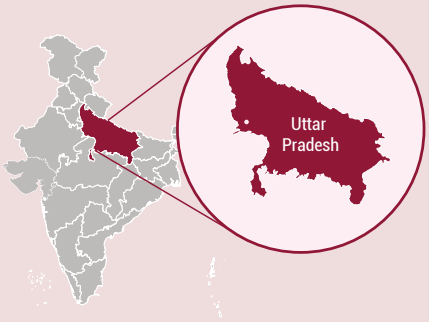
Indore, with over 246 projects aimed at city upgradation, has made investments exceeding USD 445 million. Among these projects, ISCDL has implemented 10 innovative initiatives that contribute towards achieving the targets under SDG 8. These include market redevelopment projects and the establishment of an incubation centre. The redevelopment of Chappan Dukkan has significantly increased footfall, benefiting 250 vendors with improved livelihood opportunities. The successful incubation of 76 start-ups through the Indore Smart Seed Incubation Centre enabled young entrepreneurs to secure more than USD 0.18 million in external funding. These projects have helped enhance productivity through diversification and technological upgradation, while also generating decent employment opportunities for the youth, thereby reducing unemployment rates. Overall, Indore's smart city initiatives have fostered entrepreneurship, creativity, and innovation, contributing to the city's progress in realizing SDG 8 targets.

Market Redevelopment-Chappan Dukkan: In Indore, approximately 10,000 sqm of market and vending areas were redeveloped, greatly improving the lives of over 250 vendors. This redevelopment project included the creation of 56 stores along a 175-meter-long street in the business district of Indore, known as "*Chhappan*" in Hindi. Notably, this street is the city's first vehicle-free zone designed as a public space, featuring green spaces, seating, and room for various community activities. The project aimed to alleviate congestion, provide a pedestrian-friendly environment, and offer vendors a well-organized commercial space. It has successfully transformed the area into a vibrant and accessible zone, serving as Indore's inaugural vehicle-free street complex.

> **"We have never had a street food hub which is clean and adequately equipped. The work of Indore Smart City has turned Chappan Dukaan into a major landmark."**
>
> **Harsh Kanungoo**
> Resident, Indore

Agra

Uttar Pradesh, India



Agra, located in the state of Uttar Pradesh, is a historic city renowned for its iconic monument, the Taj Mahal. With a population of nearly 1.6 million, Agra is known for its dense, old cityscape. The city is executing 62 projects aimed at improving liveability, economic-ability, and sustainability. Among them, 6 projects specifically focus on creating job opportunities for the city's residents. Initiatives such as micro skill development centres, street vending zones, tourist kiosks, Taj orientation centre, museum upgrades, and automated fare collection systems have contributed to economic prosperity. These efforts have resulted in increased tourism, higher revenue collection, and more employment opportunities for the youth. The micro skill centre in the Tajani area has provided training to 104 self-help groups, benefiting over 1,300 people. The tourist kiosks have also benefited more than 200,000 travellers, thanks to the presence of one of the world's most famous monuments in the vicinity.

Skill Development Centre: The city has established a micro skill development centre that offers training in a range of trades, including tourism, handicrafts, and manufacturing. It provides professional instruction in language skills, computer literacy, interpersonal skills, and technical skills. Additionally, the centre offers entrepreneurship development programs to help participants establish sustainable livelihoods. This project focuses on workforce training for the tourism industry, equipping youth with the necessary skills to adapt to the job market and create job opportunities.

> **"The micro skill development centre established by Agra Smart City has become the focal point for community interaction—it has helped us develop skills and competence that have opened new commercial avenues."**
>
> **Raj Kumar**
> Artisan, Agra

Image 26: Establishment of skill development centres in major SCM cities has enabled the localization of targets under SDG 8, benefitting over 10,000 individuals. Agra Smart City houses one of the largest micro skill development centres, having trained over 1,500 individuals. *Source: Agra Smart City.*

Tourist Kiosks: The city has placed tourist kiosks at strategic locations to promote tourism and assist visitors. These kiosks serve as a one-stop solution for tourists, providing information about local monuments and offering services like ticketing and golf cart rentals. The project aims to provide accurate and up-to-date information to enhance the visitor's experience, while also gathering valuable feedback. This data has been beneficial for tourist operators and local authorities in improving tourism services.

3.6 Localizing SDG 9: Industries, Innovation, and Infrastructure

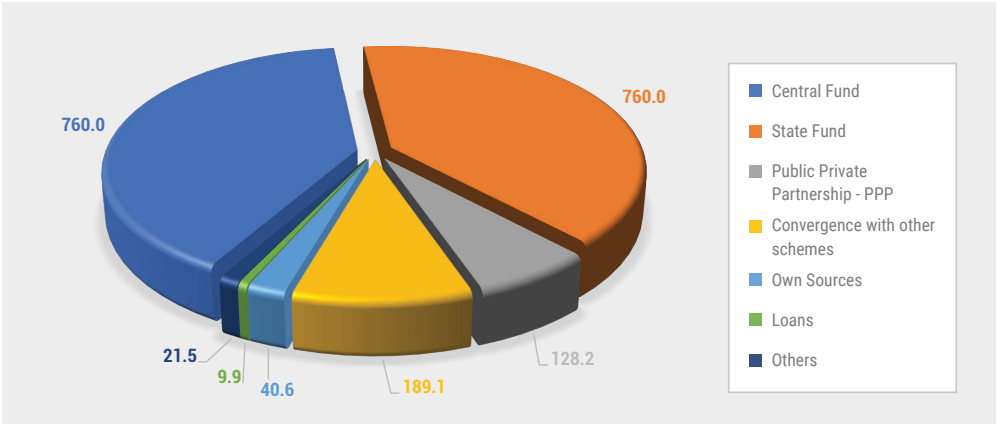
9 INDUSTRIES, INNOVATION, AND INFRASTRUCTURE

Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation

Target 9.c	Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020
NIF Indicators	9.c.1: Number of Internet Subscriptions as percentage of total population
	9.c.2: Number of broadband subscribers per 10,000 persons
SCM Indicator 1	Total number of wifi hotspots installed
Indicator Value	9,805
SCM Indicator 2	Number of interactive digital platforms/mobile applications deployed (nos.)
Indicator Value	1,306

The 100 Smart Cities have played a significant role in showcasing replicable models for achieving SDG 9. 374 SCM projects with a total investment of USD 1.9 billion have enabled the localization of targets under SDG 9 (refer to Figure 20). These projects have made substantial contributions to the development of resilient infrastructure, inclusive and sustainable industrialization, and fostering innovation. Nearly 80 per cent of the funds pertaining to projects under SDG 9 came in the form of grants.

FIGURE 20: Sources of funds for projects under SDG 9 (USD Mn). Source: SCM.



9,805

WiFi hotspots installed

1,306

interactive digital platforms/mobile applications deployed

3.6.1 Key Interventions

Ensuring Equitable and Affordable Access to Internet: Equitable internet access is essential for inclusive urban development. Smart Cities have implemented projects like smart poles with video surveillance cameras, Wi-Fi, and solar panels, and Wi-Fi hotspots in public areas. These initiatives promote connectivity, improve access to services and resources, and bridge social gaps.

Sustainable and Resilient Infrastructure for Effective Governance: The 100 SCM cities have operationalised ICCC as the central hub for urban management. These state-of-the-art centres utilize the latest technologies and enable seamless coordination across various sectors including traffic management, solid waste management, water supply and sewerage systems, safety and security, and risk reduction. The integration of data from these sectors allows for effective analysis and informed decision-making. Additionally, the open data platforms provided by the ICCCs promote innovation by making valuable data accessible to industries and startups.

Supporting Small and Medium Enterprises: To promote inclusive economic prosperity, several Smart Cities have undertaken initiatives to formalize and modernize their markets, specifically targeting small and medium enterprises. Notable projects include the market modernization in the textile hub of Erode, the upgradation of wholesale and daily markets in Panposh, Rourkela, and the development of a tourism facility and market complex at Dashashwamedh Ghat in Varanasi. These efforts aim to formalize the open market sector and foster the growth of small and medium enterprises in these cities.

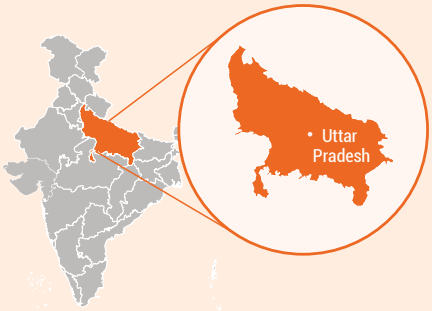
Environmentally Sound Industrial Technologies: Smart Cities have implemented energy infrastructure projects like piped gas networks, bio-methanation plants, and waste-to-energy plants to improve access to energy and support sustainable development. These initiatives provide green energy for industries, enhance resource utilization, and address the challenge of poor energy access, which is a significant barrier to development.

Image 27: The 100 SCM cities have operationalised ICCC as the central hub for urban management. These state-of-the-art centres utilize the latest technologies and enable seamless coordination across various sectors. *Source: Bhopal Smart City*.

3.6.2 City Spotlight

Lucknow

Uttar Pradesh, India



Lucknow, the capital city of Uttar Pradesh, is renowned as The City of Nawabs. The city is home to a population of 2.8 million as per the last census in 2011. To promote sustainable development, Lucknow is implementing 97 projects valued at USD 197.56 million, spread across different sectors. Around 30 of these projects are dedicated to the development of resilient infrastructure. These initiatives encompass digitalization, data intelligence, smart traffic management solutions (ATMS), underground ducting of distribution cables, and the improvement of internal roads, drainage, and street lighting, among other infrastructure projects.

Integrated Command and Control Centre: The ICCC in Lucknow plays a vital role in collecting and analyzing comprehensive city data for solid waste management, traffic control, public health, and disaster management. Equipped with city sensors and integrated with mobile technology, it facilitates public participation and supports participatory governance. The ICCC set up played in important role in pandemic management during the Covid-19 crisis.

118 video surveillance cameras, 10 emergency call boxes, and 20 Public Address Systems (PAS) with variable message display boards are integrated to the ICCC. The integrated ICT infrastructure of the city has made it safer. Additionally, the ICCC enables improved traffic junction management with the aid of the Adaptive Traffic Control System (ATCS). Over 70 Automatic Number Plate Recognition (ANPR) cameras installed across 226 junctions help detect red light violations. Furthermore, around 2 lakh smart streetlights are centrally managed from the ICCC, resulting in improved city traffic management and enhanced safety for residents. The city has provided open data access through 30 data catalogues covering various sectors, promoting transparency and innovation in urban governance.

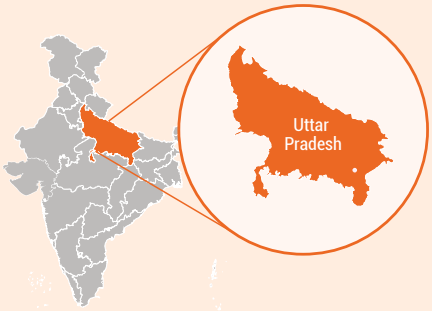
Image 28: A multi-utility "Smart Pole" installed in Visakhapatnam Smart City. A network of these poles have facilitated wi-fi connectivity in public areas across different cities. The mission has helped expand access to the internet in the selected cities. *Source: Visakhapatnam Smart City*

Wi-Fi Hotpots in Park and Public Places:
Lucknow Smart City has successfully installed Wi-Fi hotspots at 20 key public locations across the city, including bus stands, educational institutes, hospitals, tourist spots, prominent markets, and slum areas. The project provides 90 minutes of free internet access per user per day, promoting digital connectivity and access for all residents. By establishing service level agreements with private service providers, the city has fostered sustainable and effective private partnerships. The Wi-Fi network has already garnered over 7 lakh registered users, with a cumulative data consumption exceeding 1,000 GB.

