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BHOPAL

VOLUNTARY LOCAL REVIEW 2023

An Agenda for Action: Sustainable Urban Transformation in Bhopal

PREPARED BY:

UN⊕HABITAT
FOR A BETTER URBAN FUTURE

SUBMITTED TO:

Bhopal Municipal Corporation

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Urban Transformation in Bhopal

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LIST OF ACRONYMS

ACUITE	Acuité Ratings & Research Limited
ADB	Asian Development Bank
AFOLU	Agriculture, Forestry and Other Land Use
AIIMS	All India Institute for Medical Sciences
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
ANM	Auxiliary Nurse and Midwife
ANPR	Automatic Number Plate Recognition
ATCS	Adaptive Traffic Control System
BCLL	Bhopal City Link Limited
BDA	Bhopal Development Authority
BDP	Bhopal Development Plan
BMC	Bhopal Municipal Corporation
BRTS	Bus Rapid Transit System
BSCDCL	Bhopal Smart City Development Corporation Limited
BSSS	Bhopal School of Social Sciences
BWUMS	Bhopal City Water Utility Management System
CAGR	Compound Annual Growth Rate
CNG	Compressed Natural Gas
CPCB	Central Pollution Control Board
CSCAF	Climate Smart Cities Assessment Framework
CSO	Central Statistics Office
CSR	Corporate Social Responsibility
CSS	Centrally Sponsored Schemes
DCR	Development Control Regulations
EPCO	Environment Planning and Coordination Organization
EWS	Economically Weaker Sections
FAR	Floor Area Ratio
FD	Fixed Deposit
FIC	Full Immunization Coverage
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIS	Geographical Information System
GoI	Government of India
GoMP	Government of Madhya Pradesh
GPSC	Global Platform for Sustainable Cities
GRIHA	Green Rating for Integrated Habitat Assessment
GUMF	Global Urban Monitoring Framework
GVA	Gross Value Added
HDU	High Dependency Units

HFA	Housing for All
HLPF	High Level Political Forum
IAAS	Infrastructure as a Service Model
IAS	Indian Administrative Service
ICCC	Integrated Command and Control Centre
ICT	Information and Communications Technology
ICU	Intense Critical Unit
IIFM	Indian Institute of Forest Management
IISER	Indian Institute of Science, Education and Research
IMR	Infant Mortality Rates
INR	Indian National Rupee
IoT	Internet-of-Things
IPPU	Industrial Processes and Product Use
ITMS	Intelligent Traffic Management System
ITS	Intelligent Traffic Solutions
LEED	Leadership in Energy and Environmental Design
LHV	Lady Health Visitors
LIG	Low Income Groups
LPA	Local Planning Area
MANIT	Maulana Azad Institute of Technology
MIG	Middle Income Groups
MLD	Million Litres Per Day
MMR	Maternal Mortality Rates
MoEFCC	Ministry of Environment, Forests and Climate Change
MoHFW	Ministry of Health and Family Welfare
MoHUA	Ministry of Housing and Urban Affairs
MoSPI	Ministry of Statistics and Programme Implementation
MP PCB	Madhya Pradesh Pollution Control Board
MP SCERT	Madhya Pradesh State Council of Education Research and Training
MPSDMA	Madhya Pradesh State Disaster Management Authority
MRF	Material Recovery Facility
MT	Metric Tonnes
NCRB	National Crime Records Bureau
NDC	Nationally Determined Contribution
NEP	National Education Policy 2020
NFHS	National Family Health Survey
NGT	National Green Tribunal
NID	National Institute of Design
NIF	National Indicator Framework
NIFT	National Institute of Fashion Technology
NIUA	National Institute of Urban Affairs
NPC	National Productivity Council
NRW	Non-Revenue Water

NTPC	National Thermal Power Corporation
NUA	New Urban Agenda
NULM	National Urban Livelihood Mission
O&M	Operations and Maintenance
ODF	Open Defecation Free
PAS	Public Address System
PHC	Primary Health Centres
PMAY	Pradhan Mantri Awaas Yojana (Prime Minister Housing Scheme)
PPH	Persons Per Hectare
PPP	Public Private Partnership
PWD	Public Works Department
RDF	Refuse-Derived Fuel
RLVD	Red Light Violation Detection
RTE	Right to Education
SAPCC	State Action Plan on Climate Change
SBM	Swachh Bharat Mission
SCADA	Supervisory Control and Data Acquisition
SCIAP	Sustainable Cities Integrated Approach
SDG	Sustainable Development Goals
SLB	Service Level Benchmark
SPA	School of Planning and Architecture
SQKM	Square Kilometres
STP	Sewage Treatment Plant
SVD	Speed Violation Detection
T&CP	Town & Country Planning Department
TDR	Transferrable Development Rights
TNCP	The Directorate of Town and Country Planning
TPD	Tonnes Per Day
ULB	Urban Local Body
UNDP	United Nations Development Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund URDPFI
URDPFI	Urban and Regional Development Plans Formulation and Implementation
USAF	Urban Sustainability Assessment Framework
USD	US Dollars
VLR	Voluntary Local Review
VNR	Voluntary National Review
VPD	Vaccine-Preventable Disease
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization
WPR	Workforce Participation Rate
WWF	World Wide Fund for Nature

PREFACE

The Covid-19 pandemic has brought renewed attention to transformative frameworks within universal development agendas. Against the backdrop of a global crisis, the Sustainable Development Goals (SDGs) and their associated Agenda 2030 hold the promise of a better future for humanity. Cities and urban areas are the places where the quest for a sustainable future is going to unfold. Local contemplation and action will largely determine the success of our universal development agendas.

India's second Voluntary National Review (VNR) was presented to the United Nation's High Level Political Forum (HLPF) in its 2020 cycle. While the NITI Aayog has anchored India's VNR, the Ministry of Statistics and Programme Implementation (MoSPI) has adapted the UN's global indicator framework for the Indian context as National Indicator Framework. Further, according to NITI Aayog, more than 20 states and union territories (UTs) have initiated steps to localize the SDGs. Bhopal is the first city in India to join the global movement on localization of SDGs. We hope that other Indian cities will follow Bhopal's lead to localize the SDGs and undertake Voluntary Local Reviews (VLRs).

A VLR is a means to forefront the role of local action in the achievement of the SDGs. UN-Habitat has released guidelines in two volumes to help cities prepare their VLR document[1]. The participatory process allows flexibility to cities to narrate their development stories using the tools and framework provided by the Agenda 2030. It seeks to enable them to prepare a VLR even with limited capacity and availability of data. Bhopal has demonstrated the way forward for Indian cities to use the methodological flexibility and a combination of qualitative and quantitative approaches to drafting a VLR.

This VLR is the outcome of a long-standing partnership between the Bhopal Municipal Corporation and UN-Habitat to plan and implement sustainable and resilient development pathways. A people-centric participatory process was adopted to promote transparency and accountability in civic engagements. This VLR was made possible by the leadership, vision and initiative of the City Mayor, Smt. Malti Rai, and the Commissioner, Shri. KVS Choudary. The UN-Habitat India team has worked tirelessly over the last year to bring out this VLR. The achievement would not have been possible without the unstinted support and cooperation of various departments of the Bhopal Municipal Corporation and other city level agencies whose work is demonstrated in the report. We hope that the city continues its work as an exemplar for localization of the Sustainable Development Goals.

Parul Agarwala
Country Programme Manager
UN-Habitat India

January 2023
New Delhi, India

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1   UCLG and UN-Habitat. "Guidelines for Voluntary Local Reviews Volume 1" (2020). https://unhabitat.org/guidelines-for-voluntary-local-reviews-volume-1-a-comparative-analysis-of-existing-vlrs

FOREWORD FROM MAYOR

अत्यंत हर्ष का विषय है कि भोपाल, स्वैच्छिक स्थानीय समीक्षा विवरण (Voluntary Local Review) रिपोर्ट तैयार करने वाला, भारत वर्ष का पहला शहर बन गया है। स्वैच्छिक स्थानीय समीक्षा विवरण (Voluntary Local Review) का वैश्विक आंदोलन अत्यंत तेजी से बढ़ा है। संधारणीय विकास लक्ष्य (Sustainable Development Goals) की प्रगति पर नजर रखने और रिपोर्ट करने के लिए दुनिया भर के शहरों में, स्थानीय एवं क्षेत्रीय सरकारें वीएलआर का उपयोग कर रही हैं। वीएलआर सतत विकास लक्ष्यों के स्थानीयकरण की प्रक्रिया का शक्तिशाली त्वरक बन गए हैं। अंततः भारत वर्ष में भोपाल स्वैच्छिक स्थानीय समीक्षा विवरण (Voluntary Local Review) की प्रक्रिया करने वाला पहला शहर बन गया है। भोपाल स्वैच्छिक स्थानीय समीक्षा यूएन–हैबिटेट और भोपाल नगर निगम द्वारा संयुक्त रूप से तैयार की गई है।

सतत विकास लक्ष्य, सार्वभौमिक (Global) हैं और जिनका उद्देश्य गरीबी को समाप्त करने, पृथ्वी की रक्षा करने और यह सुनिश्चित करने के उपायों को अपनाने के लिए हो सकता है, ताकि सभी लोग शांति और समृद्धि का आनंद ले सकें। ये सभी के लिए बेहतर और अधिक टिकाऊ भविष्य के लिए 17 आपस में जुड़े वैश्विक लक्ष्यों का संग्रह हैं। लेकिन, भले ही एसडीजी वैश्विक हों और मुख्य रूप से राष्ट्रीय राज्यों पर केंद्रित हों, उनकी उपलब्धि शहरों की उन्हें वास्तविकता बनाने की क्षमता पर भी निर्भर करेगी।

मध्य प्रदेश स्तर पर यूएनडीपी के सहयोग से मप्र राज्य योजना आयोग द्वारा राज्य एसडीजी सेल का गठन किया गया है। राज्य एसडीजी सेल राज्य स्तर पर एजेंडा 2030 के स्थानीयकरण के लिए एक नोडल एजेंसी है। इस उद्देश्य के लिए कई जिला एसडीजी सेल बनाए गए हैं। यह राज्य स्तर पर विभिन्न एजेंसियों के बीच समन्वय एजेंसी के रूप में भी कार्य करते है। एजेंडा 2030 को प्राप्त करने की आकांक्षाओं और लक्ष्यों को रिपोर्ट करने के लिए मध्य प्रदेश राज्यस्तर पर कार्य योजना तैयार कर रहा है। राज्य स्तरीय एसडीजी सेल के अनुरूप शहर स्तर पर एजेंडा 2030 को स्थानीय बनाने की जिम्मेदारी नगर निगम भोपाल की है, जिसके लिए यह स्वैच्छिक स्थानीय समीक्षा विवरण (VLR) तैयार किया गया है।

स्वैच्छिक स्थानीय समीक्षा (VLR) स्थानीय विकास रणनीतियों के साथ अभिव्यक्ति के लिए प्राथमिकताएं और मार्गदर्शन प्रदान करता है। यह धन और वित्तीय संसाधनों को भी आकर्षित करता है। यह बहु–स्तरीय संवाद और सहयोग को भी बढ़ावा देता है। यह स्वैच्छिक स्थानीय समीक्षा विवरण शहर की विभिन्न प्राथमिकताओं पर निर्णय लेने के लिए नगर आयुक्त और अधिकारियों के लिए सर्वाधिक प्रासंगिक हो सकता है। यह समीक्षा विवरण अलग–अलग जानकारी को ध्यान में रखते हुए अंततः मात्रात्मक और गुणात्मक तथा गैर–पारंपरिक जानकारी का मिश्रण बन वैश्विक ध्यान और निवेश आकर्षित करने में भी सहायक होगा। इससे राष्ट्रीयध्उप–राष्ट्रीय सांख्यिकीय कार्यालयों के साथ परस्पर सम्बन्ध रखने की क्षमता में वृद्धि होना अवश्वम्भावी है। भोपाल स्वैच्छिक स्थानीय समीक्षा विवरण (VLR)

के तैयार होने के साथ एजेंडा 2030 के सतत विकास लक्ष्यों (SDGs) के प्रति नागरिकों और समुदायों की समावेशी भागीदारी प्रक्रिया की संभावना बढ़ गई है। इससे एक प्रकार की 'बॉटम–अप अप्रोच' तैयार हो गई है।

इस विवरण में चालू या प्रस्तावित परियोजनाओं, निवेशों या राष्ट्रीय मिशनों के साथ संरेखण पर ध्यान केंद्रित किया गया है। साझेदारी और समर्थन के लिए प्रदर्शित की जाने वाली कुछ परियोजनाओं को उचित थीमों के साथ जोड़ा गया है। कुल मिलाकर, भोपाल स्वैच्छिक स्थानीय समीक्षा विवरण (VLR) से निम्नलिखित अवसर अपेक्षित हैं।

यह स्थानीय सरकार को अपने लोगों की जरूरतों को सुनने और उन्हें स्थानीय नीति निर्माण में प्रतिबिंबित करने का अवसर देता है। यह राज्य की नीति अनुसार सतत विकास लक्ष्य (SDGs) के बेहतर स्थानीयकरण के लिए रास्ते की ओर इशारा करते हुए आत्म–प्रतिबिंब आमंत्रित करता है। स्थानीय समीक्षा विवरण (VLR) तैयार किया जाना, एक ऐसी प्रक्रिया है जो डेटा–संचालित है और इसका उपयोग भोपालियों के उज्ज्वल भविष्य को प्राप्त करने के लिए कार्यान्वयन की योजना बनाने के लिए किया जा सकता है। स्थानीय समीक्षा विवरण (VLR) सतत स्थानीय विकास पर वैश्विक बातचीत सम्मिलित करते हुए स्थानीय विकास में उत्थान प्रदाय करेगा।

मैं यूएन–हैबिटेट की टीम तथा नगर निगम भोपाल की टीम, जिनका भोपाल स्थानीय समीक्षा विवरण (VLR) तैयार करने में योगदान है, की सराहना करती हूँ। निश्चय ही ये बधाई के पात्र हैं।

मालती राय

<div align="right">जनवरी, 2023
भोपाल, भारत</div>

FOREWORD FROM COLLECTOR

I congratulate the city of Bhopal for taking the lead to localize the Sustainable Development Goals as well as for the distinction of being the first city to do so in the country.

The Government of Madhya Pradesh has established an interdepartmental SDG cell, which is embedded in the State Planning Commission for the review and monitoring of the goals in the state. Further, we have district level SDG cells, which review and monitor the progress of implementation of SDGs locally. While Bhopal district constantly endeavours to work in sync with the Bhopal Municipal Corporation and other key city level agencies, I welcome this report as a mechanism to localize the SDGs, which is tailored to suit the requirements of the city.

The Bhopal VLR is an opportunity for the district and the municipal administration to complement each other's work in the service of the people of Bhopal. It is also an opportunity to explore the linkages and gaps across developmental programmes at the city, district and the state level. While MoSPI's National Indicator Framework provides us with a common framework to localize and review the SDGs, the local indicators and availability of data pertaining to those indicators can vary across the city and district.

I commend the painstaking efforts of the officers of Bhopal Municipal Corporation and UN-Habitat in bringing out this report. Let us use it to build partnerships between different government bodies so that we can come together to chart a common path for achieving the SDGs at the level of the city as well as the district. To me, this report is also an opportunity to invite people's participation in the implementation of the SDGs at the local level; and I hope it becomes a tool that people use to own and adopt the SDGs in their daily lives.

Avinash Lavania, IAS
Collector, Bhopal District

January 2023
Bhopal, India

FOREWORD FROM COMMISSIONER

I am honoured to announce that Bhopal is the first city in India to publish a Voluntary Local Review. This remarkable achievement for the city would not have been possible without our collaboration with UN-Habitat India, which anchored the process throughout the various stages since inception.

The Bhopal Municipal Corporation constituted an SDG advisory group, which held its first meeting on 8 April 2022. The intention was to unpack the SDG framework for local stakeholders and outline its consistency with the day-to-day work of a local government. We sought to build a local narrative that makes the vision of SDGs a part of people's vocabulary.

The advisory group was also instrumental in providing information in this report and I acknowledge the efforts of the municipal officers and the Bhopal Smart City team in facilitating the data to UN-Habitat for this report. As the later part of the report notes, the availability of the disaggregated data at the city level is a challenge in the Indian context. This VLR report has sought to turn this challenge into a strength by striking a fine balance between narrative reporting and quantitative assessment to provide a holistic picture of the city's progress towards the localization of SDGs.

As a way forward, BMC will establish appropriate channels to ensure that review and monitoring of the city's progress towards the SDGs is continued and that the findings of the VLR are integrated in administrative decision making. We hope to use various technology platforms to encourage the people of Bhopal to engage with their city's work, in alignment with the SDGs.

I write with the hope that this VLR takes Bhopal closer to translating Agenda 2030 into a local reality. This report reflects the commitment of Bhopal Municipal Corporation towards the localization of SDGs. And while efforts spanning several months have culminated with the publication of this report, the real work begins now.

KVS Choudhary, IAS
Commissioner, BMC

January 2023
Bhopal, India

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CITY PROFILE

Bhopal is the capital city of the state of Madhya Pradesh in Central India. It is the second most populous city of the state and a regional centre for trade, commerce and tourism.

The city is a rich tapestry of cultural and natural heritage, comprising historical sites, lakes and national parks. It is located about 30 km north-west from Bhimbetka Caves, a prehistoric site from the palaeolithic age and a designated UNESCO World Heritage Site. The city has another UNESCO World Heritage Site in proximity: a Buddhist complex at Sanchi situated about 40 km north-east of the city, known for the legendary Sanchi Stupa. Bhopal is also known as the 'City of Lakes' owing to the numerous water bodies that dot its landscape. Nearly 23 per cent of the land in the city is protected under forests and waterbodies.

The city began as a guardian settlement along its largest waterbody, the 36-sqkm Upper Lake, in the eleventh century and witnessed numerous phases of development before growing into the multi-functional city that it is today. The old city

has retained several of its heritage structures, a palimpsest of the successive historical phases.

In 1984, the city was struck by one of the worst industrial disasters in human history owing to a gas leak from the pesticide factory of Union Carbide India Limited[2]. It claimed close to four thousand lives and caused permanent injuries to over half a million people, which was more than 60 per cent of the population of the city at the time.[3]

The population of the city, as per the Census of 2011, stands at 1.79 million and is projected to have grown to 2.37 million by 2020. It is spread over an area of over 417 sqkm. However, the Bhopal Capital Region constitutes a much larger area comprising the nearby towns of Hoshangabad, Sehore, Obedullaganj, Mandideep, Itarsi, and Vidisha, which are largely dependent on the city of Bhopal for economic opportunities and improved services.

The Bhopal Municipal Corporation (BMC) is the principal urban local body in the city, which is layered within the three-tiered federal

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2   Dutta, Prabhash. "Bhopal gas tragedy: What had happened this day 33 years ago that killed thousands?". Dec 3, 2017. https://www.indiatoday.in/india/story/bhopal-gas-tragedy-what-had-happened-this-day-33-years-ago-that-killedthousands-1099247-2017-12-03

3   Ibid.

set up mandated by the Indian Constitution through the 74th Constitutional Amendment. The second and first tiers are constituted by the State Government of Madhya Pradesh and Government of India, respectively. BMC has been established under the provisions of a state legislation in Madhya Pradesh, referred to as the Madhya Pradesh Municipal Corporation Act, 1956.

Figure 1: City profile

ULB Area/City Area
Sq.Km: **417**

Number of households in 2020
Nos. **4,37,000**

Population (2011 Census)
Nos. **17,98,218**

Female Population
Nos. **8,62,050**

Male Population
Nos. **9,36,168**

Projected Population for 2030
Nos. **36,00,000**

Number of wards
Nos. **85**

Population living in slums
Nos. **5,68,424**

Total households in slums
Nos. **1,56,246**

Income per capita (as per state estimates from 2015-16)
Nos. **96,055**

Literacy Rate
% **85.2**

Source: Bhopal City Profile and Diagnostics Report, UN-Habitat India.
https://www.unhabitat.org.in/sciap-publications/city-profile-and-diagnostic-report---bhopal

1.1 Socio-economic Profile

Madhya Pradesh is among the five most populous states of India and the second largest in terms of area. The state government implemented the Population Policy 2000 with the aim of bringing down the fertility rate as well as maternal and child mortality rates. Bhopal's population grew from 1.06 million in 1991 to 1.79 million in 2011, while the municipal area grew from 71.23 sqkm to 417 sqkm during the same period [4].

The sex ratio of the population of Bhopal stood at 920, below the national average of 940 as per Census 2011. Meanwhile, over 35 per cent of the population were dependent (0-14 years and above 65 years) on 65 per cent of the population who were in their working age (15-64 years). The youth population (15-34 years)[5] comprised 39.1 per cent of the city's total population. The Workforce Participation Rate (WPR) stood at 34.2 per cent in 2011, lower than the state WPR of 46.6 per cent as per Census 2011. This could be attributed to the low female participation in the workforce (a mere 18.4 per cent as per Census 2011)[6]. The female workforce participation trends in Bhopal were higher than the national trend, where the same in urban India stood at 15.4 per cent in 2011. Most of the city's population worked in the service sector (see Figure 2)[7].

Figure 2: Socio-economic profile of Bhopal city

Age Sex Pyramid

Age Group (in years)	Female	Male
65+	48,705	48,165
40-64	2,15,201	1,91,409
15-39	4,62,512	4,30,547
0-14	2,71,687	2,48,825

Population

Sex Ratio

920

Age Cohort

0-14: 27.2%
15-64: 65.1%
65+: 7.7%

Workforce Participation Rate

Male: 74.8%
Female: 18.4%
Total: 34.2%

Distribution of Workforce by Occupation

Service/Tertiary Sector: 95.4%
Household Industry Workers: 3%
Agricultural Labourers: 1%
Cultivation: 1%

Source: Census of India, 2011

4   Census of India 2011
5   Central Statistics Office (CSO), Ministry of Statistics and Programme Implementation (MoSPI), GoI (2017), considered the youth category as the population group to be between 15-34 years.
6   Census of India, 2011
7   Ibid.

Figure 3: Sector-wise GVA (in INR lakh) of Bhopal District at Current Prices (2016-17).

Primary Sector

Mining & quarrying	5,81
Fishing & aquaculture	27,27
Forestry & logging	15,435
Livestock	79,064
Crops	1,55,004

Secondary Sector

Construction	3,97,693
Electricity, gas, water supply & other service utilities	64,646
Manufacturing	4,47,704

Service Sector

Other services	1,98,603
Public administration	3,38,601
Real estate, ownership of dwelling & professional services	1,49,988
Financial services	2,84,795
Communications & services related to broadcasting	1,24,874
Railways	39,176
Transport by other means & storage	1,25,668
Trade, repair, hotels & restaurants	4,29,269

Source: Estimates of District Domestic Product, Madhya Pradesh, 2019.

The service sector (public administration, banking, telecommunication, healthcare, etc.) formed the major share of the city's economy, contributing 71 per cent to the total Gross Value Added (GVA)[8] of Bhopal District[9]. Meanwhile, the agriculture and manufacturing sectors contributed 6.2 per cent and 22.6 per cent of the total GVA, respectively.

1.2 GHG Emissions Profile

In 2015-16, Bhopal[10] emitted a total of 36,60,161 Mt CO2-eq from stationary energy, transportation, waste, industrial processes and product use (IPPU), and the agriculture forestry and other land use (AFOLU) sectors. The total CO2, CH4 and N2O emitted were 27,67,923 Mt, 27,286 Mt, and 484 Mt, respectively. Emissions under Scopes 1, 2, and 3 are summarized in Figure 4.

Emissions from stationary energy were the highest contributors of GHGs, accounting for 56 per cent of Bhopal city's total emissions. The transportation sector emitted 19 per cent and the AFOLU sector 15 per cent of the total GHG emissions in the city. Emissions from the IPPU sector were zero as there are no industries that can be classified as such in Bhopal.

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8   As per the Estimates of District Domestic Product, Madhya Pradesh, 2019, issued by the Directorate of Economics & Statistics, the GVA for Bhopal District in 2015-16 was INR 16,77,425 lakh at current prices.

9   The city level disaggregated data is not available.

10 Disaggregated figures for the city are not available. Data for Bhopal District in the Estimates of District Domestic Product, Madhya Pradesh, 2019, are used instead.

Figure 4: GHG emission profile of Bhopal for 2015-16
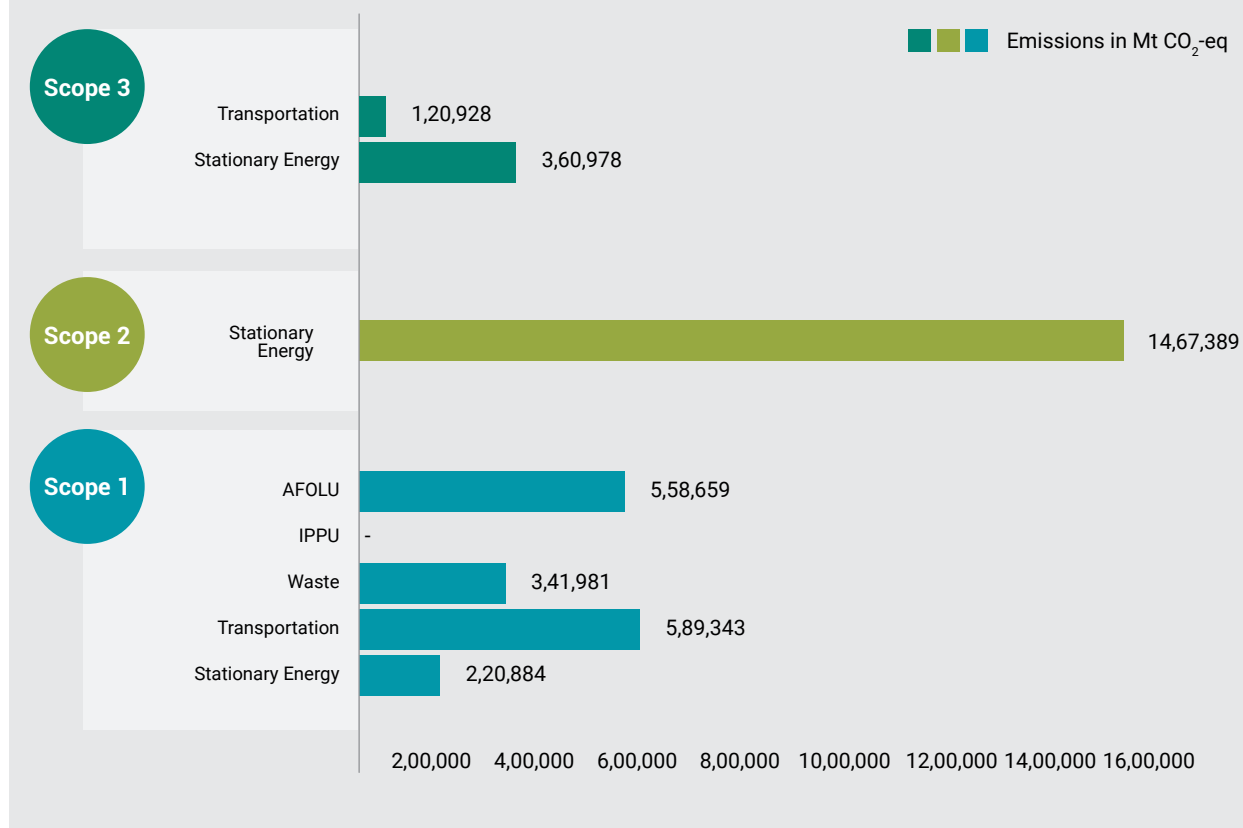
Source: United Nations Industrial Development Organization (UNIDO)

1.3 Urban Transformation

The initial impetus for urbanization came from the establishment of a major public sector manufacturing unit (Bharat Heavy Electrical Limited) in the city in the postcolonial era. Between 1951-61, Bhopal witnessed a 120 per cent decadal growth in its population[11]. The growth of the city continued in subsequent decades with the consolidation of economic activities around public sector manufacturing. The built-up area of the city stood at 26.3 sqkm in 1975 against a population of 3.84 lakh.

The built-up area had increased from 68.6 sqkm in 2000 to 107.8 sqkm in 2018 (see Map 2). The city area underwent an expansion in 2014 with the merger of Kolar Town Municipality with the Bhopal Municipal Corporation area, bringing the total area of the city to the current 417 sqkm. As per the existing land use analysis in the Draft Bhopal Development Plan 2031, around 87.63 sqkm of land (20 per cent of the city area) is undeveloped as per the proposals notified under the Bhopal Development Plan 2005[12].

The gross population density of BMC in 2020 was 56.8 Persons Per Hectare (PPH)[13]. The low net population density could be attributed to the predominance of the natural elements (forest areas, water bodies) in the municipal area. Of the total area, close to 98 sqkm is occupied by protected natural features. If the developable area of 319 sqkm within the municipal area is

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11 Bhopal Development Plan, 2005.

12 UN-Habitat India. "Bhopal City Profile Diagnostic Report". August 2021. https://www.unhabitat.org.in/sciap-publications/city-profile-and-diagnostic-report---bhopal

13 Ibid.

solely considered, the net population density of the city is 60.2 PPH. As per UN-Habitat's principles for sustainable urbanization, a minimum density of 150 PPH is desirable for optimal urban development [14]. The population density in similar Indian cities hovers close to that of Bhopal: it is 58 PPH in Guntur (Andhra Pradesh) and 62.85 in Jaipur (Rajasthan). However, with a population density of 102

PPH and 167 PPH, Mysuru (Karnataka) and Vijayawada (Andhra Pradesh), respectively, do much better than Bhopal. Just as in these cities, the population density varies steeply across Bhopal; while the densest pockets of the city could have a density as high as 1,003 PPH, over 60 per cent of the municipal area has a density of less than 150 PPH (see Map 1)[16].