> **Wi-Fi facility provided by Lucknow Smart City is a great initiative to improve digital access, particularly for those in the low-income neighbourhoods.**
>
> **Amit Kashyap**
> Resident, Lucknow

Varanasi

Uttar Pradesh, India



Varanasi (also known as Kashi) is an ancient city located on the banks of the Ganges. The city has a population of 1.2 million and is a major attraction for tourists and pilgrims alike. As part of SCM, Varanasi has undertaken 105 projects to enhance basic services, upgrade infrastructure, and introduce smart technologies into its historic fabric. An investment of approximately USD 248.41 million has been made to transform Varanasi into a smart, resilient, and future-ready city. These projects have localized SDG 9 by focusing on the establishment of smart governance infrastructure, integrated power development schemes, multimodal terminals, trade and tourism facilitation centres, and solid waste management centres. By promoting sustainability and resilience in infrastructure, supporting small and medium enterprises, and encouraging the adoption of environmentally sound technologies, these initiatives contribute to the city's overall development.

Kashi Integrated Command and Control Centre: Varanasi Smart City has implemented the ICCC to efficiently manage civic services. The ICCC integrates various functions, including city surveillance with an advanced video surveillance system comprising of 2,790 cameras, and a centrally controlled traffic management system. The traffic system includes an automatic e-challan/fine system with Red Light Violation Detection (RLVD) and ANPR cameras. Additionally, the ICCC incorporates a smart street lighting system with 9,600 LED lights, sensor-based solid waste collection and disposal systems with GPS integration. Real-time weather monitoring from 15 weather stations provides early warnings for weather anomalies. The ICCC also features the Kashi Geo Hub, an integrated map hub with 54 thematic layers accessible through an open data portal, facilitating its use in various applications. Overall, the ICCC in Varanasi Smart City streamlines operations, enhances safety and security, improves traffic management, and ensures effective monitoring and coordination of civic services.

> **The Kashi Geo Hub provides an integrated platform containing multi-sectoral data pertaining to Varanasi Smart City. The platform is an asset for researchers like me.**
>
> **Jitendra Kumar**
> Resident, Varanasi

Development of Tourism Facility and Market Complex: Dashashwamedh Bhawan, built at a cost of USD 3.9 million, is a tourist facility designed to alleviate congestion at Varanasi's sacred Dashashwamedh Ghat (banks of the Ganges). This complex includes an air-conditioned restaurant and features 196 shops spread across three levels. Each year, it generates a revenue of USD 0.61 million, providing tourists with a comfortable experience while visiting the revered Dashashwamedh Ghat.

> **The project has proved to be a new landmark in Kashi as it has not only rehabilitated all the shops under a roof but also played impactful role in decongestion of the roads and creation of employment opportunities.**
>
> **Suman Kumar Roy**
> Resident, Varanasi

Image 29: A view of the renovated "Namo Ghat" in the city Varanasi which is equipped with state-of-the-art infrastructure to address the needs of the tourists as well as the local economy. *Source: Varanasi Smart City.*

3.7 Localizing SDG 11: Sustainable Cities and Communities

11 SUSTAINABLE CITIES AND COMMUNITIES

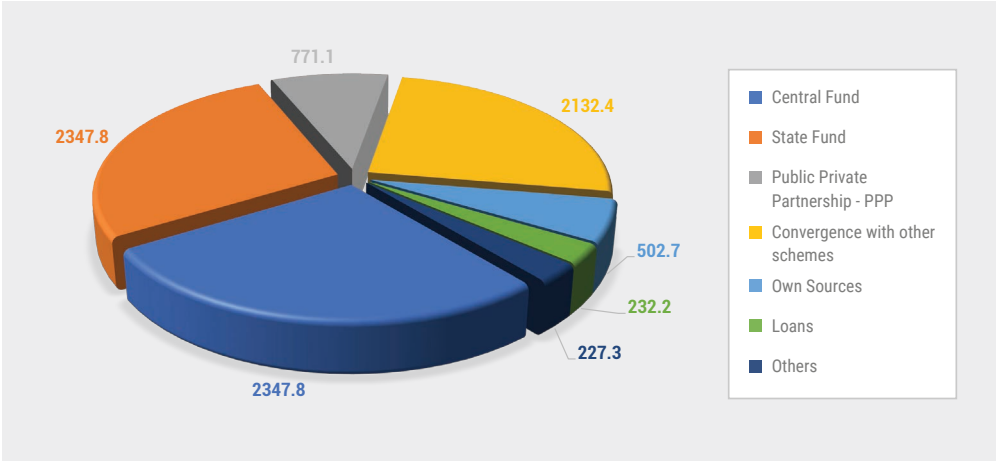
Make cities and human settlements inclusive, safe, resilient and sustainable

Target 11.1	By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums
NIF Indicators	11.1.1: Proportion of urban population living in slums, informal settlements or inadequate housing
SCM Indicator 1	Total number of households benefitted from affordable housing
	44,054
Target 11.2	By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons
NIF Indicators	11.2.1: Proportion of Households in urban areas having convenient access to public transport
	11.2.2: People killed/injured in road accidents (per 1,00,000 population) (similar to 3.6.1)
SCM Indicator 1	Total number of new public transport buses deployed
Indicator Value	7,704
SCM Indicator 2	Total number of traffic junctions improved/developed
Indicator Value	3,503
SCM Indicator 3	Total length of smart roads constructed/improved (in km)
Indicator Value	2,500
Target 11.3:	By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries
NIF Indicators	11.3.1: Proportion of cities with Master plans (similar to 11.a.1)
SCM Indicator 1	Total number of cities with Integrated Command and Control Centre (ICCC)
Indicator Value	100
SCM Indicator 2	Length of water supply system being monitored through SCADA (in km)
Indicator Value	6,853 km
Target 11.4:	Strengthen efforts to protect and safeguard the world's cultural and natural heritage
NIF Indicators	11.4.1: Total per capita expenditure on the preservation, protection and conservation of all cultural and natural heritage
SCM Indicator 1	Total number of heritage monuments conserved/ redeveloped
Indicator Value	595
Target 11.6:	By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management

NIF Indicators	11.6.1: Proportion of households from where solid waste is regularly collected, by agency of collection, by frequency of collection
	11.6.2: Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)
	11.6.3: Number of days the levels of fine particulate matter (PM2.5 and PM10) above mean level
	11.6.4: Percentage of wards with 100% door to door waste collection
	11.6.5: Percentage of waste processed
SCM Indicator 1	Total waste to energy processing capacity installed/augmented (in TPD)
Indicator Value	1,330 TPD
SCM Indicator 2	Total number of RFID enabled solid waste bins installed (nos.)
Indicator Value	3,28,655
Target 11.7:	By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities
NIF Indicators	11.7.1: Proportion of households reporting an open space within 500 meters from premises (urban)
SCM Indicator 1	Total area of the parks and gardens developed (in acres)
Indicator Value	1,700
SCM Indicator 2	Total LED/solar street lights installed (nos.)
Indicator Value	27,87,358

A significant number of SCM projects, 3,447 in total, accounting for 43.9 per cent of the overall projects, are dedicated to localizing SDG 11. These projects have received investments totalling USD 8.56 billion, aimed at enhancing the sustainability and resilience of cities. Of the total investment, 57 per cent came in the form of grants, while the remaining 43 per cent was funded through public-private partnerships, convergence with other schemes, internal city revenues, and loans (refer Figure 21). Furthermore, partnerships with the private sector at the city level have mobilized up to 9.3 per cent of the funds, fostering collaboration for sustainable urban development.

FIGURE 21: Sources of funds for projects under SDG 11 (USD Mn). Source: SCM.



44,054
households benefitted from affordable housing

7,704
new public transport buses deployed

3,503
traffic junctions improved/developed

2,500 km
of smart roads constructed/improved

100
Integrated Command and Control Centres (ICCCs) operationalized

6,853 km
of water supply system monitored through SCADA

595
heritage monuments conserved/redeveloped

1,330 TPD
of waste-to-energy capacity installed/ augmented

1,700 acres
of parks and gardens developed

5,23,728
LED/solar street lights installed

3,28,655
RFID enabled solid waste bins installed

3.7.1 Key Interventions

Affordable Housing and Shelters: 58 SCM cities have made investments in affordable housing, providing shelter to more than 44,000 vulnerable urban households. These houses are equipped with essential amenities such as parking, fire safety equipment, play spaces, sports facilities, green spaces, and easy access to public amenities. Surat, for instance, has constructed 3,958 dwelling units at nine different locations, costing USD 30.36 million, specifically for economically underprivileged families. These houses not only offer sufficient living space but also include basic civic amenities, sewage treatment plants, biowaste converter plants, and rainwater harvesting systems. As a result, the area covered by slums in Surat has decreased from 20 per cent in 2002 to just 6 per cent in 2022[11].

Improving Intracity Mobility: Interventions aimed at improving intra-city mobility form over 24 per cent of the SCM projects, which is the largest sectoral share amongst the different LES sub-sectors. These initiatives include development of smart road infrastructure, non-motorized mobility infrastructure, and upgraded multimodal public transport networks. Integration of smart solutions in traffic management, implementation of smart traffic junctions, transit-oriented developments, and the establishment of multimodal transport networks with last mile connectivity have collectively contributed to a more efficient and convenient transportation system within the cities.

SCM has witnessed a total of 173 public transportation projects that stand completed and are spread across 71 cities. Notable examples include the "Majhi Smart Bus" project in Aurangabad, which has expanded the city's public transport network and serves around 26,000 passengers daily on 44 routes. The Surat City Bus Service, launched by the Surat Municipal Corporation (SMC) in November 2016, is another successful public transportation initiative. The service has grown to cover 491 kms of road network across the city with 575 buses on 45 routes. These projects have brought about significant changes in travel patterns, leading to an increased reliance on public transport among the residents.

Image 30: An affordable housing complex constructed by Surat Smart City to serve economically underprivileged families. 58 SCM cities have made investments in affordable housing, providing shelter to more than 44,000 vulnerable urban households. *Source: Surat Smart City*.

Image 31: Commuters using the "Majhi Smart Bus" introduced by Aurangabad Smart City to fill the public transportation gap in the city with over 1.5 million residents. SCM has witnessed a total of 173 public transportation projects that stand completed and are spread across 71 cities.
Source: Aurangabad Smart City.

Integrated Greenfield Development: Innovative city development projects are undertaken by SCM cities like Amaravati, Bhopal, Rajkot, Ranchi, and Naya Raipur, focusing on sustainable planning and revenue generation for future growth. Bhopal, for instance, has allocated around 342 acres of land for greenfield development, which includes a land monetization strategy which ensures that the proceeds from auctions and leases of reserved land are used to fund various development projects. The city ensures regulated development through policies mandating 27 per cent of the area to be reserved for open green spaces. As a result, Bhopal has added up to 11 acres of green spaces, resulting in a 1-3 degrees reduction in ambient temperatures. Moreover, the city managed to raise USD 32.68 million by monetizing over 9 acres of land, which is an additional financial resource for the development of the city. The city aims to raise more than USD 50 million in the near future through land monetization strategies implemented with the aid of private partners.

Vibrant Public Spaces: Over 1300 projects have been implemented across the 100 Smart Cities with a focus on creating new parks and green open spaces that are accessible to all. Notable examples include the development of an all-ability public realm (a park) in Visakhapatnam Smart City, which offers barrier-free access and sensory play equipment. Even as the park witnesses dense usage throughout the week, the local community has taken the onus to keep it well-maintained. To cite another example, Pune Smart City has developed a science park featuring innovative scientific activities for people of all ages. The park features an interactive space called Bookzania, which offers opportunities for painting, reading, board games, and access to an e-library kiosk.

Image 32: A view of an all-ability public park developed by Visakhapatnam Smart City. Over 1300 projects have been implemented across the 100 Smart Cities with a focus on creating new parks and green open spaces that are accessible to all. *Source: Visakhapatnam Smart City.*

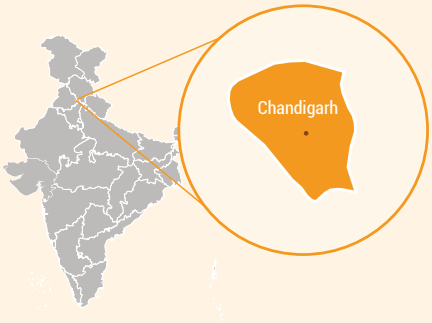
Integrated Approach to Risk Reduction:
Pune Smart City has installed more than 50 flood sensors at strategic locations such as under bridges, in canals, and riverbanks to monitor water levels. The primary goal is to notify authorities about potential flooding in the city and enable timely preparations. These environment sensors also gather data on pollution levels, temperature, humidity, etc. This proactive approach keeps residents and the administration informed, empowering them to take necessary measures in the event of an emergency.

Image 33: Pune Smart City has installed more than 50 flood sensors at strategic locations as part of an integrated approach to disaster risk management. *Source: Pune Smart City*

3.7.2 City Spotlight

Chandigarh

Chandigarh, India



Chandigarh, a federally governed city with a population of 1.21 million, serves as the shared capital for the northern states of Punjab and Haryana. The city has undertaken 98 projects as part of SCM, out of which 40 projects seek to ensure sustainability and improvement in basic services. These projects include the refurbishment of over 200 km of cycle tracks, induction of 80 e-buses into the city's public transportation fleet, expansion of door-to-door waste collection to cover 1.5 lakh households, creation of 5.2 acres of additional open spaces, and installation of over 4,000 video surveillance cameras at traffic junctions for centralized monitoring and surveillance. The Intelligent Traffic Management System (ITMS) incorporated in Chandigarh's bus-based public transportation service has successfully reduced route variation by 40 per cent and curbed over speeding and rash driving by 30 per cent. Further, Chandigarh has made its transport network more inclusive, safe, and environmentally friendly with the introduction of public bike sharing, which has over 30 per cent women users.

Public Bike Sharing Systems and Cycle Tracks: Chandigarh has implemented India's largest and densest pan-city Public Bicycle Sharing (PBS) system with 310 docking stations and over 2,500 bicycles strategically located throughout the city. The PBS system has not only made the city more cycle-friendly but has also contributed to reducing traffic congestion and promoting public health. With over 2 lakh registered users and more than 8.3 lakh rides taken, the PBS system has become a viable alternative for commuting. On average, there are 1,500 rides per day, and the cumulative ride length has reached 15,00,000 kilometres. This has resulted in a significant environmental impact, saving approximately 825 tonnes of CO_2 emissions.

Image 34: SCM cities such as Chandigarh have added cycle tracks and public bike sharing systems to their public mobility infrastructure. *Source: Chandigarh Smart City*.

Intelligent Transport System: Chandigarh has implemented the Intelligent Transportation System (ITS) in 450 city buses, enabling real-time tracking of the location of buses through an Automatic Vehicle Location System (AVLS). This system has made bus services more accessible and convenient for residents as they can now track the buses in real time using a mobile app. The technology has improved traffic flow, enhanced road safety, and provided real-time information on traffic conditions, allowing commuters to plan their journeys more efficiently. To ensure the safety of passengers and monitor the bus routes effectively, CCTV cameras equipped with SOS features have been installed, enabling rigorous surveillance and monitoring. These interventions have led to prompt resolution of over 3500 grievances, contributing to a safer and more efficient public transportation system in Chandigarh.

“

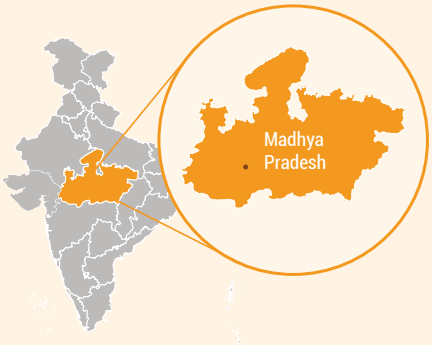
After college, in the evening, my friends usually go to the cricket stadium, which is 3 km away. Earlier, we used to take a cab or bus and never used bicycles as there was a risk of accidents. But after construction of the cycle track, I use my bicycle to commute. Some of my friends who don’t own a bicycle have started using public bicycle sharing system. We can easily travel across the city without fear of accidents as there are dedicated cycle tracks with proper lighting.

Yogesh Sharma
Resident, Chandigarh

“

As a female worker, I feel comfortable traveling alone in buses, especially after measures were implemented by Chandigarh Smart City to make public transport more secure, such as installation of CCTV cameras in buses. The improved safety and security of public spaces is quite empowering for working women.

Tanya Vohra
Resident, Chandigarh



Indore

Madhya Pradesh, India

Improving Air Quality of the City: Indore is implementing strategic interventions to address air pollution in collaboration with technical partners. The city has prepared a "Clean Air Action Plan", which proposes innovativ4e Information, Education, and Communication (IEC) campaigns amongst other interventions. For example, the city implemented the "*Red Light On—Engine Off*" campaign to encourage vehicle drivers to turn off ignition when faced with a red traffic signal. An intensive 15-day awareness campaign was conducted across 19 major traffic junctions, supported by 800 volunteers. Commuters were educated about the importance of reducing vehicle emissions through the campaign.

Further, the city has installed three measurement stations and 50 low-cost air quality sensors to monitor air quality. These sensors provide regular readings that are analyzed at the ICCC. Indore has also embraced environmentally friendly transportation by promoting the use of CNG and electric vehicles. The city's public transportation fleet includes 430 CNG buses and 120 electric buses. Private vehicles are served by 140 private CNG filling stations and EV charging stations.

Indore Smart City is renowned for its solid waste management system—it has eliminated 15 Lakh MT of waste through bioremediation. Additionally, over 500,000 trees have been planted at the city's landfill site. A 550 TPD biogas plant commissioned by the municipal body produces 17,500 kg of CNG daily. Furthermore, 33 industrial units have converted their polluting boilers to zero-emission PNG-based boilers.

Indore has paved more than 20 km of smarts roads to improve its mobility infrastructure including footpaths and cycle tracks. The city has also created over 100 decentralized green spaces known as *Ahilya Vans*, with 5,00,000 trees planted throughout the city.

> **The campaign 'Red Light On, Engine Off' was a commendable effort by Indore Smart City. The positive effects of this campaign are being felt by the people of Indore.**
>
> **Pooja Amravanshi**
> Resident, Indore

Adaptive Reuse of a Heritage Structure: Gopal Mandir, an architectural masterpiece built in 1832 AD, showcases the splendid craftsmanship of black sn tone and wooden frame structure. The restoration project was not only aimed at preserving this significant cultural heritage but also at attracting tourists and creating a vibrant community space for residents, holding social, economic, and cultural value for the people of Indore.

> **Earlier, I had a small shop near Gopal Mandir but due to congestion and traffic many of us were unable to generate meaningful profits. Now, Indore Smart City has relocated us to a shopping complex, which has increased the value of our shops and improved our earnings.**
>
> **Rohit Panwar**
> Resident, Indore

Traditional construction materials like lime, jaggery, fenugreek seeds, bel fruits, jute sal, and urad pulses were used in the meticulous preservation and restoration of Gopal Mandir. This approach not only ensured the authenticity of the structure but also brought economic benefits to the area. Tourism has flourished, property values have increased, and new employment opportunities have been generated. To eliminate encroachments, the project rehabilitated informal shops within the precinct by establishing a formal shopping complex consisting of 221 shops. Additionally, an auditorium with a seating capacity of 650 was included, serving as a venue for religious and cultural gatherings. This comprehensive project successfully preserved the cultural heritage, provided public spaces for residents, and boosted the local economy by attracting tourists.

Safe City Program: Indore Smart City, in collaboration with the Child and Women Development department of Government of Madhya Pradesh, launched the Safe City program with the goal of creating a safe environment for women. The program focuses on developing infrastructure in public spaces to ensure access to education, health

Image 35: Gopal Mandir, an architectural masterpiece built in 1832 AD, showcases the splendid craftsmanship of black stone and wooden frame structure. The structure was restored as part of the smart city project in Indore. *Source: Indore Smart CIty*.

services, skill development, and employment opportunities, enabling women to become self-sufficient. The initiative aims to improve safety through various measures.

Infrastructure improvements include streetlighting, clean and well-lit public toilets, waiting rooms, and public calling booths. Self-defence training programs have also been initiated to enhance personal safety for women. The program takes a comprehensive and multistakeholder approach, involving various government departments, educational institutions, NGOs, Self Help Groups, and community-driven organizations to monitor and implement safety measures on the ground.

Guidelines have been developed to raise awareness on women's health and safety as well as to promote community-driven actions to ensure women's well-being. Over 3500 officials from government departments, NGOs, and local communities are trained as resource persons, and deployed to support the program's implementation.

Image 36: Indore's Safe City program focuses on developing infrastructure in public spaces to ensure access to education, health services, skill development, and employment opportunities, enabling women to become self-sufficient.
Source: Indore Smart City.

3.8 Localizing SDG 17: Partnerships for the Goals

17 PARTNERSHIPS FOR THE GOALS

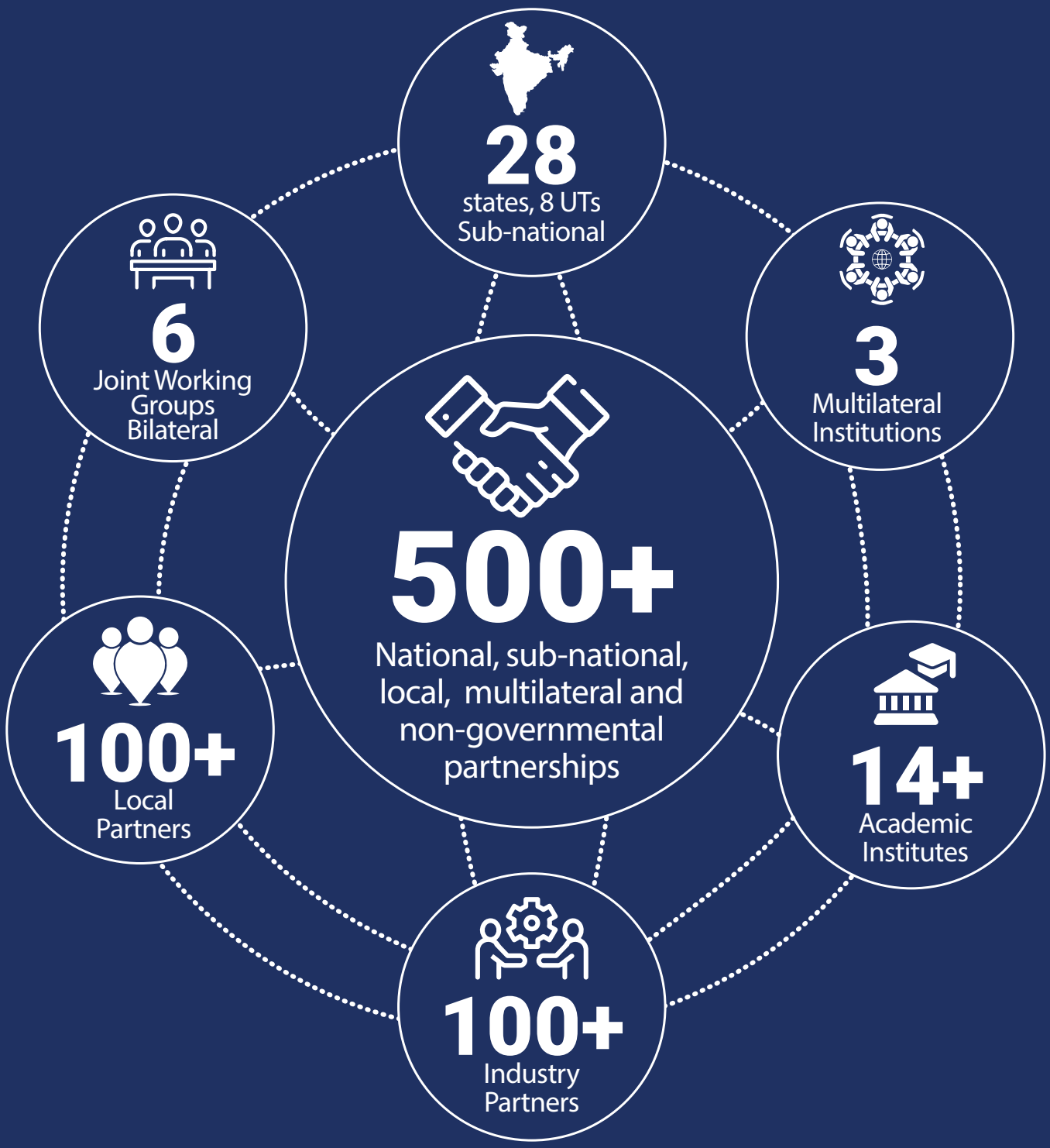
Strengthen the means of implementation and revitalize the Global partnership for Sustainable Development

Target 17.16:	Enhance the Global partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries
NIF Indicators	17.16.1: Number of States having a State Monitoring Framework that supports the achievement of the sustainable development goals
SCM Indicator 1	Framework for SDG monitoring
Indicator Value	Output-Outcome Monitoring Framework (OOMF)
Target 17.17:	Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships
NIF Indicators	17.17.1: Amount of Indian Rupees spent on Public-Private Partnership (PPP) for infrastructure
SCM Indicator 1	Amount of Indian Rupees spent on Public-Private Partnership (PPP) for infrastructure under SCM
Indicator Value	INR 18,000 crores (USD 1.83 billion)

The interconnected nature of our world requires sharing technology, knowledge, and ideas to foster innovation. Coordinated policies to manage debt and promote investment in developing countries are essential for sustainable growth. SDG 17 emphasizes the importance of global partnerships to support developing countries in realizing sustainable development goals. It calls for innovative resources and collaboration at the global, national, and local levels.