Map 1: Ward-wise population density distribution in Bhopal.

Source: UN-Habitat India.

14 UN-Habitat. "A New Strategy of Sustainable Neighbourhood Planning: Five principles - Urban Planning". 2014. https://unhabitat.org/five-principles-of-neighbourhood-design
15 Sourced from the City Profile and Diagnostics report for the respective cities published by UN-Habitat India as part of its Sustainable Cities Integrated Approach (SCIAP) project: https://www.unhabitat.org.in/sciap-publications/
16 UN-Habitat India. "Bhopal City Profile Diagnostic Report". August 2021. https://www.unhabitat.org.in/sciap-publications/city-profile-and-diagnostic-report---bhopal
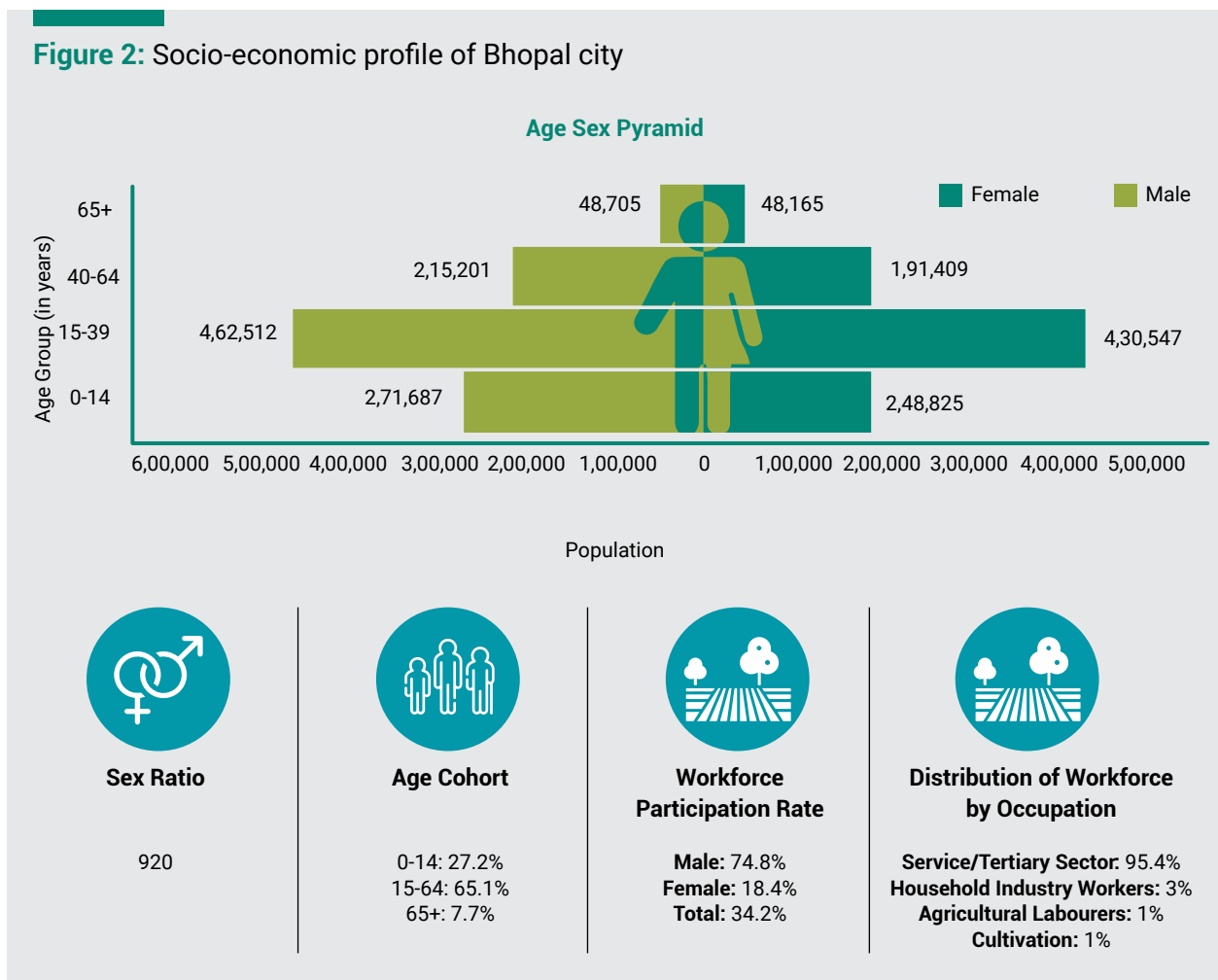
The spatial development pattern of the city is illustrated in **Map 2**

Map 2: The spatial development pattern of Bhopal.

1975
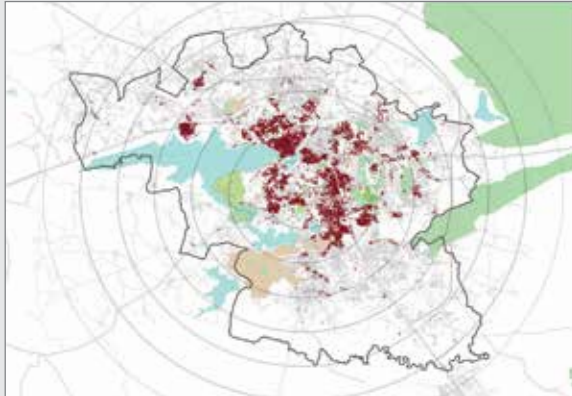
Area: 26.3 sq. km.
Population: 3.84 lakh

2000
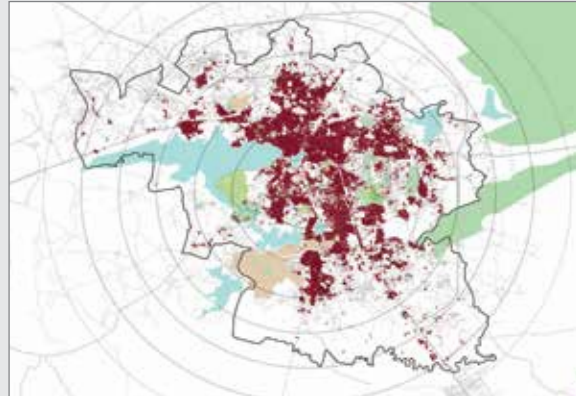
Area: 68.6 sq. km.
Population: 14.5 lakh

1990
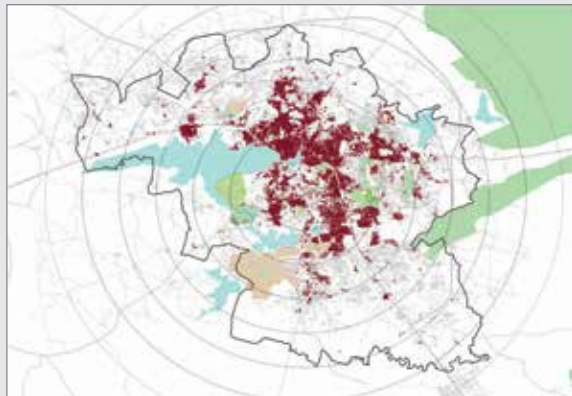
Area: 44.5 sq. km.
Population: 10.62 lakh

2014
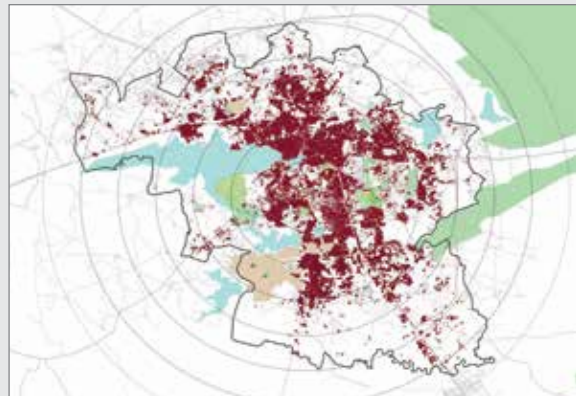
Area: 86.7 sq. km.
Population: 17.9 lakh

2018
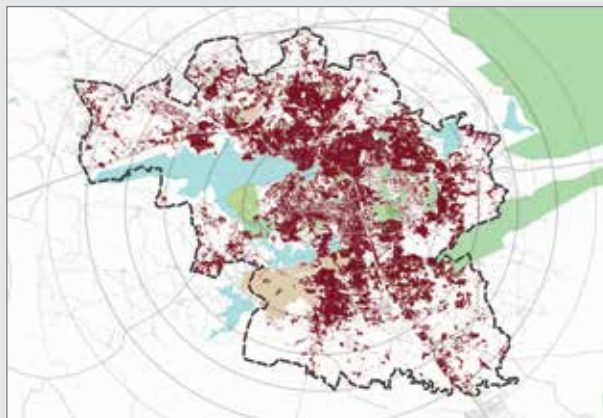
Area: 107.8 sq. km.
Population: 19.23 lakh

Source: Multitemporal information layer on built-up presence as derived from Landsat image collections (GLS1975, GLS1990, GLS2000, and ad-hoc Landsat 8 collection 2013/2014, GHSL (10m) Sentinel-2 imagery 2018)

1.4 Governance Structure

The 74th Constitutional Amendment Act of 1992 conferred a constitutional status on urban local bodies in India. [17] The amendment mandated the direct election of municipal members or councillors by the people of a municipal area, constitution of ward committees, affirmative action for marginalized groups, five-year term of office, among other conditions, making democratic urban local government a constitutional obligation of the state governments[18]. The Mayor serves as the elected head of the city government and is either directly or indirectly elected depending upon state legislation. The BMC comprises an elected wing and an executive wing (see organogram in Figure 5). The elected wing is headed by the Mayor and is structured on the lines of a 'Mayor-in-Council' system[19,20]. The general body, comprising councillors elected from wards across the city, elects the Mayor. The Mayor-in-Council is constituted by the Mayor and comprises up to 10 councillors, who further form sub-committees among themselves. The Speaker, who is elected by the Mayor and other councillors, constitutes Advisory Committees, which pertain to the executive departments of BMC, comprising of councillors other than those in Mayor-in-Council. The Mayor further nominates ward committees representing territorial wards of the city.

All executive functions, however, are vested in the Municipal Commissioner who is appointed by the state government and is usually an officer of India's higher civil services (Indian Administrative Service) in the case of large municipal corporations like Bhopal. The Commissioner has a team of other municipal officers comprising of Additional Commissioners, City Engineer, Deputy Commissioners, and other executive officers as well as engineers who comprise the executive wing of BMC (Figure 5)[21,22]. For electoral and administrative purposes, the city is divided into 17 administrative zones which are further divided into 85 wards.

While municipal service delivery is the responsibility of the Bhopal Municipal Corporation, it works in conjunction with a range of agencies whose mandate overlaps with the functioning of the city. For example, the Bhopal Development Authority is an apex authority for planning and

Figure 5: Organogram of Bhopal Municipal Corporation.
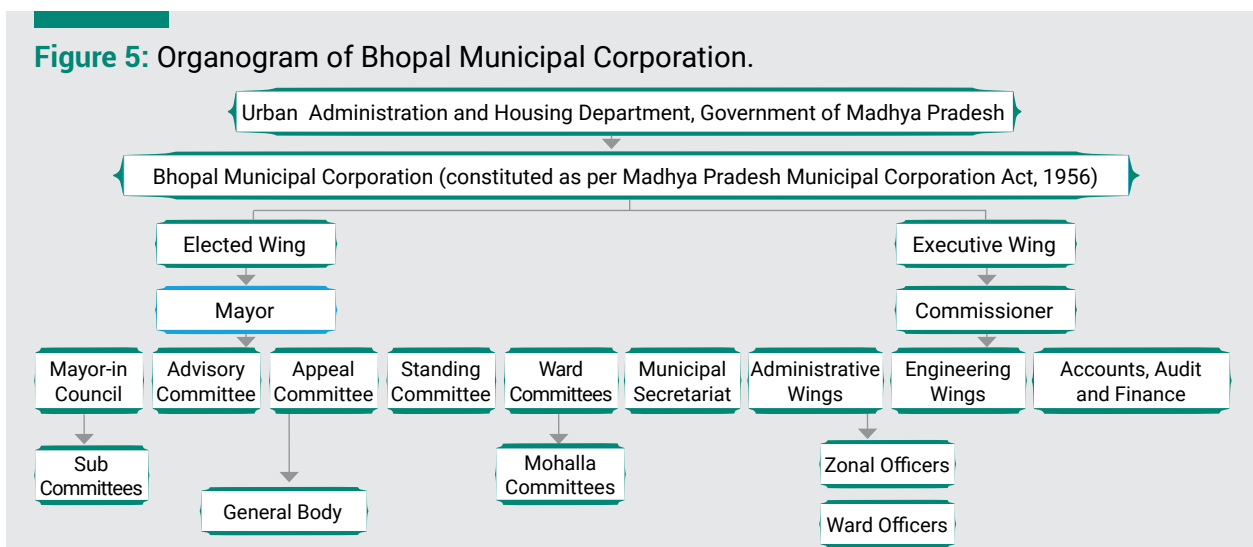
Source: Compiled by UN-Habitat India from Madhya Pradesh Municipal Corporation Act, 1956 and Bhopal City Development Plan, 2006

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17 The constitutional amendment added the 12th Schedule to the Indian constitution which places eighteen functional subjects within the purview of an urban local body. Government of India. "The Constitution (Seventy-fourth Amendment) Act, 1992". https://www.india.gov.in/my-government/constitution-india/amendments/constitution-india-seventy-fourth-amendment-act-1992 (accessed on Dec 28, 2022).

18 Ibid.

19 Bhopal Municipal Corporation. "Bhopal City Development Plan". 2006. http://www.indiaenvironmentportal.org.in/files/Bhopal%20CDP_Final%20.pdf (accessed on Jan 5, 2023)

20 Government of Madhya Pradesh. "Madhya Pradesh Municipal Corporation Act, 1956" https://www.janaagraha.org/asics/report/Madhya-Pradesh-Municipal-Corporation-Act-1956.pdf

21 Government of Madhya Pradesh. "Efficacy of Implementation of 74th Constitutional Amendment Act in Madhya Pradesh". https://www.mpenagarpalika.gov.in/irj/portal/anonymous/qlAboutuaddpalika (accessed on Dec 28, 2022)

22 Bhopal Municipal Corporation. "Bhopal City Development Plan". 2006. http://www.indiaenvironmentportal.org.in/files/Bhopal%20CDP_Final%20.pdf (accessed on Jan 5, 2023)

co-ordination in the Bhopal city region under the statutes of the Bhopal Development Authority Act, 1974, enacted by the state of Madhya Pradesh. The roles and responsibilities of the key stakeholder departments in Bhopal as well as an institutional map of the city are illustrated in Figure 6 and Figure 7, respectively[23,24].

Figure 6: Roles and responsibilities of stakeholder departments in Bhopal.