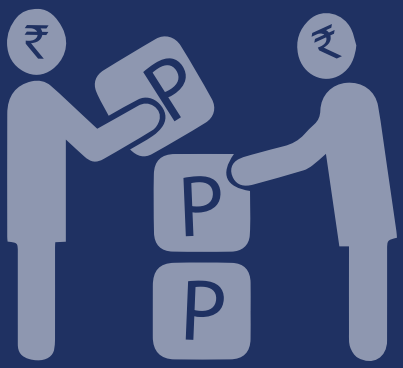
The COVID-19 pandemic created a severe commercial crisis globally, particularly affecting developing countries. While global foreign direct investments have rebounded in recent years, many nations still struggle to recover economically. These challenges hinder their progress in achieving the SDG targets. While SCM has taken a collaborative approach since its inception, the mission has had to navigate challenges of the post-pandemic world to foster partnerships that have accelerated the progress towards the achievements of the SDGs. This section seeks to demonstrate such partnerships for effective localization of SDG 17.

FIGURE 22: SCM's collaboration with stakeholders across the world to strengthen sustainable urban development through knowledge sharing and capacity building. *Source: SCM.*



Output-Outcome Monitoring Framework (OOMF)

Framework for SDG monitoring



USD 1.83 billion

worth of Public-Private-Partnership (PPP) projects under SCM

3.8.1 Key Partnerships and Collaborations

In 2015, the GOI joined forces with Bloomberg Philanthropies to support the Smart Cities Challenge—the initial phase of SCM which ensured competitive selection of cities for programme funding. This initiative aimed to select 100 cities within the first three years to receive grants, with Bloomberg Philanthropies providing strategic and technical assistance in the design and delivery of the program.

The collaboration with Bloomberg Philanthropies was one among several that followed in the subsequent years of the mission. The key partnerships across different levels of engagement that enabled SCM to pursue the objectives under SDG 17 are summarized in Figure 23. The multilevel partnerships and collaborations are further elaborated in the sections that follow. The concluding section addresses SDG target 17.1 (Strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection) through project-based case studies.

Box 1: Bloomberg Philanthropies and SCM

- Strategic and technical assistance to design and administer a Cities Challenge that enables the central government to articulate standards and goals while ensuring local officials have broad flexibility to develop approaches that are people-centred and responsive to local needs.
- Providing support to help India's municipal officials to assess challenges, engage people and communities, draw from best practices, and generate smart proposals.
- Galvanising an international network of urban practitioners to share global best practices and evidence in urban planning and smart solutions with India's municipal and state officials and their partners over the course of the competition.

Image 37: In 2015, Prime Minister of India, Shri Narendra Modi, and former Mayor of New York City, Mr Michael Bloomberg, announced a partnership between Ministry of Housing and Urban Affairs, Government of India, and Bloomberg Philanthropies to support SCM. *Source: SCM*

FIGURE 23: Key SCM partnerships that furthered the objectives under SDG 17. Source: SCM.

Organization/ Country	Conceptual Stage	Implementation Stage	Strategic support	Financial Support
International Partnerships				
Multi-Lateral				
The World Bank (CBUD initiative)				✓
Asian Development Bank				✓
Japan (JICA & Zero-sum ltd)		✓		✓
Bi-Lateral partnerships				
France (CITIIS Program)		✓		✓
USA (USTDA)		✓		
USA (US Treasury)			✓	
USA (USAID)			✓	
Israel (Tel Aviv Smart City)		✓		
Singapore		✓		
Other Joint Working Groups			✓	
Other Agencies				
Bloomberg Philanthropies	✓			
Rockefeller Foundation			✓	
Bernard van Leer Foundation			✓	
Institute for Transportation and Development Policy (ITDP)			✓	
Food Safety and Standards Authority of India (FSSAI)			✓	
National Partnerships				
28 state and 8 UT governments	✓	✓	✓	✓
Academia: 15 Premier institutes NITs, IITs, SPA.			✓	
Industry: PPP project model.		✓		
Community	✓	✓		

3.8.2 Engaging People and Communities as Partners

The mission sought to translate the vision of participatory planning into practice by incorporating people-driven ideas and innovative projects into the proposals prepared by prospective Smart Cities. This approach facilitated solutions to urgent, everyday problems. People's participation has provided valuable insights for urban practitioners. The implementation of area-based development, which focuses on compact and comprehensive interventions, highlighted the significance of design alongside the provision of citywide infrastructure. The selection of "areas" by residents exemplifies the active participation of people and communities in SCM as "partners".

Image 38: SCM has sought to engage people and communities as "Partners" for sustainable and inclusive urban transformation in India. *Source: Pimpri-Chinchwad Smart City.*

Nearly 2.5 million people participated through contests, discussions, polls, blogs, and talks on the MyGov portal, a platform to build a partnership between people and government. Additionally, around 11.7 million people were engaged through social media platforms like Facebook, WhatsApp, Twitter and Instagram, and other means such as polling, surveys, emails, local radio, workshops, seminars, and physical outreach.

FIGURE 24: An overview of public outreach achieved through MyGov platform. *Source: SCM*

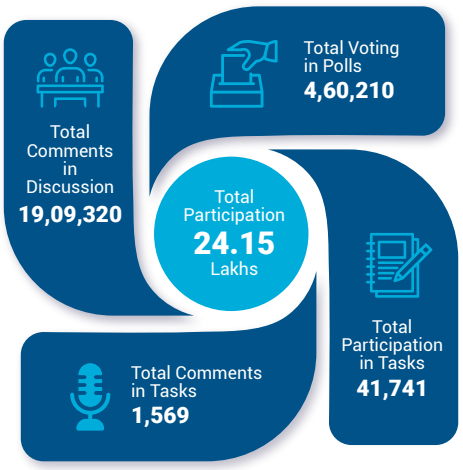


FIGURE 25: An overview of public outreach through other platforms. *Source: SCM.*

SCM has demonstrated that people can generate meaningful bottom-up solutions for local development when they are empowered with relevant information and encouraged to participate.

Box 2: Measures Implemented to Boost People's Participation and Engagement

1. Polls, discussions, workshops, blogs, newsletters, radio and television shows, *nukkad nataks* (street plays), marathons, music concerts, and mobile app-based surveys.
2. Festivals such as Ganesh Chaturthi (a Hindu religious festival) as a platform for engaging people and crowdsourcing ideas through youth associations such as Ganesh Mandals (in the cities of Pune and Sholapur).
3. Exhibitions and fairs to showcase different smart city technologies.
4. Development and use of dedicated mobile applications for public engagement (example: Belagavi's "Smart Belagavi" app).
5. "Digital Hackathon" and "*Appathon*" to encourage innovation and problem-solving.
6. Public participation campaigns to co-create and co-design Smart City Proposals—a detailed plan of action for projects to be executed in the cities selected under SCM. For example, in the city of Pune, over 3 lakh residents participated in the preparation of the Smart City proposal, with around 8,000 households from the neighbourhood selected for "area-based development" endorsing the proposal directly.
7. Recognition and awards for those championing grassroots transformations in SCM cities.

3.8.3 National Collaborations

SCM initiatives have sought to foster healthy competition among the selected cities and create a conducive atmosphere for peer-to-peer leaning. The initiatives to drive competition and peer learning were executed through "challenges" in key sectors of urban development: transportation, nutrition, climate sensitive development, etc. The "challenges" summarized in this section revolve around people-centric interventions that take a neighbourhood scale lens to address local priorities.

Image 39: A child-friendly vaccination centre developed in the city of Jabalpur as part of the Nurturing Neighbourhoods Challenge. *Source: Jabalpur Smart City.*

Nurturing Neighbourhoods Challenge: Launched in November 2020, it is a 3-year initiative led by SCM, in partnership with Bernard van Leer Foundation and WRI India. The challenge enables Indian cities to adopt an early childhood lens in designing neighbourhood-level improvements that promote the health and well-being of young children.

Transport4All (T4All) Challenge: SCM launched the Transport4All challenge in collaboration with ITDP to bring together cities, civil society groups, and start-ups to develop solutions that improve public transport to better serve the needs of all commuters.

EatSmart Cities Challenge: The SCM and FSSAI have jointly launched the 'EatSmart Cities Challenge' across India. This nationwide challenge encourages city residents to devise plans that promote a healthy, safe, and sustainable food environment. The challenge aims to address food-related issues by integrating institutional, physical, social, and economic infrastructure, along with the implementation of smart solutions.

ClimateSmart Cities Alliance: MoHUA launched the ClimateSmart Cities Alliance to further mainstream climate actions in Indian cities. The strategic partnerships as part of the alliance seek to promote the sharing of knowledge and good practices and scaling up of transformative actions to address the increasing climate risks in Indian cities.

Sister Cities: The Sister Cities initiative, a unique experiment initiated by SCM, aims to accelerate programme implementation through peer-to-peer collaboration. By pairing the leading SCM cities with those lagging behind, based on their rankings as of 22 January 2020, the Sister Cities challenge aimed to enhance the latter's performance and improve their ranking in the mission over a 100-day period. The program benefited cities such as Diu, Chandigarh, Aizawl, Atal Nagar, Amritsar, Bareilly, Karimnagar, Silvassa, Dharamshala, Itanagar, Guwahati, Saharanpur, Shimla, Pasighat, Kavaratti, Jammu, Port Blair, Puducherry, Moradabad, and Shillong.

The challenges and the associated partnerships aim to leverage the diverse skills, strengths, and resources of various stakeholders to implement projects, address the knowledge gaps and create a conducive environment to test and implement scalable interventions.

3.8.4 International Collaborations

The Government of India actively collaborates with stakeholders worldwide to share knowledge sharing and build capacities for sustainable urban transformation. These collaborations involve international and national entities, including foreign governments, local bodies, and institutions. The aim is to foster inclusive growth and development in the country by leveraging appropriate expertise. As part of this strategy,

SCM has launched several programs and initiatives that support capacity building, urban open spaces, public security, non-motorized transportation, and more.

Bi-lateral Collaborations

United States Trade and Development Agency (USTDA) and Ajmer, Prayagraj, Visakhapatnam Smart Cities: USTDA has signed MoUs with the cities of Prayagraj, Ajmer, and Visakhapatnam to provide assistance in project planning, infrastructure development, feasibility studies and capacity building. Additionally, USTDA provided funding for a feasibility study to develop the National Urban Innovation Stack, launched by MoHUA to promote the use of technology for people-centric governance.

United States Agency for International Development (USAID): USAID collaborated with multiple Smart Cities to promote water and sanitation as an essential element of sustainable and inclusive urban development.

Thane—Tel Aviv Partnership: Tel Aviv Smart City in Israel collaborated with Thane Smart City in suburban Mumbai to establish "Digi Thane". The initiative aims to provide the residents of Thane city with access to personalised services and information related to the municipal body through a mobile application and web portal. The project commenced in 2017 and lasted for 10 months.

Singapore and Pune City Partnership: In 2017, the cities of Singapore and Pune signed an MoU to upgrade Pune's transport infrastructure, traffic monitoring systems, water and wastewater management, e-governance, and channels for public engagement.

Japan and Varanasi, Chennai, and Ahmedabad Smart Cities: Japan International Cooperation Agency (JICA) has helped implement Intelligent Transport System (ITS) in Ahmedabad to alleviate traffic congestion. Further, the agency provided funding support of USD 61 million, through an agreement with the Government of India, for installation of the ITS in the Chennai metropolitan area.