S. No	Organization	Key roles and responsibilities in Bhopal
1	Bhopal Smart City Development Corporation Limited (BSCDCL)	An SPV created to develop, finance, and implement the Bhopal Smart City projects. Under smart city projects, various area-based development projects and pan city development projects are being developed. Public bicycle sharing, free Wi-Fi in public spaces, and smart traffic management are some of the key activities.
2	Bhopal City Link Limited (BCLL)	Responsible for managing the public transportation fleet in the city. BCLL maintains the city bus terminals and transit stops; and operates the bus depot and workshops for maintenance of the buses.
3	Capital Project Administration (CPA)	A parastatal body set up to implement and monitor projects in the administrative capital area of the city, which includes maintenance of government buildings, and maintenance of gardens and parks in the area.
4	Bhopal District Collectorate	Plays a key role in disaster management, public distribution, and civil supplies, monitoring, and implementation of various social welfare programmes.
5	Madhya Pradesh Police Department	Maintains law and order enforcement, and public safety in the city. Besides police stations, the city has special branches for women, traffic control, cyber security, crime records and intelligence gathering. The traffic wing handles road safety, vehicular traffic regulation and management.
6	Public Health Engineering Department (PHED)	Responsible for the investigation, design, and execution of sewerage schemes in ULBs across the state. In Bhopal, PHED jointly executes projects related to underground sewerage with BMC.
7	Madhya Pradesh Urban Development & Housing Department (MPUDH)	Nodal agency for urban development and monitoring ULBs in the state.
8	Madhya Pradesh State Disaster Management Authority (MPSDMA)	A statutory body created under the provisions of the Disaster Management Act, 2005, responsible for activities related to community safety, rescue activities, developing SOPs, multi-hazard risk management, and disaster response in the city.
9	Madhya Pradesh Pollution Control Board (MPPCB)	Responsible for prevention, control, and monitoring of various forms of pollution, such as air, water, land and noise, to improve the quality of the environment in the state by effective implementation of environmental laws. The MPPCB Bhopal regional office works in tandem with BMC in various aspects related to waste management and environmental improvement.
10	Environment Planning and Coordination Organisation (EPCO)	An autonomous organisation set up to advance the capacity of environmental management and protection in the state. EPCO assists and advises the State Government on environmental policy and planning. Appraisal of development projects, environment and sustainability research, and capacity building are the main mandates of the organisation.
11	Madhya Pradesh Forest Department	Responsible for the preservation and monitoring of state forests, national parks, and wildlife sanctuaries in the state.
12	Madhya Pradesh Metro Rail Corporation (MPMRC)	Responsible for the construction of the Bhopal Metro. The construction of phase-1 of the project is ongoing.
13	Madhya Pradesh State Industrial Development Corporation (MPSIDC)	The nodal agency for all industrial promotional activities in the state. Planning and managing all industrial estates in the state is a major mandate.
14	Madhya Pradesh Madhya Kshetra Vidyut Vitaran Company Limited (MPMKVVCL)	Provides electricity supply for the central region of the state, including Bhopal. Implements national and state flagship missions to promote alternative sources of energy in the city.
15	Bhopal Development Authority (BDA)	It is an apex body for planning and co ordination of development activities in Bhopal and nearby areas. It was constituted in 1976 and is responsible for key projects aimed at developing new growth centres.

Source: Government of Madhya Pradesh.
https://www.mpenagarpalika.gov.in/irj/portal/anonymous/qlAboutuaddpalika

23 Government of Madhya Pradesh. "Efficacy of Implementation of 74th Constitutional Amendment Act in Madhya Pradesh". https://www. mpenagarpalika.gov.in/irj/portal/anonymous/qlAboutuaddpalika (accessed on Dec 28, 2022)
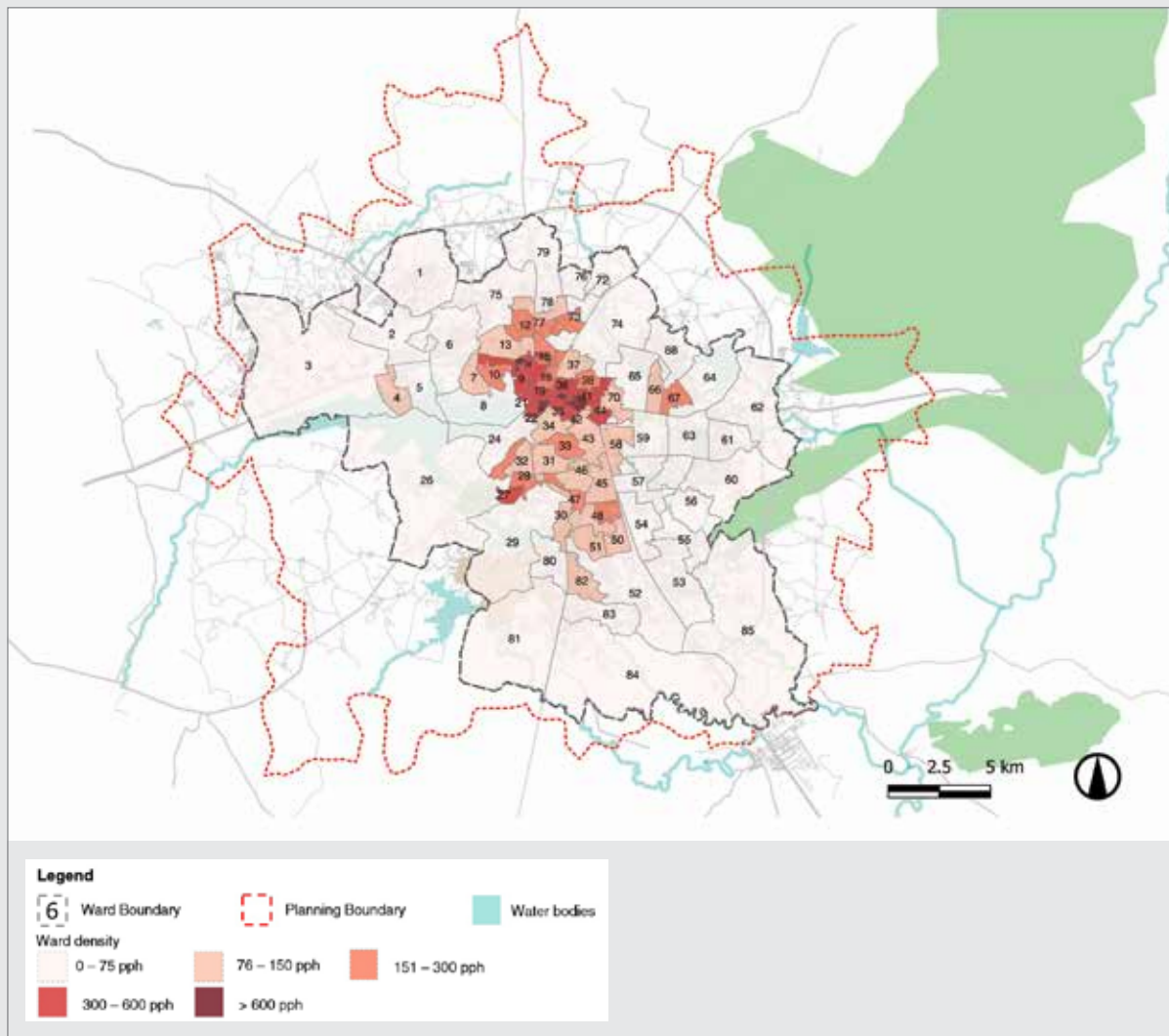24 UN-Habitat India. "Bhopal City Profile Diagnostic Report". August 2021. https://www.unhabitat.org.in/sciap-publications/city-profile-and-diagnostic-report—bhopal

Figure 7: City institutional map
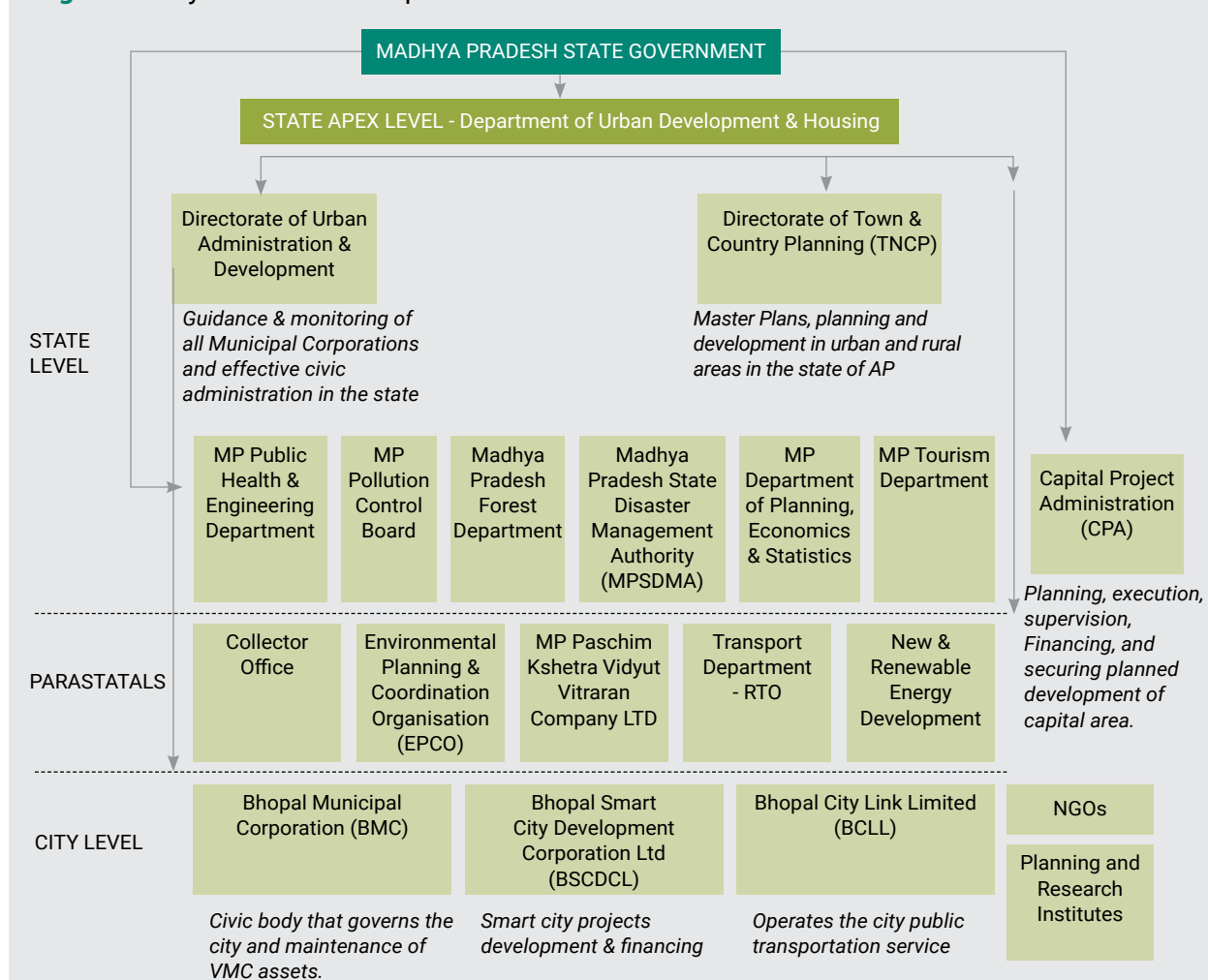
Source: Government of Madhya Pradesh and UN-Habitat India.
https://www.unhabitat.org.in/sciap-publications/city-profile-and-diagnostic-report---bhopal

1.5 City Financial Overview

The total revenue of BMC increased from INR 817.32 crore in 2016-17 to INR 996.19 crore in 2020-21, which amounts to a Compound Annual Growth Rate (CAGR) of 4.04 per cent over the five-year period[25,26]. The sources of BMC's revenue are represented at Figure 8. While close to 25 per cent of the revenue was received as grants in 2020-21, own sources of revenue contributed around 43 per cent of the total revenue receipts. The robust financial health of the municipal body is indicated by a growth

of 5.77 per cent in own revenue as opposed to a growth of only 1.81 per cent in grants over the 2016-21 period. Meanwhile, the assigned revenue grew by 2.93 per cent in the same period[27].

The share of expenditures of BMC are depicted in Figure 9. The establishment expenses constituted 39 per cent of the total expenditure in 2020-21.[28] The next major component of BMC's expenditure includes O&M expenses with a 33 per cent share in the same period. Of the total expenditure on establishment, O&M, and interest costs, over

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25 The financial statements of Bhopal Municipal Corporation pertaining to the period 2016-21. Available at http://www.bhopalmunicipal.com/corporation/financial-statement.html
26 This section draws its template of analysis from a report submitted to the 15th Finance Commission; Indian Institute for Human Settlements (IIHS), "Draft Final Report: Study for the XV Finance Commission on Urban Infrastructure and Resilience" (2022).
27 The "assigned revenue" received by BMC includes the following: stamp duty on transfer of properties, compensation in lieu of octroi, and compensation in lieu of passenger tax.
28 Establishment expenses include salaries, pensions, bonuses, benefits and allowances, etc.

Figure 8: Break-up of the revenue receipts of Bhopal Municipal Corporation (in INR Crore).

Legend: Own Revenue (Tax & Non-Tax), Assigned Revenue, Revenue Grants, Investment/Interest/FD, Other

Source: Financial statements of BMC available at http://www.bhopalmunicipal.com/corporation/financial-statement.html
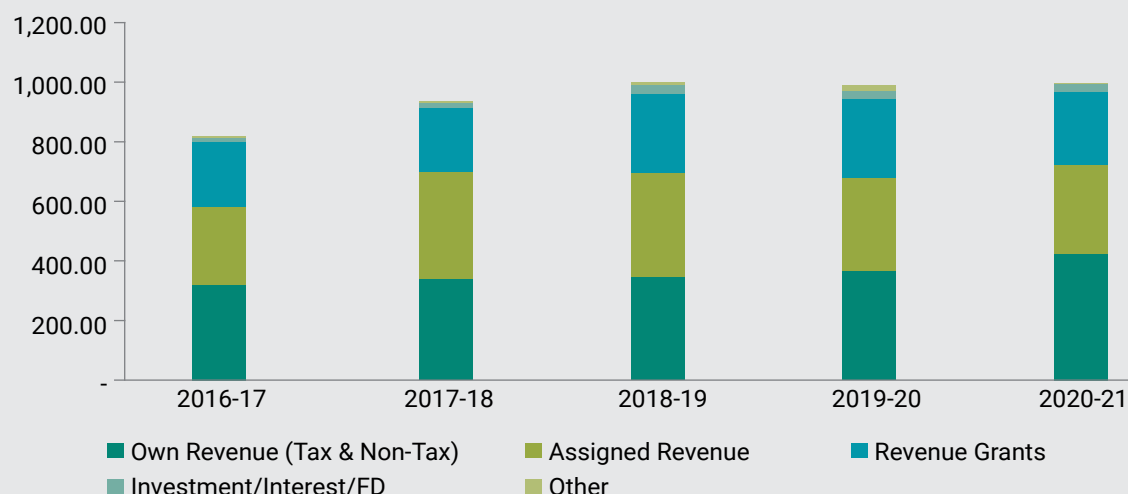
63 per cent could be covered from BMC's own sources of revenue in 2020-21, indicating the importance of working towards financial self-sufficiency[29]. However, it may be noted that BMC does better on this parameter than most similar urban local bodies (ULBs) who struggle to cover even half of such costs from their own sources of revenue[30]. The share of establishment and O&M expenses that may be covered by own sources of revenue could be as low as 30 per cent in the case of some ULBs of similar size[31].

Owing to sound financial flows, BMC managed to issue a municipal bond in 2019 worth INR 175 crore (approximately USD 21.17 million) that is rated 'AA' (stable) by two separate credit rating agencies, Brickwork and ACUITE.[32] The 'AA' rating was reaffirmed in 2022[33].

Figure 9: The components of the expenditure of Bhopal Municipal Corporation (in INR Crore).

Legend: Establishment Expenses (Salaries & Benefits), Administrative Expenses, O&M, Interest and Finance Expenses, Depreciation, Other

Source: Financial statements of BMC available at http://www.bhopalmunicipal.com/corporation/financial-statement.html
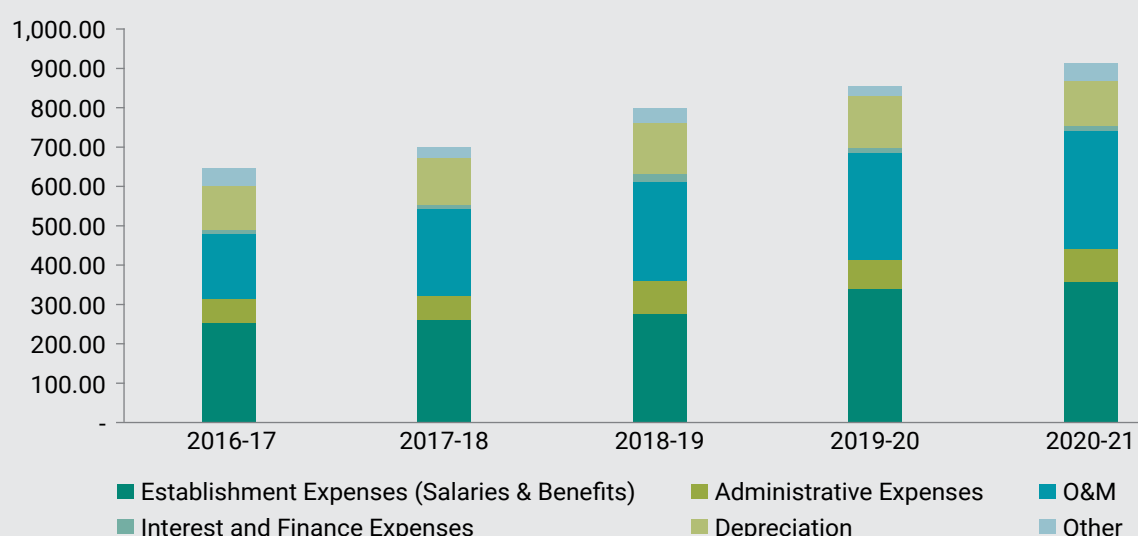
29 IIHS, "Draft Final Report: Study for the XV Finance Commission on Urban Infrastructure and Resilience" (2022).
30 Reserve Bank of India (RBI). "Report on Municipal Finances". November 2022. https://rbidocs.rbi.org.in/rdocs/Publications/PDFs/RMF101120223A34C4F7023A4A9E99CB7F7FEF6881D0.PDF
31 IIHS, "Draft Final Report: Study for the XV Finance Commission on Urban Infrastructure and Resilience" (2022).
32 ACUITE. "Press Release—Bhopal Municipal Corporation". Dec 2020. https://www.acuite.in/documents/ratings/revised/26866-RR-20201211.pdf
33 Brickwork Ratings. "Brickwork Ratings reaffirms the ratings for the Bonds/ Non-Convertible Debentures issue of Rs.175.00 Crores of Bhopal Municipal Corporation". Jan 2022. https://www.brickworkratings.com/Admin/PressRelease/Bhopal-Municipal-Corporation-19Jan2022.pdf

2
VOLUNTARY LOCAL REVIEW METHODOLOGY

VLR is a global movement to track and monitor the progress of SDGs in cities and at local and regional levels.[34] At least 75 VLRs have been published till date by as many different local governments across the world.[35,36] A VLR is an 'institutionally organic self-assessing document' that seeks to complement the reporting of respective national governments through its Voluntary National Review (VNR) to the High-Level Political Forum established by the UN as a mechanism to review the global progress of SDGs.[37] It is a way for local governments to break away from a siloed approach to complete the arc of progress on SDG localization from the national and sub-national to the local level.

Cities can use VLRs as accelerators for SDG localization. Localization of SDGs is a process for sub-national and local governments to adopt the 17 SDGs, and to establish means of implementing and monitoring them. The 17 SDGs include 169 targets. It is often mentioned that at least 65 per cent of the 169 targets could not possibly be achieved without engaging with the local urban stakeholders.[38]

Localization relates both to how the SDGs can provide a framework for local development policy as well as to how local governments can support the achievement of the SDGs through their grounded actions. Succeeding in accelerating sustainable development requires strong commitment and dedication from the city's decision-makers and the whole city organization. BMC and UN-Habitat signed an MoU on 5 July 2021, with an intent to prepare the country's first VLR and pave the way for a data driven approach towards a city's local action to achieve Agenda 2030.

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34 The SDGs are a collection of 17 interlinked global goals designed to achieve a better and more sustainable future for all. The SDGs were set up in 2015 by the United Nations General Assembly and are intended to be achieved by 2030. They are included in the UN General Assembly resolution (UN resolution A/RES/70/1), known as Agenda 2030. It calls on major groups and other stakeholders, including local authorities, to report on their contribution to the implementation of the SDGs. It is in the same spirit that local and regional governments are increasingly engaging in such sub-national reviews of SDG implementation, referred to as VLRs.
35 https://unhabitat.org/topics/voluntary-local-reviews
36 UCLG and UN-Habitat. "Guidelines for Voluntary Local Reviews Volume 2" (2021). https://unhabitat.org/guidelines-for-voluntary-local-reviews-volume-2-towards-a-new-generation-of-vlrs-exploring-the
37 UCLG and UN-Habitat. "Guidelines for Voluntary Local Reviews Volume 1" (2020). https://unhabitat.org/guidelines-for-voluntary-local-reviews-volume-1-a-comparative-analysis-of-existing-vlrs
38 Ibid.

Figure 10: Process of Localization of SDGs at the level of Bhopal City

| Global | Agenda 2030 and SDG | New Urban Agenda | Global Urban Monitoring Framework |

| NATIONAL | Ministry of Statistics and Programme Implementation | | NITI Aayog |
| | National Indicator Framework (INF) | | Voluntary National Review (VNR) |

State	Madhya Pradesh State Planning Commission		State SDG Cell
	Madhya Pradesh SDG Vision 2030		State SDG Action Plan
		District SDG Cells	

| CITY LOCAL | Bhopal Municipal Corporation | | Bhopal City SDG Advisory Group |
| | City SDG Framework | | Bhopal Voluntary Local Review (VLR) |

Among the different tools published by UN-Habitat to help local governments with SDG localization, including two volumes of guidelines published in 2020 and 2021, cities could draw from the Global Urban Monitoring Framework (UMF) which provides a data-centric approach to work with the New Urban Agenda (NUA) as a key driver for achieving the urban dimensions of the SDGs.[39] It offers an opportunity to unpack the NUA and accelerate the implementation of the SDGs, the Paris Agreement for Climate Change, Sendai Framework for Disaster Risk Reduction, and other urban-related global frameworks.

2.1 Localization of SDGs at the Country Level

The Government of India presented India's second VNR in 2020, which reported the progress on

Agenda 2030 and the 17 SDGs[40] 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)[41]. India's progress in terms of goal-wise performance is depicted in Figure 11. India's VNR emphasizes the horizontal and vertical integration of different stakeholders, charting a way for the creation of dedicated institutions at the sub-national level for implementing the SDGs in their own specific contexts.

39 UN-Habitat. "The Global Urban Monitoring Framework". 2022. https://unhabitat.org/the-global-urban-monitoring-framework
40 Government of India. "India Voluntary National Review 2020". June 2020. https://sustainabledevelopment.un.org/content/documents/26279VNR_2020_India_Report.pdf
41 Refer to the SDG India Index and Dashboard 2020-21 at https://sdgindiaindex.niti.gov.in/#/

SDG localization of India is undertaken by the Ministry of Statistics and Programme Implementation (MoSPI), which developed a National Indicator Framework (NIF) in 2018 to localize the global SDG goals to the Indian context. NIF is the backbone for facilitating 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.[43]

At the national level, NITI Aayog, an executive arm of the Government of India that specializes in public policy, has taken on the onus of 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 instrumental in providing strategic policy inputs to the Government of India.[44] The India SDG Dashboard is a unified data repository of the country's SDG targets—it has enabled the collection and analysis of data at disaggregated levels.[45] The SDG India Index includes a score range of 0-100 where a score of 100 signifies the achievement of Agenda 2030. Indian states are classified under four categories: Achiever (100), Front Runner (65-99), Performer (50-64), and Aspirant (0-49).

Figure 11: A visualization of India's progress on SDGs published by NITI Ayyog as part of SDG India Index and Dashboard 2020-21. The overall index score of the country is 66 out of 100.
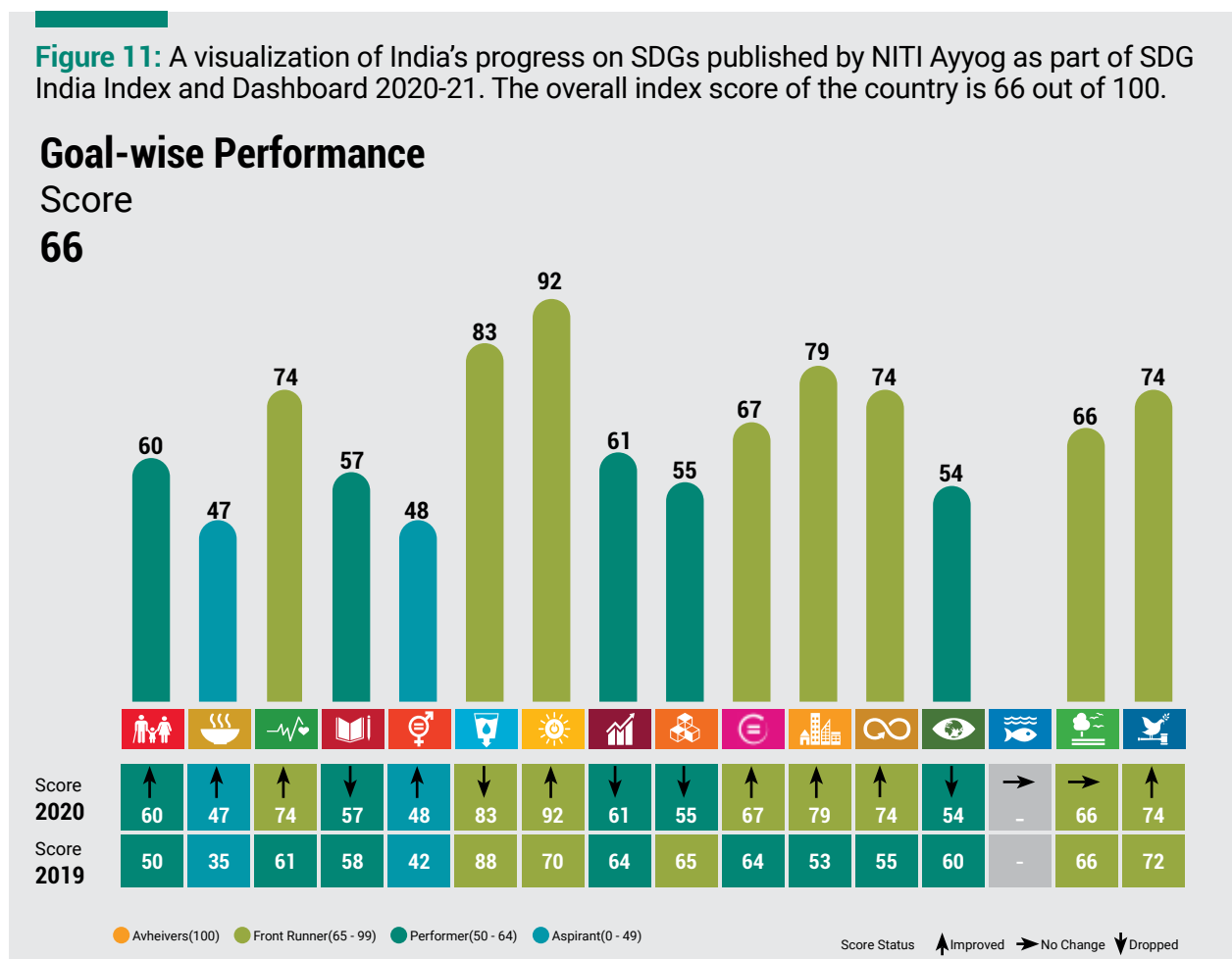
Source: https://sdgindiaindex.niti.gov.in/#/

42 https://www.mospi.gov.in/sustainable-development-goals-sdg
43 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
44 https://www.niti.gov.in/cooperative-federalism
45 https://sdgindiaindex.niti.gov.in/#/

2.2 Localization of SDGs in the State of Madhya Pradesh

The state has constituted an interdepartmental SDG cell to monitor the implementation of the SDGs and oversee relevant actions and programmes at the state level. The State Planning Commission of the Government of Madhya Pradesh has published an action plan titled 'SDG 2030 Action Plan'[46], whose indicators draw from those in the NIF published by MoSPI, NITI Aayog's SDG India Index, and include some state specific indicators as well.[47] The action plan clearly delineates the targets under each indicator with a schematic mapping of the departments and relevant developmental projects seeking to consolidate state level efforts towards the achievement of SDGs. The state ranked 17 among the 28 states in India in NITI Aayog's SDG India Index 2020. While the state is a frontrunner to achieve the targets under SDGs 6 (Clean Water and Sanitation), 7 (Affordable and Clean Energy), 11 (Sustainable Cities and Communities), 12 (Sustainable Consumption and Production), 15 (Life on Land), and 16 (Peace, Justice and Strong Institutions), it has plenty of ground to cover under SDGs 1 (No Poverty), 2 (Zero Hunger), 4 (Quality Education), 9 (Industry, Innovation and Infrastructure), and 13 (Climate Action).[48] Madhya Pradesh's performance in SDG India Index 2020 is depicted in Figure 12.

Figure 12: Madhya Pradesh ranked 17 out of the 28 states in India in NITI Aayog's SDG India Index 2020 with an index score of 62 out of 100.