3.8.5 Technical and Knowledge Partnerships

City Investments to Innovate, Integrate and Sustain (CITIIS) Program—Collaboration Between AFD and SCM: The CITIIS program aims to assist 12 Indian cities in implementing integrated, innovative, and sustainable urban infrastructure projects. The cities included in the program are Amaravati, Visakhapatnam, Surat, Hubballi-Dharwad, Kochi, Ujjain, Bhubaneswar, Puducherry, Amritsar, Chennai, Agartala, and Dehradun. The projects in these

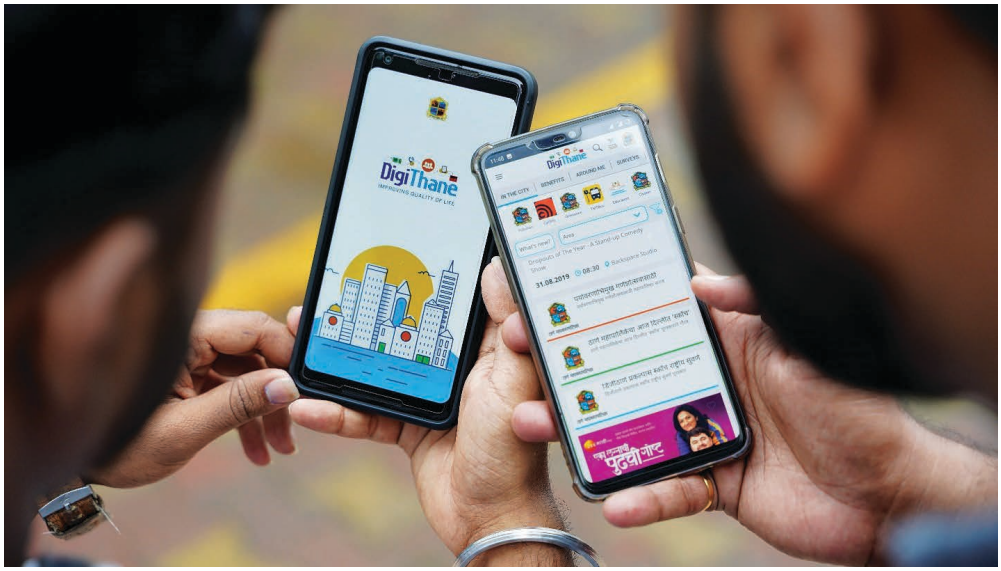


Image 40: Tel Aviv Smart City in Israel collaborated with Thane Smart City in suburban Mumbai to establish "Digi Thane", a mobile application and website for municipal services. *Source: Thane Smart City.*

cities focus on improving sustainable mobility, increasing public open spaces, enhancing municipal services through technology, and promoting social and organizational innovation in low-income settlements. While AFD provided a EUR 100 million bilateral loan, the EU contributed a EUR 6 million grant for the development of sustainable infrastructure. The program established partnerships with French organizations like Efficacity, Sciences Po, Espelia, Genre et Ville, and Cerema for program design, monitoring, and peer learning, leveraging Indo-French collaborations for knowledge sharing, design, and implementation support.

Technical Assistance for Issuance of Municipal Bonds—Collaboration with United States Department of Treasury: In 2017, Pune Municipal Corporation achieved a significant milestone by successfully issuing a municipal bond, becoming the first Indian municipal body to do so in the past decade. The US Department of Treasury provided valuable technical assistance and capacity development for the bond issuance process in Pune. The collaboration with municipal authorities and transaction advisors lasted over 10 months and resulted in successful bond issuance. Following the success in Pune, six additional cities, namely Pimpri-Chinchwad, Vadodara, Rajkot, Chandigarh, and Faridabad, have received technical assistance for the issuance of municipal bonds.

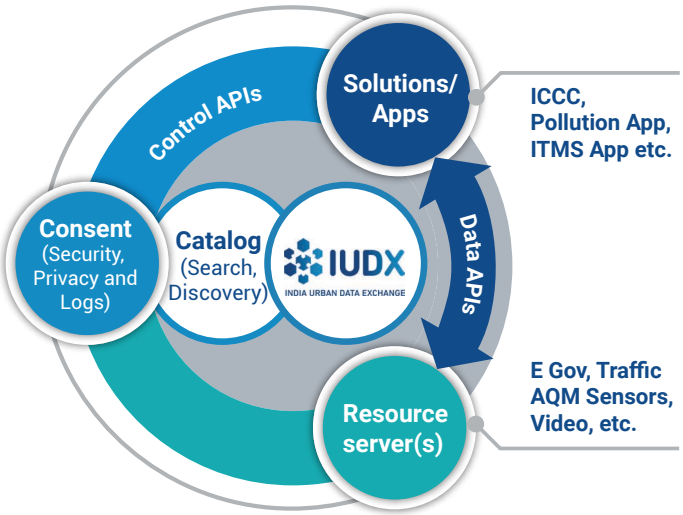
Vadodara Municipal Corporation raised USD 49 million from the capital markets through the successful issuance of a municipal bond in March 2022. Further, Pimpri-Chinchwad Municipal Corporation too succeeded in raising funds through the issuance a municipal bond in July 2023.

3.8.6 Collaborations on Data and Learning

Data driven solutions form an integral part of a smart city. Sharing of data and learning from peer cities is given paramount importance in the SCM ecosystem. The mission initiatives sought to create the foundations for data driven solutions for sustainable urban development as this section will illustrate.

India Urban Data Exchange (IUDX): IUDX is an open-source software platform designed to facilitate secure and authenticated data exchange among various platforms, applications, data producers, and consumers. Initially implemented within a city and later expanded nationwide, it ensures uniform and seamless data sharing. The platform gives data owners complete control over the data they expose and to whom. It incorporates accounting mechanisms for integration with payment gateways, laying the groundwork for a data marketplace. With developer-friendly features like open APIs and data schema templates, IUDX fosters the creation of a robust application ecosystem.

FIGURE 26: The technical architecture of the Indian Urban Data Exchange (IUDX). *Source: SCM.*



Smart Cities Open Data Initiative: National Informatics Centre (NIC), the technology partner of Government of India operating under Ministry of Electronics and Information Technology (MeitY), has created a dedicated Open Government Data (OGD) page for SCM. The corresponding portal serves as a repository for open datasets from 100 Smart Cities in India. Over 5,100 datasets are uploaded and freely accessible to the public. This initiative aligns with the OGD Platform India developed by NIC, which seeks to publish shareable datasets in an open format through the platform.

The Urban Learning Internship Program (TULIP): India has introduced "The Urban Learning Internship Program (TULIP)", jointly launched by MoHUA and Ministry of Human Resource Development (MHRD), to bridge the gap between theoretical knowledge and urban practice. The program aims to provide recent graduates with an opportunity to gain hands-on experience through an internship with ULBs and Smart Cities. The program not only benefits the interns by offering valuable learning experiences but also brings renewed vigour and innovative ideas to the cities. So far, over 39,588 internships have been posted, with 6,036 successfully completed and 4,771 ongoing.

DataSmart Cities Strategy: DataSmart Cities Strategy, rolled out across 100 Smart Cities, sought to catalyse the adoption of data-driven governance, performance monitoring, and to leverage the potential of data to address complex urban challenges using innovation and co-creation. The initiative witnessed the nomination of 100 City Data Officers (CDOs), one CDO nominated by each city, who contributed roughly 5000+ datasets open data platform. (smartcities.data.gov.in). The dataset has become an asset for research and development.

National Urban Learning Platform (NULP): The National Urban Learning Platform (NULP) is a versatile and inclusive platform designed to augment the capacities of urban stakeholders. It offers diverse digital tools and resources to facilitate content creation, course development, assessment, and certification. NULP aims to consolidate and deliver essential skills and knowledge required by urban stakeholders through a variety of channels, ensuring accessibility and flexibility for all users.

Image 41: TULIP interns at an SCM workshop to conceptualize "Healthy Streets". The programme has provided opportunities to over 3,827 young professionals to work as part of Smart City projects. *Source: SCM.*

Climate Centre for Cities: MoHUA announced Climate Centre for Cities (C-Cube) to drive climate action in Indian cities under the aegis of National Institute for Urban Affairs (NIUA). C-CUBE will act as a one stop destination for climate informed actions in Indian cities. It serves as the secretariat for initiatives like ClimateSmart Cities Alliance and implements Climate Smart Cities Assessment Framework 2.0.

Knowledge Dissemination and Publications: Documentation of developmental interventions made by different Indian cities is an important aspect of knowledge sharing and peer learning. SCM produced numerous publications highlighting the innovative solutions implemented by Smart Cities in India. These publications serve as a repository of best practices and promote continuous learning in the field of urban development.

Image 42: SCM made a conscious effort to document the learnings and best practices emerging from 100 selected cities. The publications serve as an important resource for the cities and different knowledge partners. Source: World Economic Forum.

3.8.7 Public Private Partnerships in SCM

Forging effective Public Private Partnerships (PPP) is a key objective of the mission. Over 210 PPP projects were undertaken across multiple urban sectors in 57 cities, including several intermediary cities. More than USD 1.83 billion were mobilized under PPP arrangements in SCM cities, in line with SDG target 17.17: "Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships". Box 3 captures some of the key PPP projects implemented in SCM cities.

FIGURE 27: SCM PPP projects. *Source: SCM*

3.8.8 Improvements in Capacity for Revenue Collection

Improvement in capacity for tax and other revenue collection (SDG target 17.1) is an important step towards the achievement of SDG 17. SCM has pursued the goal through its innovative institutional structure that enabled cities not only to improve their revenue collection capacities but also opened new streams of revenue. In this section, case studies from the city of Ahmedabad demonstrate effective localization of the related objectives under SDG 17.

The SPVs tasked with the implementation of the projects in cities under SCM are incorporated as limited companies under the corporate governance laws of the country (Companies Act, 2013). The statutory powers delegated to the SPVs include revenue rights pertaining to the assets created. Several projects implemented by the SPVs are generating revenues for the cities: for example, the E-Challan system in Ahmedabad, recycling of solid waste materials in Port Blair, multi-level car parking in Raipur, etc. Two such projects from the city of Ahmedabad are demonstrated:

Ahmedabad Smart City E-Challan System: Smart City Ahmedabad Development Limited, the SPV incorporated to implement SCM in the city, has installed a traffic surveillance system at 130 tolerance junctions across the city which will monitor vehicles passing by and identify traffic violations. The system sends an E-Challan (ticket) to the registered address tagged to the vehicle violating the rules.

The city has installed 2,142 Automatic Number Plate Recognition (ANPR) cameras at traffic junctions which feed real-time data to ICCC, enabling effective monitoring of traffic violations. Over 6.2 million "*challans* (traffic violation tickets)" have been issued for red-light violation since July 2018. As a result, the city has generated revenue of over USD 9 million from fines paid by the violators. The project has curbed the proclivity of motorists to violate traffic rules.

Image 43: Ahmedabad Smart City has installed 2,142 Automatic Number Plate Recognition (ANPR) cameras at traffic junctions which feed real-time data to ICCC, enabling effective monitoring of traffic violations. The intervention has led to improved revenue collection from fines for traffic violation. *Source: Ahmedabad Smart City.*

Intelligent Transit Management System (ITMS) and Automatic Fare Collection System (AFCS) for Bus Rapid Transit System (BRTS) and Ahmedabad Municipal Transport Service (AMTS)

With a budget of USD 22.68 million, the Integrated Transit Management System (ITMS) project serves as the IT backbone for the BRTS and AMTS fleets.

The AFCS regulates the fare collection mechanism and technology of the public transport system of the city. It is integrated with the municipal body's City Card Payment System (CCPS) to enable cashless payments. A single card compliant with the National Common Mobility Card (NCMC) standards is thus provided for the ease and convenience of the commuters.