	SDG 1	SDG 2	SDG 3	SDG 4	SDG 5	SDG 6	SDG 7	SDG 8	SDG 9	SDG 10	SDG 11	SDG 12	SDG 15	SDG 14	SDG 15	SDG 16
Score 2020	44 ↑	43 ↑	62 ↑	45 ↓	55 ↑	88 ↓	86 ↑	60 ↓	37 ↓	51 ↓	81 ↑	78 ↑	49 ↑	– →	84 →	66 ↑
Score 2019	40	24	50	54	45	92	62	67	44	68	55	58	47	–	94	63

Rank **17** | Score **62**

Avheivers(100) | Front Runner(65 - 99) | Performer(50 - 64) | Aspirant(0 - 49)

Score Status: ↑ Improved → No Change ↓ Dropped

Source: https://sdgindiaindex.niti.gov.in/#/
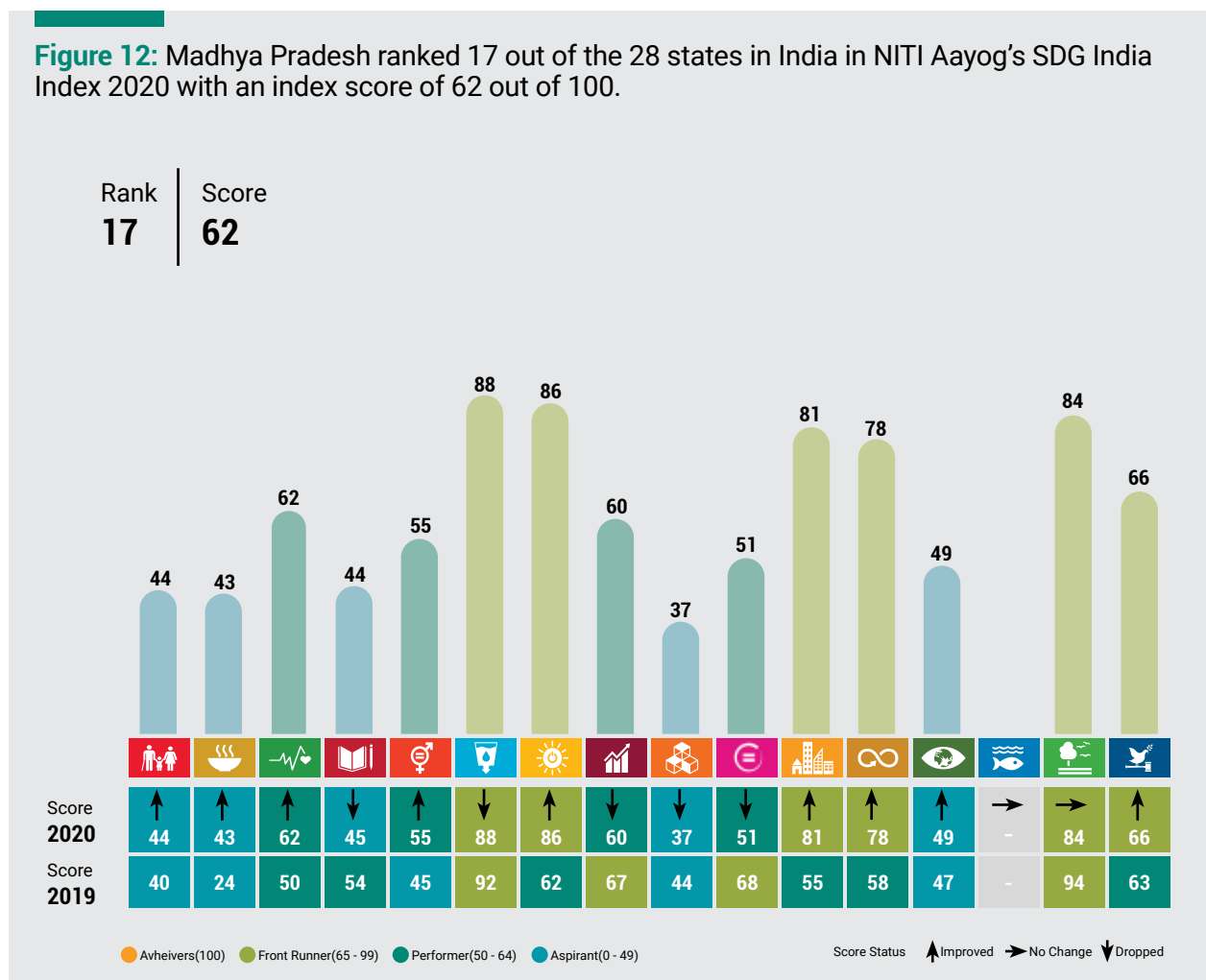
46 State Government of Madhya Pradesh. "Sustainable Development Goals State Action Plan Volume I". 2018. https://mpplanningcommission.gov.in/SDG2030_new/Volume1.pdf
47 Ibid.
48 https://sdgindiaindex.niti.gov.in/#/

The State Government of Madhya Pradesh has also published 'SDG Vision 2030', prepared by the interdepartmental SDG cell constituted within the State Planning Commission. This vision document categorizes the relevant SDG indicators into six pillars: People (SDGs 2, 3 and 4), Planet (SDGs 6, 12, 13, 14, and 15), Prosperity (SDGs 7, 8, 9, 10 and 11), Dignity (SDGs 1 and 5), Justice (SDG 16) and Partnerships (SDG 17).[49]

Further, the state has established an SDG cell in each of its 52 districts with the respective District Collector as the chairperson to facilitate coordination of government agencies and monitor the implementation of its action plan.[50]

2.3 Localization of SDGs in Bhopal

This VLR report reflects the commitment of BMC towards localizing Agenda 2030 and tracking the progress of the city's development initiatives in achieving the SDGs. The process attempts to establish vertical convergence of national, sub-national and local efforts towards SDG implementation and initiate a dialogue between inter-governmental agencies. The VLR preparation involves processes that are important for Bhopal to review its progress toward delivering Agenda 2030. In line with this objective, the framework of Bhopal's VLR was established to guide in structuring its delivery and to galvanize support for its implementation.

The Agenda 2030 and the 17 SDGs sit atop 169 targets and 240 indicators that were envisioned to form the global reference for SDG localization. Similarly, as discussed in the earlier section, India has localized the SDGs and has prepared the NIF (286 indicators), which draws relevance with SDGs in the Indian context. A framework was created by combining the global and national frameworks to capture and report the multi-dimensional progress at the city level, using a mix of qualitative and quantitative approaches. Consultations

with government agencies, citizen groups, and subject experts were carried out to formulate the methodology and identify the indicators for VLR reporting. Continuous stakeholder engagement was an integral part of the multi-layered VLR process in Bhopal.

2.3.1 Stakeholder Consultation

BMC constituted a core group, the SDG advisory group, of representatives from different departments of the ULB as well as the utilities serving the city, such as the public transport operator, Bhopal City Link Limited (BCLL). A list of the members of BMC's SDG advisory group is included in Annexure 2. The group's first meeting was held on 8 April 2022. It was instrumental in providing the data for this present VLR and has continued to deliberate ways to institutionalize the SDGs within the local government. The members of the group have worked to build partnerships internally and externally for SDG localization in Bhopal. At least 17 different departments were engaged as part of the VLR process whose outputs reflect in the subsequent sections of the report. In addition, at least five other government entities with a role in the governance of the city were consulted, including parastatals and special purpose vehicles (SPVs) such as the Bhopal Smart City Development Corporation Limited (BSCDCL), and the Collector's office. Consultations with the local elected representatives and people's groups were continually held and facilitated by the advisory group. Using the inputs from different stakeholders, a two-pronged VLR methodology was worked out (see Section 2.3.2 for details). The methodology and the findings of the report were subsequently presented during a stakeholder consultation workshop held on 9 January 2023 for further feedback and comments from a diverse set of stakeholders. The programme note issued by BMC inviting participants to the workshop is included in Annexure 3.

The Mayor of Bhopal, Smt. Malti Rai, presided over the stakeholder consultation workshop in the presence of the Commissioner of BMC,

49 State Government of Madhya Pradesh. "SDG Vision 2030". 2018. https://mpplanningcommission.gov.in/SDG2030_new/VISION2030.pdf
50 State Government of Madhya Pradesh. "Sustainable Development Goals State Action Plan Volume I". 2018. https://mpplanningcommission.gov.in/SDG2030_new/Volume1.pdf

Shri KVS Choudary. Held in hybrid mode (online and offline), the workshop participants included other local elected representatives of Bhopal, officials of BMC, and other city-based stakeholders.

The participants were provided their inputs on the VLR framework, which were used to refine the methodology and update the mapping of projects presented later in this report.

Image 1: Bhopal City Mayor Malti Rai presided over the stakeholder consultation workshop, in the presence of BMC Commissioner KVS Choudary, to review the framework of Bhopal VLR. Picture credit: UN-Habitat

Image 2: The stakeholder consultation workshop was held in hybrid mode (offline and online) and attended by other local elected representatives, officials, and other city-based stakeholders. Picture credit: UN-Habitat.
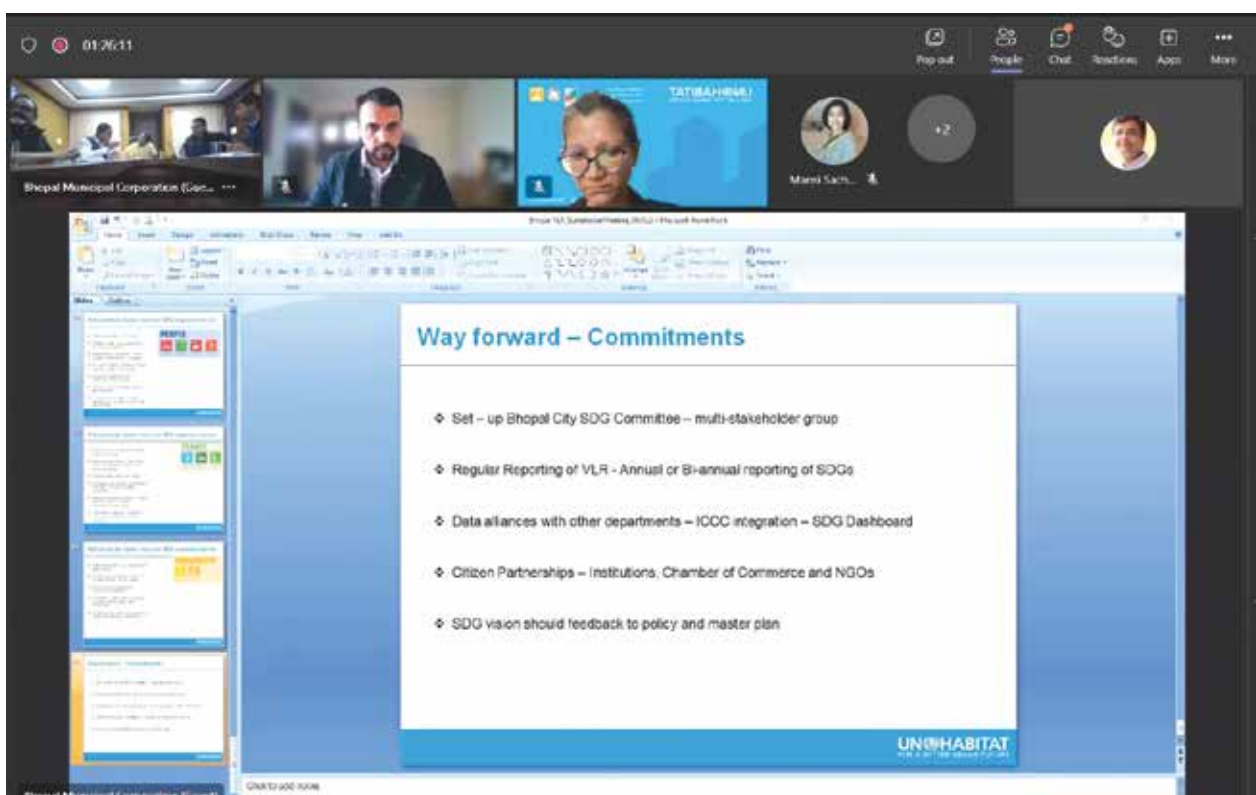
> " The process of Voluntary Local Review has proven to be a useful tool to provide direction to the developmental work being done in the city of Bhopal. Sustainable Development Goals are an integral part of my vision for the city's future. As a community, Bhopal is committed to the objectives of Agenda 2030, and we pledge to work tirelessly in the coming years to achieve the goals. I hope that this VLR enables us to showcase our work internationally and access platforms where we can learn from the global best practices.
>
> **MALTI RAI, CITY MAYOR**

> " It is a matter of immense pride and satisfaction that Bhopal is leading the movement to localize the SDGs at the city level in India. We welcome the findings of the VLR process. We have sought to expand the ambit of review by including as many schemes and initiatives of BMC as possible. The flexibility of the VLR process has allowed us to work around various constraints to do a thorough review of where we stand with respect to the Sustainable Development Goals. We will endeavour to use the VLR as a platform to engage with the people of Bhopal to create a sense of collective ownership that can accelerate the city's progress on SDGs.
>
> **KVS CHOUDARY, COMMISSIONER, BMC**

2.3.2 Report Methodology

First, various policies, schemes and projects— ongoing, completed or planned in the years 2015-2023—**are linked to Agenda 2030.** The linkages are mapped through a thematic clustering of the city's policies, schemes, and projects in a narrative form against the three key pillars of Agenda 2030: people, planet and prosperity. In doing so, the VLR follows the Madhya Pradesh 'SDG Vision 2030', which categorizes SDG indicators into the following pillars: people (SDGs 2, 3 and 4), planet

(SDGs 6, 12, 13, 14, and 15), prosperity (SDGs 7, 8, 9, 10 and 11), dignity (SDGs 1 and 5), justice (SDG 16) and partnerships (SDG 17)[51]. The pillars of 'people, planet and prosperity' are mobilized in this report as a heuristic for a qualitative analysis of the city's initiative. Select indicators are included under the three pillars as per their suitability to the level of analysis and the municipal context of the VLR: SDGs 1, 3, 4 and 5 are considered under 'people' (SDGs 1 and 5, included under 'dignity' in the state's 'SDG Vision 2030', are merged with 'people'),

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51 Government of Madhya Pradesh. "SDG Vision 2030". 2018. https://mpplanningcommission.gov.in/SDG2030_new/VISION2030.pdf

SDGs 6, 13 and 15 are considered under 'planet', and SDGs 7, 8 and 11 are considered under 'prosperity'. SDG 11 is taken up for an in-depth quantitative assessment in the latter half of the VLR analysis. The first step is prefaced with the mapping of the city's goals to the SDGs using the various ongoing, completed or planned initiatives pertaining to the period 2015-2023. A total of 56 such initiatives were mapped to the SDGs chosen under 'people, planet and prosperity'. Annexure I demonstrates the alignment of the projects taken up for thematic clustering and narrative description with the relevant targets as well as the indicators in the NIF under the respective SDGs.