Image 44: NCMC is an initiative of MoHUA that seeks to provide an inter-operable transport card for seamless access to public transport networks in Indian cities. The AFCS project in Surat Smart City has facilitated a single payment card compliant with NCMC standards for commuters in the city. *Source: Surat Smart City.*

The ITMS and AFCS projects have streamlined revenue collection for the public transportation services in the city. Ahmedabad BRTS has achieved an exponential increase in the adoption of different cashless ticketing platforms. Digital payments have risen from almost 0.01 per cent in 2018-19 to 6 per cent in 2021-22. The impact is seen in both reduction of costs associated with revenue collection as well as increased collection. The operational and collection efficiency achieved by the combined use of ITMS and AFCS has led to cumulative savings of around USD 2 million.

ITMS and AFCS systems have added value for the commuters as well as the service providers by making public transportation efficient, safe, and reliable.

Endnotes

1 UNESCAP. "Localizing the 2030 Agenda in Asian & Pacific Cities". https://www.unescap.org/projects/da11/sdglocalization

2 Government of India. "India Voluntary National Review 2020". June 2020. https://sustainabledevelopment.un.org/content/documents/26279VNR_2020_India_Report.pdf

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5 https://www.mospi.gov.in/sustainable-development-goals-sdg

6 Ministry of Statistics and Programme Implementation (MoSPI), Government of India. "National Indicator Framework on SDG (Version 3.0)". March, 2021. https://www.mospi.gov.in/documents/213904/0/NIF.pdf/c16a84f2-053d-49b0-9042-96be12cf8247?t=1619176001725

7 https://www.niti.gov.in/cooperative-federalism

8 https://sdgindiaindex.niti.gov.in/#/

9 NITI Aayog and United Nations in India. "The Indian Model of SDG Localization". 2022. https://india.un.org/en/192868-indian-model-sdg-localization

10 HLPF is the institutional framework established by the UN for the monitoring and evaluation of the SDGs. It is an intergovernmental forum, pursuant to Agenda 2030, to which the UN member states submit their VNR. It serves as a platform for the UN member states to showcase their progress towards the achievement of Agenda 2030. Each member state is required to submit at least two VNRs leading up to 2030. More at https://hlpf.un.org/

11 Data provided by SCM.

04

Smart Cities Mission – a Living Lab for People-centric Smart Urbanization

India is amongst at least 100 other countries in the "Global South" that are projected to have more than half of their population living in urban areas by 2050.[12] In India's context, this implies adding a new Chicago every year until 2030 or adding 700 to 900 million square meters of urban space, in the words of Hon'ble Union Minister Hardeep Singh Puri[3]. Undoubtedly, to ensure that human progress is equitable and inclusive, cities will need to address the current and future demand-supply gaps in housing, infrastructure, services, employment and economic opportunities. The global implications of India's urban pathway can be understood by the estimate that - nearly 60 per cent of India's carbon emissions by 2030, for instance, will come from "buildings and factories that are yet to be built, and vehicles and appliances that are yet to be bought".[4]

India's urban agenda is a living lab for the Global South given the geographic, ecological, social, and economic diversity of cities, which is also characterised by rapidly urbanizing small and medium cities and towns. Over two-thirds of cities under Smart Cities Mission have population of less than one million persons on one end of the spectrum and the megacities of Bengaluru, Chennai, Mumbai, with population exceeding 10 million persons on the other end.[5] Collectively, this ecosystem of 100 Smart Cities has contributed to India's national development agenda – Sabka Saath Sabka Vikas Sabka Vishwaas – by improving performance in access to basic services, financial and digital inclusion, accelerated economic growth, while placing people at the heart of development.

Agenda 2030 is an integral part of SCM and manifests in its linkages with 15 out of the 17 SDGs. The mission has impacted more than 100 million lives in 100 cities across India by funnelling investments of USD 22 billion since its inception in 2015. The sheer scale of projects—more than 7,800 in 100 cities—and beneficiaries make it a unique global case study which is anchored in the New Urban Agenda and accelerating progress towards achieving the SDGs. It offers important learnings and pathways to translate the SDGs into local action through structural transformation of cities by, (i) Fit-for-Purpose" Policy and Guidelines, (ii) Urban Planning and Design with Neighbourhood-led Approach, (iii) Local Implementation–Decentralized Governance, and (iv) Financing People-Centric Transformations, discussed in the following sections.

4.1 "Fit-for-Purpose" Policy and Guidelines

To represent India's diorama of cities, SCM adopted a "Fit-for-Purpose" approach in formulating the mission guidelines.[6] The simple objective of improving core infrastructure to offer decent quality of life to urban residents, while nudging cities to invest in "smart solutions" that modernize these investments was important to enable cities to be practical in their aspirations based on

their position in the development spectrum. The guidelines clearly articulated the most pertinent common urban challenges across the entire ecosystem of cities and required solutions under the categories of – retrofitting, redevelopment, greenfield/infill, pan city, or a combination. The result of such an approach which combined mandates with flexibility has proven to be a successful model for cities to propose comprehensive implementable plans of transformative projects based on their size, nature of urbanization, digital and technological maturity, financial and technical capacities. Thus, it provided a level playing field to small island towns such as Kavaratti (11,210 persons in 2011) to submit comprehensive proposals of USD 64.3 million alongside Chandigarh (1,055,450 persons in 2011) with proposed investments of USD 729 million.[7 8]

SCM addresses the most persistent urban challenges in India which are also experienced in many cities and countries in the Global South. This model of national policy and guidelines emphasizing an integrated and wholistic approach to urban development and investments as enablers of local level contextual planning decisions merits consideration for urbanization in Global South.

4.2 Urban Planning and Design with Neighbourhood-led Approach

SCM is a good example of a national scale mission that evoked a vigorous neighbourhood scale mobilization of people and resources in planning and implementation of projects. This was achieved through "challenges" that encouraged people centric-planning and delivery of infrastructure: India Cycles for Change (IC4C), Streets for People, Nurturing Neighbourhoods, Place Making and Transport for All, among others. Each of these challenges was led by collaboration between communities, interest groups, local governments and inspired people-centric transformations which took the lens and scale of a neighbourhood as its focus. Cities then competed to showcase their innovations which were recognized by MoHUA through awards and funds. For example, in the wake of the pandemic, the Cycles for Change Challenge contributed to the development of cycle tracks with several cities seeking to showcase innovations in the choice of materials and improvisation of existing infrastructure. Similarly, the Streets

Image 45: A view of the transformed Lal Chowk area in Srinagar Smart City. *Source: Srinagar Smart City.*

Image 46: Ms. Droupadi Murmu, the Hon'ble President of India, presents Smart Cities Mission with an award for its work in developing a digital model for decentralized governance. *Source: SCM.*

for People, Nurturing Neighbourhood and Place Making, promoted the principle of "Leaving No One Behind" with children-centric neighbourhoods and creative public spaces. People's engagement in urban governance was thus prioritized through neighbourhood scale "challenges".

4.3 Local Implementation– Decentralized Governance

SCM, operationalized within a three-tiered federal structure for governance, enabled policy, planning and financial instruments to be adapted and improvised to cater to the unique needs and aspirations of the people in each city.

An important contribution of SCM is to improvise and augment the efficiency of the existing apparatus of decentralized governance. City governance in India is the domain of statutory ULBs that draw from 18 functions specified in the constitution[9]. SCM departed from earlier national programmes in its requirement of a city-level SPV that implemented the programme in selected cities. With a governance structure that drew from the company laws of the country, cities leaders and administrators could exercise substantive local autonomy that enabled speedy implementation of the projects. The governance structure also enabled the building of capacity through streamlined recruitment processes that allowed a mix of government officers and private sectors experts at the helm of the SPVs. The capacity addition empowered the SPVs to serve as a link between diverse city level agencies which often operate within circumscribed domains. Such an "integration" across the levels of governance allowed on-ground "convergence" with other national and state programmes. Further, the City Level Advisory Forums (CLAFs) sought to deepen the representation of people and communities at the city level.

4.4 Financing People-Centric Transformations

SCM sought to encourage blended financing that drew investments from traditional government grants—both federal and state—but also private sources of financing through PPPs and other instruments. For instance, nearly USD 1.83 billion were raised through PPPs. SCM sought to bolster the revenue generating capacity of the cities that may reduce their dependence on government

grants in the long run. As an example, the mission enabled the cities to delegate powers with respect of levying to certain taxes in ABD areas and elsewhere to the SPVs. The cities could also delegate the "Right of Way (ROW)" in the municipal areas which could be utilized by the SPVs as additional sources of revenue. Further, monetization of certain municipal assets such as land opened a new stream of revenue for the SPVs. And finally, the corporate structure of the SPVs also allowed for provisions that could be used to access equity-based financing. Optimizing existing sources of revenue was given as much importance as new sources. With the help of enabling technologies, some cities reported enhanced revenue collections. For example, 18 cities have reported increased revenue collection with a cumulative addition of over USD 7 million. These measures are important precedents that may empower cities in the "Global South" to go beyond conventional sources of financing and government grants and seek to build robust revenue sources.

"In conclusion, localizing the Sustainable Development Goals (SDGs) through flagship missions and instituting robust SDG progress monitoring systems has helped India make significant progress towards its commitment to the 2030 Agenda. As India continues the remarkable urban trajectory, the exemplary structural impact of SCM on – liveability, economic-ability, and sustainability in the 100 Smart Cities will inspire cities not only in India but also globally.

Digital transformation and transition will be critical for cities to be competitive and relevant in an increasingly urbanizing reality. Technology and innovations that promote inclusion, wealth, and human rights must be made prominent using "civic technology, geographic information systems, the sharing economy, open data, and digital platforms".[10]The future national missions and priorities must evolve to promote "People-Centered Smart Cities" for bridging the social, economic and digital divide to make sure that no one and no place is left behind."

Image 47: A portrait from Kannagi Nagar in Chennai Smart City, a resettlement colony transformed into an "Art District". *Source: Chennai Smart City.*

Endnotes

1 Ritchie, Hannah, Max Roser. 2018. "Urbanization." Our World in Data, September, 2018. https://ourworldindata.org/urbanization#what-share-of-people-will-live-in-urban-areas-in-the-future (Accessed June 8, 2023)

2 Finance Centre for South-South Co-operation. n.d. "Global South Countries (Group of 77 and China)." http://www.fc-ssc.org/en/partnership_program/south_south_countries (Accessed June 8, 2023)

3 Press Information Bureau, Government of India. 2018. "RERA aims to ensure Good Governance through greater transparency & accountability: Shri Hardeep Singh Puri, MoS Housing & Urban Affairs". https://pib.gov.in/Pressreleaseshare.aspx?PRID=1530883# (Accessed June 8, 2023)

4 International Energy Agency. 2021. "India has the opportunity to build a new energy future". https://www.iea.org/news/india-has-the-opportunity-to-build-a-new-energy-future (Accessed June 8, 2023)

5 Data provided by the Ministry of Housing and Urban Affairs, Government of India.

6 For example, SPVs could collaborate with the existing line departments to draw on their respective capacities while retaining the control over the service level parametres making it a "win-win" situation for all urban agencies working together. Further, cities could add, modify or delete projects depending on evolving priorities subject to certain requirements. See, for example, Ministry of Housing and Urban Affairs. 2018. "Project Management and Monitoring Under MIS of Smart City Mission." Sep 08, 2018. http://smartcities.gov.in/content/advisory.php and Ministry of Housing and Urban Affairs. 2018. "Tripartite Agreement Between Smart Cities SPV, Government Line Departments/Agencies and the Prospective Bidder in Smart City Projects." 14 January, 2019. http://smartcities.gov.in/content/advisory.php

7 Census of India, 2011

8 Ibid.

9 The Constitution of India. 1950. "12th Schedule (introduced by the 74th Constitutional Amendment Act of 1992)." https://legislative.gov.in/constitution-of-india/

10 UN Habitat. N.d. "The People Centered Smart Cities Flagship Programme". https://unhabitat.org/programme/people-centered-smart-cities (Accessed July 10, 2023)