Second, SDG 11 (Sustainable Cities and Communities) **is taken up for an in-depth review through quantitative assessment of city level indicators.** SDG 11 is vital to realizing policy objectives of the city and has important linkages with other SDGs. The quantitative assessment of the city's progress on SDG 11 is made possible through the available disaggregated data. SDG 11 includes 10 targets that are operationalized using 15 indicators[52,53]. Bhopal's VLR is conducted by identifying local or city level indicators against each target and the respective global indicator(s) and national indicator(s)[54]. Consistency with global and national indicator frameworks is maintained while adapting the indicators to the city context. A narrative description of city schemes and policies runs alongside the quantitative assessment. The city level indicators are drawn from the Bhopal Urban Sustainability Indicators Report 2021 based on the Urban Sustainability Assessment Framework (USAF)[55,56]. Each city level indicator is further evaluated against national/ international benchmarks as a way to measure progress on the achievement of the goal at the city level. Further, the rationale behind the choice of Goal 11 under the SDG framework and the related indicators builds on UNESCAP's Asia-Pacific Regional Guidelines on Voluntary Local Reviews, which notes that the local governments should 'have a certain degree of control over the indicators so that they can be influenced by local/ subnational policies' and that the data should be 'easily available for the indicators as it could reduce additional administrative burden and increase the chances of Sub National Governments (SNGs) actually working on monitoring their progress'[57].

SDG 11 is noted as a 'transversal, uniquely urban Goal'[58]. It has interlinkages with most other SDGs: SDG 1 (No Poverty), SDG 3 (Health and Well-being), SDG 6 (Water and Sanitation), SDG 7 (Energy), SDG 9 (Resilient Infrastructure), SDG 12 (Sustainable Consumption and Production), SDG 13 (Combat Climate Change) and Goal 17 (Partnerships)[59]. SDG 11 has deep interlinkages with the New Urban Agenda action areas, which also has a strong emphasis on gender equality, connecting it with SDG 5[60,61]. It is one of the goals under examination by the High Level Political Forum (HLPF) in its 2023 cycle[62,63].

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52 UN Resolution A/RES/71/313. "Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development". 2018. https://unstats.un.org/sdgs/indicators/indicators-list/

53 Goal 11c (Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials) is excluded from the purview of this review.

54 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

55 UN-Habitat India. "Urban Sustainability Indicators Report—Bhopal". June 2021. https://www.unhabitat.org.in/sciap-publications/urban-sustainability-indicators-report---bhopal

56 USAF seeks to facilitate a cohesive understanding of a city by mobilizing information and analysis from twelve development sectors. It enables the monitoring of a city's performance using indicators set against thresholds and benchmarks based on national and international standards. The city level indicators and benchmarks were rigorously tested, reviewed, and endorsed by city officials and experts during the formulation and finalization of USAF. UN-Habitat India. "Urban Sustainability Assessment Framework". 31 August 2022. https://www.unhabitat.org.in/sciap-publications/draft-urban-sustainability-assessment-framework-(usaf)

57 UNESCAP. "Asia-Pacific Regional Guidelines on Voluntary Local Reviews". 2020. https://www.unescap.org/resources/asia-pacific-regional-guidelines-voluntary-local-reviews

58 UCLG and UN-Habitat. "Guidelines for Voluntary Local Reviews Volume 1" (2020). https://unhabitat.org/guidelines-for-voluntary-local-reviews-volume-1-a-comparative-analysis-of-existing-vlrs

59 UNESCAP. "Visualization map of interlinkages between SDG 11 and other SDGs". 2018. https://www.unescap.org/sites/default/files/Visualisation%20of%20interlinkages%20for%20SDG%2012_new.pdf

60 UNESCAP. "Asia-Pacific Regional Guidelines on Voluntary Local Reviews". 2020. https://www.unescap.org/resources/asia-pacific-regional-guidelines-voluntary-local-reviews

61 https://www.urbanagendaplatform.org/

62 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/

63 The theme for 2023 cycle of HLPF is "accelerating the recovery from the coronavirus disease (COVID-19) and the full implementation of the 2030 Agenda for Sustainable Development at all levels". The following SDGs are slated for an in-depth review during the 2023 cycle: Goals 6, 7, 9, 11 and 17.

3 BHOPAL'S PROGRESS ON THE SDGs

The transformation of cities with effective local governance is the action at the heart of sustainable development. Urban services and programmes that make a difference to the ordinary lives of communities can enable cities to advance their progress towards the SDGs, establish norms and standards, share learnings, and deliver successful models at scale. The chosen initiatives exemplify the actions towards achieving the SDGs, aligned with the three pillars of people (SDGs 1, 3, 4 and 5), planet (SDGs 6, 13 and 15) and prosperity (SDGs 7,8 and 11). The clustering of the city initiatives in Table 1 is substantiated by Annexure I.

3.1 Overview: Mapping City Initiatives to the SDGs

Table 1: Mapping city initiatives to SDGs

	City Strategy and Objectives	Safety and Innovation	Basic Infrastructure/Social Security	Resilience	Digital Governance
1 NO POVERTY	No Poverty		• Improved Access to Basic Amenities **(A)**		
2 ZERO HUNGER	Zero Hunger				
3 GOOD HEALTH AND WELL BEING	Good health and well being	• Covid 19 Local Action **(E)**	• Poshit Parivar Suposhit Madhya Pradesh Scheme **(B)** • Improving Children's and Women's Health **(C)** • Achieving Full Immunization Coverage Milestones **(D)**	• Fever Clinics (F) • Interventions to Meet the Demand for Oxygen (G)	• ICCC for Pandemic Management **(H)** • -Nirmay Bhopal Mobile Application **(I)**
4 QUALITY EDUCATION	Quality education	• Implementing the National Education Policy 2020 **(J)**	• State Programmes for Quality Education **(K)** • Free Education for Children Orphaned by the Covid-19 Pandemic **(L)** • CM Rise Schools in Bhopal **(M)**		• Smart Schools **(N)**

	City Strategy and Objectives	Safety and Innovation	Basic Infrastructure/Social Security	Resilience	Digital Governance
5 Gender Equality	Gender equality		• Improved Sex Ratio in Bhopal **(O)** • Women's Ownership of Property under PMAY (Urban) **(P)** • Quality Education for the Girl Child **(Q)** • Urja Mahila Help Desk **(R)**		
6 Clean Water and Sanitation	Clean water and sanitation	• Reuse of Treated Wastewater **(V)**	• Improvements in Water Supply Network **(S)** • Improved Sanitation Services **(W)** • Improved Access to Toilets **(X)**	• Water Conservation Measures **(U)**	• Centralized Control of Water Supply Using SCADA **(T)**
7 Affordable and Clean Energy	Affordable and clean energy	• Waste to Energy Plant **(MM)**	• Smart Street Lighting Initiative **(OO)**	• Energy Efficient Green Buildings **(NN)** • Encouraging the Use of Solar Energy **(PP)** • 20 MW Solar Plant at Neemach **(QQ)**	
8 Decent Work and Economic Growth	Decent work and economic growth	• Incubation Centre for Start-Ups **(RR)**	• Safeguarding Livelihoods **(SS)**		
9 Industry, Innovation and Infrastructure	Industry, innovation, infrastructure				
10 Reduced Inequalities	Reduced inequalities				
11 Sustainable Cities and Communities	Sustainable cities and communities (See Section 3.2)	• Conservation of Historical Places **(3.3.4)** • Conservation of Natural Heritage **(3.3.4)**	• Housing for All—Pradhan Mantri Awas Yojana (PMAY) **(3.3.1)** • Multi-Modal Transportation **(3.3.2)** • Complete Streets with Universal Accessibility **(3.3.2)** • GIS-based Master Plan for City Development **(3.3.3)** • Effective Solid Waste Management **(3.3.6)** • Reclaimed Landfill Site **(3.3.6)** • Development of Public Parks **(3.3.7)**		• Intelligent Traffic Management System **(3.3.2)** • Smart Street Lighting Smart Poles **(3.3.7)**
12 Responsible Consumption and Production	Responsible consumption and production				
13 Climate Action	Climate action	• Green Transferable Development Rights (TDR) **(AA)**	• Disaster Management Cell and Action Plan **(EE)**	• Climate Action Plan **(Y)** • Initiatives to Reduce GHGs Emissions **(Z)** • Climate Smart Cities Assessment **(BB)** • Education, Awareness on Climate Change **(CC)** • Clean Air Action Plan **(DD)** • Risk & Hazard Vulnerability Plan **(FF)**	

	City Strategy and Objectives	Safety and Innovation	Basic Infrastructure/Social Security	Resilience	Digital Governance
14 Life below water	Life below water				
15 Life on land	Life on land	• Green-Blue Master Plan for Smart City **(LL)**		• Protection of Natural Assets **(GG)** • Proposed Tiger Reserve **(HH)** • Conservation of Kerwa-Kaliasot Forest Region **(II)** • Improving the Green Cover **(JJ)** • City Forest **(KK)**	
16 Peace, justice and strong institutions	Peace, justice, and strong institutions				
17 Partnerships for the goals	Partnerships for the goals				

Figure 13: Ongoing initiatives in Bhopal under SDG framework

3.2 Key City Initiatives

3.2.1 People

A. Improved Access to Basic Amenities

Urban areas in Madhya Pradesh, including Bhopal, have historically witnessed a high incidence of poverty. As per the erstwhile Planning Commission's Estimates of Poverty (1993-94), the state had an urban poverty ratio (percentage of urban population) of 48.4 per cent, the highest among all states at the time[64]. In 2005, over 49.8 per cent of the city's households were estimated to be living without adequate shelter and basic amenities[65]. This number as a proportion of the population has come down over the years. In 2019, 36 per cent of the city's households lived in informal settlements without basic amenities[66]. City has sought to address the shortfall in basic amenities through concerted efforts directed under central, state, and own programmes.

For example, the shortfall in housing supply is sought to be addressed under the *Pradhan Mantri Awaas Yojana* (PMAY) (Urban) programme. BMC will add a total of 51,694 housing units (33,284 EWS units, 14,366 LIG units and 4,044 MIG units) at a cost of INR 4,750 crore (around USD 574 million). The scheme provides financial assistance for beneficiary-led construction of housing units as well.

In the Water, Sanitation and Hygiene (WASH) sector, the provision of basic amenities among the urban poor was advanced by the *Swachh Bharat Mission* (SBM), a flagship scheme of the Government of India, other state level programmes and initiatives of the ULB. Over 46,000 households among the urban poor received financial assistance to construct individual toilets. The city was declared Open Defecation Free (ODF) in 2016. It has also increased the provision of public and community toilets with a total of over 205 units built in the city under the SBM programme. The city has also sought to increase the coverage of its water supply network. BMC plans to add 535 km of water supply lines. It is also working to increase the treatment capacity by 30 MLD under the Atal Mission for Rejuvenation and Urban Transformation (AMRUT), another programme of the Government of India.

Education is another area where the city has sought to make strides to provide basic amenities. The city has a mix of public and private schools, and it is endeavouring to expand access to education at all levels. Over 1,120 public schools provide access to education for the disadvantaged and vulnerable communities in the city.

There are 85 Primary Health Centres (PHC) in the city that provide local communities with

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64 Cited in UN-Habitat. "Poverty Mapping: A Situation Analysis of Poverty Pockets in Bhopal". 2006. https://unhabitat.org/poverty-mapping-a-situational-analysis-of-poverty-pockets-in-bhopal

65 Ibid.

66 As per the Housing for All (HfA) survey carried out in 2019. The survey is a demand analysis of housing shortage in urban areas conducted by a ULB as part of the central government's flagship housing programme, PMAY. Cited in UN-Habitat India. "Bhopal City Profile Diagnostic Report". August 2021. https://www.unhabitat.org.in/sciap-publications/city-profile-and-diagnostic-report---bhopal

access to basic health services like vaccination, fever treatment and primary diagnosis. The State Department of Public Health and Family Welfare, State Government of Madhya Pradesh, has sought to increase the coverage of health insurance schemes and programmes. It has set a target of reaching 100 per cent coverage under the health programme by 2024.

B. Poshit Parivar Suposhit Madhya Pradesh Scheme

Maternal mortality rates (MMRs) and infant mortality rates (IMRs) prevalent in Madhya Pradesh are among the highest in the country[67,68,69,70]. The State Department of Women and Children Development has sought to address this problem through a community-based nutrition management programme called, *Poshit Parivar Suposhit* Madhya Pradesh, which aims to improve nutrition among mothers and their children, especially within the first 1,000 days of a child's conception[71]. It is being implemented across the state, including the city of Bhopal.

The *Suposhit* (nourished) component of the scheme targets the reduction of malnutrition among children under five years (CUFs). It aims to reduce the IMR in the state to 25 per 1,000 live births by 2030.

C. Improving Children's and Women's Health

Improvement of child health is vital to the socio-economic development of any society and is an indicator of the priority accorded to the cause of social welfare by a city. While the IMR in Madhya Pradesh has declined to 43 per live 1,000 births in 2020 from 50 per 1,000 live births in 2015, it was the highest in the country in 2020 with the national average at 28[72,73]. Of the total infant deaths in the state in 2018-19 (25,786) and 2019-20 (26,266), Bhopal district reported the highest share in 2018-19 (1,491) as well as 2019-20 (1,380)[74]. The state is endeavouring to address this challenge at all levels, including in Bhopal.

Efforts to address the health of women have sought to focus on the provision of improved antenatal and post-natal treatment, availability of skilled healthcare personnel during delivery, and proper nutrition. This has led to significant improvements in maternity care parameters. The percentage of women who received antenatal care in their first trimester increased to 90.2 per cent in 2019-21 from 77.2 per cent in 2015-16[75]. The percentage of mothers who received postnatal care from a doctor/ nurse/ Lady Health Visitors (LHV)/ Auxiliary Nurse and Midwife (ANM)/ midwife/ other healthcare personnel within two

67 As per the Sample Registration System (SRS) Bulletin of Registrar General of India (RGI), in 2020, Madhya Pradesh reported the country's highest IMR at 43 per 1,000 live births, while the national average stood at 28. Further, the MMR has reduced from 17.5 in 2015-17 to 15.3 in 2018-20, which is still more than twice the national average of 6 in 2016-18.

68 Ministry of Health and Family Welfare, Government of India. "Status of IMR and MMR in India". Feb 8, 2022. https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1796436 (accessed on Jan 3, 2023)

69 Office of the Registrar General and Census Commissioner, India (ORGI). "Special Bulletin on Maternal Mortality in India—2018-20". Nov 2022. https://censusindia.gov.in/nada/index.php/catalog/44379

70 Office of the Registrar General and Census Commissioner, India (ORGI). "Sample Registration System (SRS) Bulletin—2020". May 2022. https://censusindia.gov.in/nada/index.php/catalog/42687

71 All India Radio News. "Madhya Pradesh conducts 'Poshit Parivar-Suposhit Madhya Pradesh' campaign in all districts". Nov 19, 2020. https://newsonair.gov.in/News?title=Madhya-Pradesh-conducts-%26%2339%3BPoshit-Parivar-Suposhit-Madhya-Pradesh%26%2339%3B-campaign-in-all-districts&id=404555 (accessed on Jan 3, 2023)

72 Ministry of Health and Family Welfare, Government of India. "Status of IMR and MMR in India". Feb 8, 2022. https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1796436 (accessed on Jan 3, 2023)

73 Office of the Registrar General and Census Commissioner, India (ORGI). "Sample Registration System (SRS) Bulletin—2020". May 2022. https://censusindia.gov.in/nada/index.php/catalog/42687

74 Health Management Information System (HMIS), National Health Portal, Government of India. "F.1.Performance of Key HMIS Indicators (up to District level)". 2019-20. https://hmis.nhp.gov.in/#!/standardReports

75 Ministry of Health and Family Welfare, Government of India. "National Family Health Survey—(NFHS-5), 2019-21: District Factsheet, Bhopal, Madhya Pradesh". http://rchiips.org/nfhs/index.shtml

days of delivery also increased to 89.5 in 2019-21 from 58.7 in 2015-16[76]. Bhopal district witnessed close to 98.3 per cent of institutional deliveries, which increased from 91.7 per cent in 2015-16.[77]

The welfare goals will be pursued further through improvements in access to and utilization of health services, family welfare, and nutrition services with a special focus on underserved communities [77].