Annexure

Mapping of OOMF Indicators to SDG Targets

SDG 6

SDG 6	Ensure availability and sustainable management of water and sanitation for all
Target 6.1:	By 2030, achieve universal and equitable access to safe and affordable drinking water for all
NIF Indicators	6.1.1: Percentage of Population getting safe and adequate drinking water within premises through Pipe Water Supply (PWS) (similar to 1.4.1)
	6.1.2: Percentage of population using an improved drinking water source (Rural)
SCM Indicator 1	Average volume of drinking water treated per day
SCM Indicator 2	Total length of water supply pipelines laid
SCM Indicator 3	Total number of water ATMs installed
Target 6.2:	By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations
NIF Indicators	6.2.1: Proportion of households having access to toilet facility (Urban & Rural) (similar to 1.4.7)
	6.2.2: Percentage of Districts achieving Open Defecation Free (ODF) target
	6.2.3: Proportion of schools with separate toilet facility for girls
SCM Indicator 1	Total number of toilets seats (smart toilets, community toilets, public toilets) constructed in public spaces
Target 6.3	By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
NIF Indicators	6.3.1: Percentage of sewage treated before discharge into surface water bodies, 2020
	6.3.2: Proportion of Water Bodies with Good Ambient Water Quality
	6.3.3: Proportion of waste water treatment capacity created vis-a-vis total generation
SCM Indicator 1	Total length of sewerage pipelines laid/augmented
SCM Indicator 2	Total number of sewerage pumping stations developed

SCM Indicator 3	Capacity of STP augmented.
SCM Indicator 4	Increase in wastewater treatment capacity
Target 6.4	By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity
NIF Indicators	6.4.1: Percentage ground water withdrawal against availability
	6.4.2: Per capita storage of water, (in m3/person)
	6.4.3: Per capita availability of water (in m3/person)
SCM Indicator 1	Total installed capacity of the water treated for other uses
SCM Indicator 2	Volume of recycled water
SCM Indicator 3	Total volume of water being distributed
SCM Indicator 4	Total reduction in Non-Revenue Water
SCM Indicator 5	Total capacity of the water tanks developed
SCM Indicator 6	The number of SCM cities that installed SCADA
SCM Indicator 7	Length of water supply system being monitored through SCADA
SCM Indicator 8	Number of households covered under smart water/water meter projects
Target 6.5:	By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate
NIF Indicators	6.5.1: Percentage area of river basins brought under integrated water resources management
SCM Indicator	Number of rainwater harvesting recharge pits/ locations developed
Target 6.6:	By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes
NIF Indicators	6.6.1: Percentage of blocks/mandals/taluka over-exploited
	6.6.2: Percentage sewage load treated in major rivers
	6.6.3: Biological assessment information of surface water bodies
SCM Indicator 1	Number of lakes/ponds/ waterbodies restored or developed
SCM Indicator 2	Total area of lake/waterbody restored
Target 6.a:	By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies
NIF Indicators	Under development
SCM Indicator	N/A
Target 6.b:	Support and strengthen the participation of local communities in improving water and sanitation management
NIF Indicators	6.b.1: Proportion of villages with Village Water & Sanitation Committee [VWSC]
SCM Indicator	N/A

SDG 7

SDG 7	Ensure access to affordable, reliable, sustainable and modern energy for all
Target 7.1:	By 2030, ensure universal access to affordable, reliable and modern energy services
NIF Indicators	7.1.1: Percentage of households electrified (similar to 1.4.3)
	7.1.2: Percentage of household using clean cooking fuel
SCM Indicator 1	Total length of the overhead electricity cabling constructed/ upgraded
SCM Indicator 2	Total length of the underground electricity cabling constructed/ upgraded
SCM Indicator 3	Total number of households connected to the electricity distribution network
SCM Indicator 4	Total number of connections into the grid
SCM Indicator 5	Total number of HHs connected to smart meters
SCM Indicator 6	Total length of the gas pipeline laid
SCM Indicator 7	Total number of HHs connected to gas meters
Target 7.2:	By 2030, increase substantially the share of renewable energy in the global energy mix
NIF Indicators	7.2.1: Renewable energy share in the total installed electricity generation
SCM Indicator 1	Total capacity of the solar energy installed
Target 7.3:	By 2030, double the global rate of improvement in energy efficiency
NIF Indicators	7.3.1: Energy intensity measured in terms of primary energy and GDP, (in mega joules per rupee)
SCM Indicator 1	Total LED/Solar Street lights installed
Target 7.a:	By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology
NIF Indicators	Under development
SCM Indicator 1	N/A
Target 7.b:	By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States and landlocked developing countries, in accordance with their respective programmes of support
NIF Indicators	7.b.1: Installed renewable energy generating capacity in the country (in watts per capita) (Similar to 12.a.1)
SCM Indicator 1	Addition to renewable energy generating capacity (in watts per capita)

SDG 8

SDG 8	promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
Target 8.1:	Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent GDP growth per annum in the least developed countries
NIF Indicators	8.1.1: Annual growth rate of GDP (adjusted to price changes) per capita
SCM Indicator	N/A
Target 8.2:	Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors
NIF Indicators	8.2.1: Annual growth rate of GDP per employed person
	8.2.2: Total number of patents issued (granted), (similar to Indicator 8.3.2 and 9.5.3)
	8.2.3: Annual growth in manufacturing sector, (in percentage)
	8.2.4: Annual growth in agriculture sector, (in percentage)
SCM Indicator	N/A
Target 8.3:	Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of MSME, including through access to financial services
NIF Indicators	8.3.1: Percentage of workers in informal sector among total workers engaged in non-agriculture sector
	8.3.2: Total number of patents issued (granted) (similar to indicators 8.2.2 and 9.5.3)
	8.3.3: Outstanding Credit to MSME, (in Rs. crore)
	8.3.4: Number of MSME units registered under the online Udyog Aadhaar registration
	8.3.5: Number of start-ups recognized under Start-up India, (in number)
SCM Indicator 1	Total number of applications/dashboards developed for economic development (Online trading, product outreach)
SCM Indicator 2	Total value generated from online transactions via online trading platforms
SCM Indicator 3	Total number of incubation centres developed
SCM Indicator 4	Total number of companies registered/working under incubation
SCM Indicator 5	Total number of startups facilitated/registered in the incubation centres
SCM Indicator 6	Total unit of industries (Small/medium/large) or small businesses benefitted from the incubation centres/skill centres.
Target 8.4:	Improve progressively, through 2030, global resource efficiency in consumption and production and Endeavour to decouple economic growth from environmental degradation, in accordance with the 10Year Framework of programmes on Sustainable Consumption and production, with developed countries taking the lead
NIF Indicators	8.4.1: Proportion of waste recycled vs. waste generated
	8.4.2: Per capita fossil fuel consumption, (in Kg.)

SCM Indicator 1	Total waste to energy processing capacity installed
SCM Indicator 2	Amount of fossil fuel/wood saved till date
SCM Indicator 3	Electric/CNG/Eco-friendly crematorium installed
Target 8.5:	By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value
NIF Indicators	8.5.1: Average hourly earnings of employees, by sex, age, occupation (in Rs.)
	8.5.2: Unemployment rate
	8.5.3: Wages earned by male-female in regular wage/salaried employment (Rs. per month)
	8.5.4: Workforce Participation Ratio
	8.5.5: Total population with disabilities covered under social protection schemes
	8.5.6: Share of unemployed persons in population aged 15-24
SCM Indicator 1	Total area of shop space (vending units) built/redeveloped/retrofitted.
SCM Indicator 1	Total number of vendors impacted in market redevelopment/ hawker zone projects
SCM Indicator 2	Total area of market redevelopment/Hawkers zone development
Target 8.6:	By 2020, substantially reduce the proportion of youth not in employment, education or training
NIF Indicators	8.6.1: Unemployment Rate (15-24 years)
	8.6.2: Proportion of youth (15-24 years) not in education, employment or training (NEET)
SCM Indicator 1	Total number of skill development centres/ vocational training institutes developed/redeveloped
SCM Indicator 2	Total number of course offered by training institute developed
SCM Indicator 3	Total number of seats offered by training institutes
SCM Indicator 4	Total number of people passed from the institute
Target 8.7:	Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms
NIF Indicators	8.7.1: Human trafficking cases per 10,00,000 population
	8.7.2: Number of missing children, (similar to Indicator 16.2.3)
SCM Indicator	N/A
Target 8.8:	Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment
NIF Indicators	8.8.1: Percentage of households receiving social protection benefits under Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)
	8.8.2: Percentage of migrant workers
	8.8.3: Number of accidents in factories

SCM Indicator	Total number of rooms built in community housing projects like Rain Basera, Hostel (non-educational), night shelters etc
Target 8.9:	By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products
NIF Indicators	8.9.1: Direct contribution of Tourism to total GDP and in growth rate
	8.9.2: Percentage change in number of visits by tourists (domestic & foreign) over previous year
SCM Indicators 1	Total number of Tourist Information/ Facilitation centers developed/installed
SCM Indicators 2	Total number of applications/web based/digital intervention (audio/visual) made for Tourism development
SCM Indicators 3	Total number of cafes constructed
SCM Indicators 4	Total number of hotels constructed/ refurbished
SCM Indicators 5	Capacity of the hotels/transit homes constructed/ refurbished
Target 8.10:	Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all
NIF Indicators	8.10.1: Indicator on financial inclusion
	8.10.2: Number of accounts (including deposit and credit accounts) of scheduled commercial banks per 1,000 population (similar to 1.4.5)
	8.10.3: Number of banking outlets per 1,00,000 population
	8.10.4: Automated Teller Machines (ATMs) per 1,00,000 population
SCM Indicator 1	Number of persons using fare collection system, automated systems, smart cards, etc., for public transport
SCM Indicator 2	Total number of registered card users
Target 8.a:	Increase aid for trade support for developing countries, in particular least developed countries, including through the Enhanced Integrated Framework for trade-related technical assistance to Least Developed Countries
NIF Indicators	Under development
SCM Indicator	N/A
Target 8.b:	By 2020, develop and operationalize a global strategy for youth employment and implement the Global Jobs pact of the International Labour Organization
NIF Indicators	8.b.1: Existence of a developed and operationalized national strategy for youth employment, as a distinct strategy or as part of a national employment strategy
	8.b.2: Number of person days created under Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), (in lakhs)
SCM Indicator 1	Total number of skill development centres/ vocational training institutes developed/redeveloped

SDG 9

SDG 9	Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation
Target 9.1:	Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all
NIF Indicators	9.1.1: Proportion of the rural population who live within 2 km of an all-season road
	9.1.2: Passenger and freight volumes, by mode of transport
	9.1.3: Gross Capital Formation by industry of use (in Rs. crore)
SCM Indicator	N/A
Target 9.2:	Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries
NIF Indicators	9.2.1: Percentage Share of GVA in Manufacturing to Total GVA
	9.2.2: Manufacturing employment as a proportion of total employment
SCM Indicator	N/A
Target 9.3:	Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets
NIF Indicators	9.3.1: Share of household sector in total industry value added
	9.3.2: Percentage of credit flow to MSME as a percentage of Total Adjusted Net Bank Credit
SCM Indicator	N/A
Target 9.4:	By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities
NIF Indicators	9.4.1: Total CO_{2} emissions of power sector per unit of GDP (in Tonne/Rupees Crore)
	9.4.2: Energy use intensity of manufacturing value
SCM Indicator	N/A
Target 9.5:	Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending
NIF Indicators	9.5.1: Percentage share of government spending on IPP (Research and Development) to total GDP
	9.5.2: Researchers (in full time equivalent) per million population
	9.5.3: Total number of patents issued (granted), (similar to Indicator 8.2.2 and 8.3.2)
SCM Indicator	N/A

Target 9.a:	Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States
NIF Indicators	Under development
SCM Indicator	N/A
Target 9.b:	Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities
NIF Indicators	9.b.1: Share of IPP in total Gross Fixed Capital Formation
	9.b.2: Share of GVA of Information and Computer related activities in total GVA
SCM Indicator	N/A
Target 9.c:	Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020
NIF Indicators	9.c.1: Number of Internet Subscriptions as percentage of total population
	9.c.2: Number of broadband subscribers per 10,000 persons
SCM Indicator 1	Total number of wifi hotspots locations
SCM Indicator 2	Total number of users of wifi hotspots
SCM Indicator 3	Number of interactive digital platforms / mobile applications deployed in the FY 2021-22
SCM Indicator 4	Number of civic services made available through digital platforms / mobile applications in the FY 2021-22
SCM Indicator 5	Total number of registered users of the mobile application based services provided by the city
SCM Indicator 6	Total number of registered grievances, in the online grievance redressal system developed, till date
SCM Indicator 7	Total number of grievances addressed digitally

SDG 11

SDG 11	Make cities and human settlements inclusive, safe, resilient and sustainable
Target 11.1	By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums
NIF Indicators	11.1.1: Proportion of urban population living in slums, informal settlements or inadequate housing
SCM Indicator 1	Total number of households benefitted from affordable housing
SCM Indicator 2	Total number of rooms built in Community housing projects like Rain Basera, Hostel (non-educational), night shelters etc
SCM Indicator 3	Number of families benefitted annually
SCM Indicator 4	Area of slum upgraded
SCM Indicator 5	Number of slum people directly benefited from the initiative
SCM Indicator 6	Number of families living in slum benefited

SCM Indicator 7	Number of households benefited with pucca housing
Target 11.2:	By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons
NIF Indicators	11.2.1: Proportion of Households in urban areas having convenient access to public transport
	11.2.2: People killed/injured in road accidents (per 1,00,000 population) (similar to 3.6.1)
SCM Indicator 1	Total number of new public transport buses deployed
SCM Indicator 2	Length of the road network where public transport is introduced
SCM Indicator 3	Total number of bus stops developed/ redeveloped/ retrofitted in the city
SCM Indicator 4	Total number of bus terminals/ depots developed/ redeveloped/ retrofitted
SCM Indicator 5	Total number of buses integrated with intelligent public transport system
SCM Indicator 6	Total number of Passenger Information Systems enabled bus stands
SCM Indicator 7	Total number of services integrated in Integrated Transport Management System ITMS (Signal timing, Dynamic Routing, etc.)
SCM Indicator 8	Length of Non-Motorised Transport infrastructure (footpath, bicycling lane) has been developed/ redesigned in FY 2021-22
SCM Indicator 9	Average length of NMT infrastructure per length of road network in the ABD area across city
SCM Indicator 10	Total number of bicycles deployed in public bike sharing
SCM Indicator 11	Total number of bi-cycle stand developed
SCM Indicator 12	Decrease in waiting time of the pedestrians
SCM Indicator 13	Total length of the cycle tracks developed
SCM Indicator 14	No. of intersections/ midblock locations where pedestrian phase/ pelican signal provided
SCM Indicator 15	Total length of the footpath developed
SCM Indicator 16	Total length where tactile tiling has been done for People with Disabilities (PwD)
SCM Indicator 17	Total length of smart roads constructed/improved
SCM Indicator 18	Total number of traffic junctions improved/developed
SCM Indicator 19	Total length of the road friendly for People with Disabilities (PwD)
SCM Indicator 20	Total length of utility ducts laid along the roads
SCM Indicator 21	Total number of utilities shifted underground
SCM Indicator 22	Total length of the streets where signages and street design has been developed
Target 11.3:	By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries
NIF Indicators	11.3.1: Proportion of cities with Master plans (similar to 11.a.1)
SCM Indicator 1	Availability or development of Integrated Command and Control Centre (ICCC)

SCM Indicator 2	Total number of services being developed and integrated through ICCC in the city
SCM Indicator 3	Total number complaints redressed through ICCC
SCM Indicator 4	Total number of users benefitted through ICCC
SCM Indicator 5	Number of services operationalized through ICCCs in the FY 2021-22
SCM Indicator 6	Total area covered under GIS mapping for the property tax collection
SCM Indicator 7	Number of civic services made available through digital platforms /mobile applications in the FY 2021-22
SCM Indicator 8	Numbers of city mobile applications developed
SCM Indicator 9	Total number of mobile application-based services provided by the city
SCM Indicator 10	Total number of grievances addressed digitally
SCM Indicator 11	Number of Common Service Centre built/redeveloped
SCM Indicator 12	The number of SCM cities that installed SCADA
SCM Indicator 13	Length of water supply system being monitored through SCADA
Target 11.4:	Strengthen efforts to protect and safeguard the world's cultural and natural heritage
NIF Indicators	11.4.1: Total per capita expenditure on the preservation, protection and conservation of all cultural and natural heritage
SCM Indicator 1	Total per capita expenditure on the preservation, protection and conservation of all cultural and natural heritage under SCM
SCM Indicator 2	Total number of heritage monuments conserved/ redeveloped
Target 11.5:	By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global GDP caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations
NIF Indicators	11.5.1: Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population (similar to Indicator 1.5.1 and 13.1.1)
SCM Indicator	N/A
Target 11.6:	By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management
NIF Indicators	11.6.1: Proportion of households from where solid waste is regularly collected, by agency of collection, by frequency of collection
	11.6.2: Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)
	11.6.3: Number of days the levels of fine particulate matter (PM2.5 and PM10) above mean level
	11.6.4: Percentage of wards with 100% door to door waste collection
	11.6.5: Percentage of waste processed
SCM Indicator 1	Total number of HHs/ DUs covered under door-to-door collection
SCM Indicator 2	The total amount of waste/legacy waste managed till date
SCM Indicator 3	Total area of the landfill site developed

SCM Indicator 4	Volume of Construction and Demolition waste disposed
SCM Indicator 5	Total value of Road sweeping/solid waste management equipment/ vehicles procured and deployed.
SCM Indicator 6	Total capacity of micro composting centres developed
SCM Indicator 7	Total waste to energy processing capacity installed/augmented
SCM Indicator 8	Amount of fossil fuel/wood saved till date
SCM Indicator 9	Total number of environmental sensors installed
SCM Indicator 10	Environmental Monitoring digital application developed
SCM Indicator 11	Total number of RFID enabled solid waste bins installed
Target 11.7:	By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities
NIF Indicators	11.7.1: Proportion of households reporting an open space within 500 meters from premises (urban)
SCM Indicator 1	Per capita green space developed
SCM Indicator 2	Total area of the parks and gardens developed
SCM Indicator 3	Total area of green and public open spaces developed in the FY 2021-22
SCM Indicator 4	Total land area of the Lakefront/ Riverfront/ Foreshore developed
SCM Indicator 5	The project for development/ rejuvenation of public spaces or promenading done in the city
SCM Indicator 6	Total number of smart poles installed
SCM Indicator 7	Total number of CCTV cameras installed
SCM Indicator 8	Total LED/solar street lights installed (nos.)
Target 11.a:	Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning
NIF Indicators	11.a.1: Proportion of cities with Master plans (similar to 11.3.1)
SCM Indicator 1	Availability or development of Integrated Command and Control Center (ICCC)
Target 11.b:	By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels
NIF Indicators	11.b.1: Whether the country has adopted and implemented national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030 (similar to Indicator 11.b.1 and 13.1.2)
	11.b.2: Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies, (similar to Indicator 1.5.4 and 13.1.3)
SCM Indicator 1	Disaster management plan status
SCM Indicator 2	Total number of platforms/applications related to disaster and emergency response developed

SCM Indicator 3	No of trained personnel and volunteers available for response
SCM Indicator 4	No of early warning sensors installed to pre-empt floods/cyclones/any other disaster
SCM Indicator 5	Number of early warning messages issued to citizens
SCM Indicator 6	Number of Public Address System installed
SCM Indicator 7	Reduction in response time for disaster warnings from previous incidents
SCM Indicator 8	Fire and Emergency Response Systems/Hydrants/ Automated Systems/ Fire Stations
SCM Indicator 9	Total value of Fire and Emergency Equipment Purchase
Target 11.c:	Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials
NIF Indicators	Under development.
SCM Indicator	N/A

SDG 17

SDG 17	Strengthen the means of implementation and revitalize the Global partnership for Sustainable Development
Target 17.1:	Strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection
NIF Indicators	17.1.1: Total government revenue as a proportion of GDP, by source
	17.1.2: Proportion of domestic budget funded by domestic taxes
SCM Indicator 1	Water tax collection increase in the FY
SCM Indicator 2	Total revenue generated from advertisement boards
SCM Indicator 3	Total area covered under GIS mapping for the property tax collection
SCM Indicator 4	Amount of Fare Collected through fare collection system, Automated systems, Smart Cards, etc. till date
SCM Indicator 5	Number of cities in which Geo enabled city operations for Land or Tax Management helped in increasing tax collection
Target 17.2:	Developed countries to implement fully their official development assistance commitments, including the commitment by many developed countries to achieve the target of 0.7 per cent of gross national income for official development assistance (ODA/GNI) to developing countries and 0.15 to 0.20 per cent of ODA/GNI to least developed countries; ODA providers are encouraged to consider setting a target to provide at least 0.20 per cent of ODA/GNI to least developed countries
NIF Indicators	The target is not relevant in the national context
SCM Indicator 1	N/A

Target 17.3:	Mobilize additional financial resources for developing countries from multiple sources
NIF Indicators	17.3.1: Foreign Direct Investment as proportion of Gross National Income
	17.3.2: Volume of remittances as a proportion of total GDP
SCM Indicator 1	N/A
Target 17.4:	Assist developing countries in attaining long-term debt sustainability through coordinated policies aimed at fostering debt financing, debt relief and debt restructuring, as appropriate, and address the external debt of highly indebted poor countries to reduce debt distress
NIF Indicators	17.4.1: Debt service as a proportion of exports of goods and services
SCM Indicator 1	N/A
Target 17.5:	Adopt and implement investment promotion regimes for least developed countries
NIF Indicators	Under development.
SCM Indicator 1	N/A
Target 17.6:	Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge-sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism
NIF Indicators	17.6.1: Fixed internet broadband subscriptions per 100 inhabitants, by speed
SCM Indicator 1	N/A
Target 17.7:	Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed
NIF Indicators	Under development.
SCM Indicator 1	N/A
Target 17.8:	Fully operationalize the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology
NIF Indicators	Under development.
SCM Indicator 1	N/A
Target 17.9:	Enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to implement all the Sustainable Development Goals, including through North-South, South-South and triangular cooperation
NIF Indicators	Under development.
SCM Indicator 1	N/A
Target 17.10:	promote a universal, rules-based, open, non-discriminatory and equitable multilateral trading system under the World Trade Organization, including through the conclusion of negotiations under its Doha Development Agenda

NIF Indicators	Under development.
SCM Indicator 1	N/A
Target 17.11:	Significantly increase the exports of developing countries, in particular with a view to doubling the least developed countries' share of global exports by 2020
NIF Indicators	17.11.1: Share of India's exports in Global exports, (in percentage)
SCM Indicator 1	N/A
Target 17.12:	Realize timely implementation of duty-free and quota-free market access on a lasting basis for all least developed countries, consistent with World Trade Organization decisions, including by ensuring that preferential rules of origin applicable to imports from least developed countries are transparent and simple, and contribute to facilitating market access
NIF Indicators	Under development.
SCM Indicator 1	N/A
Target 17.13:	Enhance global macroeconomic stability, including through policy coordination and policy coherence
NIF Indicators	17.13.1: Macroeconomic Dashboard
SCM Indicator 1	N/A
Target 17.14:	Enhance policy coherence for sustainable development
NIF Indicators	Under development.
SCM Indicator 1	N/A
Target 17.15:	Respect each country's policy space and leadership to establish and implement policies for poverty eradication and sustainable development
NIF Indicators	Under development.
SCM Indicator 1	N/A
Target 17.16:	Enhance the Global partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries
NIF Indicators	17.16.1: Number of States having a State Monitoring Framework that supports the achievement of the sustainable development goals
SCM Indicator 1	SCM OOMF Framework for SDG Monitoring
Target 17.17:	Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships
NIF Indicators	17.17.1: Amount of Indian Rupees spent on Public-Private Partnership (PPP) for infrastructure
SCM Indicator 1	Amount of Indian Rupees spent on Public-Private Partnership (PPP) for infrastructure under SCM
Target 17.18:	By 2020, enhance capacity-building support to developing countries, including for least developed countries and small island developing States, to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts

NIF Indicators	17.18.2: Whether the country has national statistical legislation that complies with the Fundamental Principles of Official Statistics
SCM Indicator 1	N/A
Target 17.19:	By 2030, build on existing initiatives to develop measurements of progress on sustainable development that complement gross domestic product, and support statistical capacity-building in developing countries
NIF Indicators	17.19.1: Budget allocated to different Ministries for strengthening statistics, (in Rs. Lakh)
	17.19.2: Proportion of States/UTs that have achieved 100 per cent birth registration and 80 per cent death registration
SCM Indicator 1	N/A

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FOR A BETTER URBAN FUTURE

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