D. Achieving Full Immunization Coverage Milestones

The State Government of Madhya Pradesh has taken various steps in the last five years to significantly improve immunization service quality and coverage, through systematic interventions at all tiers of the healthcare system. It is estimated that Full Immunization Coverage (FIC)[78] in Bhopal district stood at 62.3 per cent in 2019-20[79], which was much lower than the national average of 76.4 per cent in 2019-20. The Government of India's Mission Indradhanush at the national level aimed to reach the 90-per cent FIC milestone by 2022[80]. Further, Madhya Pradesh, including Bhopal district, has been accorded the status of a priority state in the strategy published by the Ministry of Health and Family Welfare, Government of India, to achieve the FIC milestone[81]. The initiatives seek to intensify monitoring, increase vaccination confidence and community engagement activities[82]. The state healthcare department has collaborated with UNICEF, UNDP, and WHO to improve vaccine logistics, cold chain management, vaccine preventable disease (VPD) surveillance, supportive supervision, and capacity building.

E. Covid-19 Local Action

The Covid-19 pandemic period in Bhopal witnessed the intersections of the three pillars mobilized in this report—people, planet, and prosperity—come alive in a daunting manner. The situation demanded extraordinary efforts from the local government who did not leave any stone unturned in seeking appropriate solutions.

As part of the Covid-19 emergency response, the city mobilized testing and vaccination sites throughout the city, complementing efforts led by the national and state governments. City-run sites administered over 2.4 million Covid-19 tests as of July 2021. More than 1.3 million vaccinations were administered through city-run sites and mobile units, including private sector hospitals.

The city increased the oxygen supply to 100 MT in 2021 from 60 MT per day in 2020, which was a major gamechanger during the second pandemic wave in India in 2021, enabling healthcare authorities to reduce deaths caused by shortage of oxygen. In 2022, the city is close to ramping up its own production capacity to around 150 MT of liquid oxygen per day.

BMC successfully collaborated with other government departments such as the Bhopal District Administration, Department of Public Health and Family Welfare, as well as community-based organizations, and private service providers. From establishing testing and vaccination sites, emergency cash assistance programmes, childcare sites, temporary shelters for migrant labourers, and floating virtual services to ensure civic engagement and access, the work done during the pandemic demonstrates the ability of the local government in Bhopal to match up to the scale of a crisis as monumental as the Covid-19 pandemic.

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76 Ibid.

77 Ibid.

78 As represented by the following indicator in NFHS-5 data: "Percentage of children aged 12-23 months fully vaccinated based on information from either vaccination card or mother's recall".

79 Ministry of Health and Family Welfare, Government of India. "National Family Health Survey—(NFHS-5), 2019-21: District Factsheet, Bhopal, Madhya Pradesh". http://rchiips.org/nfhs/index.shtml

80 Press Information Bureau, Government of India. "Focus on Universal Immunization: Dr. Mansukh Mandaviya launches Intensified Mission Indradhanush (IMI) 4.0". Feb 2022. https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1796099

81 Ministry of Health and Family Welfare, Government of India. "Roadmap for achieving 90% full immunization coverage in India: A guidance document for the states". Jan, 2019. https://nhm.gov.in/New_Updates_2018/NHM_Components/Immunization/Guildelines_for_immunization/Roadmap_document_for_90%25_FIC.pdf

82 Ibid.

Box 1: Healthcare Infrastructure in Bhopal

Bhopal has a robust healthcare system owing to the government's extensive support and investment in promoting overall public health as well as active private sector participation. Both public and private healthcare facilities are augmented to cope with the rising patient demand for better healthcare and population growth. All India Institute for Medical Sciences (AIIMS) Bhopal, a centrally funded multi-specialty hospital, is an important healthcare institution in the state. Similarly, Hamidia Hospital and Jay Prakash (JP) Hospital are important state funded healthcare institutions that provide quality services to the Bhopal region. The state's Department of Public Health and Family Welfare delivers quality healthcare services, while Bhopal BMC works closely with the state department to provide seamless access to healthcare facilities to citizens. The spatial distribution of healthcare facilities in the city is illustrated in Map 3.

Map 3. Population with access to healthcare facilities with 800-m. radius
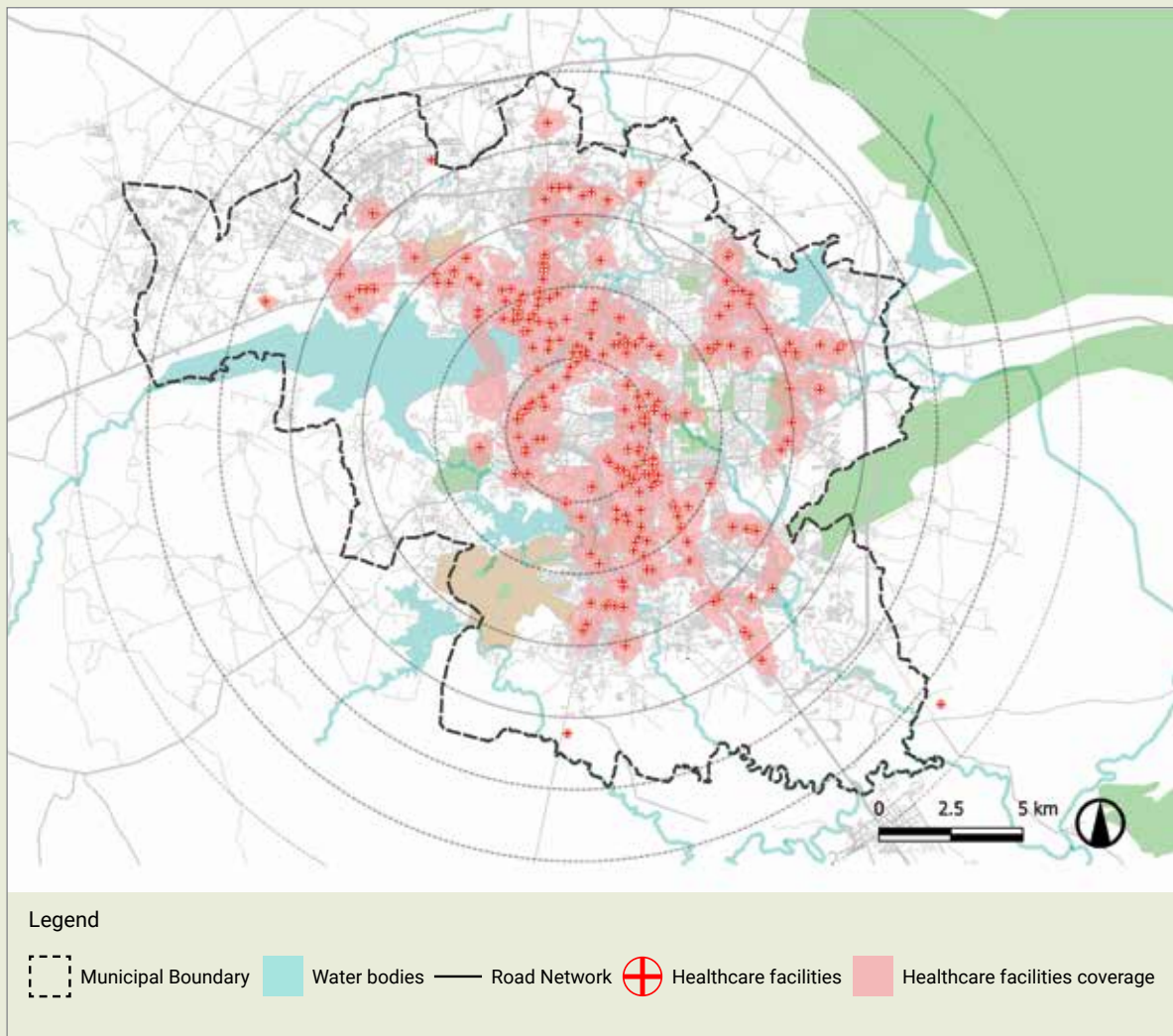
Source: UN-Habitat India. "Bhopal City Profile Diagnostic Report". August 2021.
https://www.unhabitat.org.in/sciap-publications/city-profile-and-diagnostic-report---bhopal

Bhopal has around 260 healthcare institutions, including primary healthcare centres and hospitals. Around 82 per cent of citizens have access to healthcare facilities within an 800-m. radius of their homes. The availability of hospital beds currently stands at 4.7 beds per 100,000 population which needs considerable improvement.

F. Fever Clinics

The state's Department of Public Health had established 56 fever clinics in Bhopal city, where arrangements for examination and treatment of patients of common fever, cold and cough were made available. Arrangements were made for collection of samples to diagnose the Covid-19 infection. The objective of these clinics was to conduct rapid testing, facilitate the isolation of infected patients, and minimize the spread of the infection. The PHCs provided treatment for long-term ailments, regular health check-ups for the elderly and intermediate support in case of emergency.

G. Interventions to Meet the Demand for Oxygen

Shortage of oxygen supply is one of the most important learnings from the second wave of Covid-19 in Bhopal—it led to an increase in the number of causalities. Prior to the pandemic, Bhopal had an oxygen demand of about 30 MT per day and the city had the capacity to generate 60 MT, which proved sufficient during the first wave of the pandemic. The demand for oxygen escalated to 100 MT per day during the second wave in 2021, which was sought to be addressed by setting up additional plants. The current capacity in the city is 120 MT and the government is working to increase this capacity to 150 MT per day to meet future demands and address issue of logistics, transportation and storage of medical oxygen.

H. Integrated Command and Control Centre (ICCC) for Pandemic Management

Bhopal Smart City Development Corporation Limited, an SPV set up under the Smart Cities Mission[83], has developed an Integrated Command and Control Centre (ICCC) to closely integrate city operations, and to monitor and facilitate all the services being offered in the city. It brings the various state and local governance services under one platform to establish a better connection, coordination and control over the future development of Bhopal. City surveillance, intelligent traffic management, environmental and citizen grievance redressal are some of the key services integrated into the ICCC.

Leveraging the most advanced cloud infrastructure, the ICCC will be providing Infrastructure as a Service Model (IAAS) to various state and local government departments and utilities. BSCDCL is endeavouring to establish partnerships with the State Police Department, State Tourism Department, *Urja Vikas Nigam* (state electricity distribution utility) and State Health Department.

During the Covid-19 pandemic, ICCC was used as a state platform to manage the emergency operations for the Health Department. The usage of ICCC project as an IAAS model has also opened up a new revenue stream for the city administration through BSCDC*L*.

I. Niramay Bhopal Mobile Application

Niramay Bhopal App is an initiative of BSCDCL to monitor Covid-19 patients who are isolated at home or quarantined, to ensure that the best medical facilities and resources are provided to them.

Following are the salient features of the *Niramay Bhopal App*:

- Real time update on availability of hospital beds, Intense Critical Unit (ICU)/ High Dependency Unit (HDU) beds, isolation rooms, and oxygen
- Reporting of emergency incidents to the relevant authorities
- Bhopal Smart City facilitated live yoga sessions for citizens and patients in isolation

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83 Bhopal was selected for the implementation of the Smart City Mission, a central government programme to encourage the adoption of ICT and IoT-based solutions to improve municipal service delivery. The city is among the 104 cities in the country that are executing a range of municipal infrastructure and service delivery projects.

- List of doctors empanelled for free teleconsultation
- List of empanelled clinical psychologists for free tele-counselling
- Provision of Covid-19 test results and medical reports
- List of all vaccination centres in Bhopal
- Provision and guidance for procuring medical kits
- List of Fever Clinics in the city and their location/ contact details

J. Implementing the National Education Policy (NEP) 2020

India is one of the few countries in the world where right to education is a fundamental right. Article 21A of the Constitution of India, inserted via the Constitution (Eighty-sixth Amendment) Act, 2002, provides for free and compulsory education of all children in the age group of 6-14 as a fundamental right[84]. It is in reference to this constitutional provision that the Indian parliament has enacted the statutes for free and compulsory education for all children, referred to as The Right of Children to Free and Compulsory Education Act or Right to Education (RTE) Act, 2009[85]. Under the RTE framework, the State Government of Madhya Pradesh provides access to free and quality education in government schools.

Further, NEP 2020 is another step to evolve the education system in the country[86]. A series of workshops and seminars were initiated to disseminate the intention and intricacies of the policy in the state. The Bhopal School of Social Sciences (BSSS) in collaboration with Human Resource Development Centre and Department of Continuing Education, Barkatullah University, has conducted several teacher training programmes in the city, which focus on innovative teaching strategies to implement the NEP 2020.

K. State Programmes for Quality Education

The state government has initiated several programmes that ensure inclusive, equitable, and quality education for children, while incentivizing higher education. Examples of such interventions include:

- **Vikramaditya Free Education Scheme:** It provides free higher education to students from families with a household income of less than INR 1,20,000 (USD 1,450), who are not covered by the existing affirmative action programmes.
- **Mukhyamantri Medhavi Vidyarthi Yojana (Chief Minister Meritorious Student Scheme) 2020:** It provides financial assistance to meritorious students interested in graduating in any discipline, ensuring a promising career.
- **Madhya Pradesh Laptop Distribution for Meritorious Students Scheme:** It provides financial assistance for purchasing laptops to students who exceed a minimum academic performance threshold in high school. This scheme enabled several students to purchase laptops and continue their learning online, especially during the Covid-19 pandemic.

L. Free Education for Children Orphaned by the Covid-19 Pandemic

The state government will provide free education for students who have lost their parents/ guardians to the Covid-19 pandemic. Such students will be provided with an additional monthly stipend of INR 5,000 (USD 60), which will enable them to buy books and other necessities for education. Apart from providing free education, the state and local governments are assisting people by providing loans and enabling families to find livelihood opportunities.

84 Ministry of Law and Justice, Government of India. "Constitution of India". Accessed on Jan 3, 2023. https://legislative.gov.in/constitution-of-india
85 Ministry of Education, Government of India. "Right to Education". Accessed on Jan 3, 2023. https://dsel.education.gov.in/rte
86 Press Information Bureau, Government of India. "Salient Features of NEP, 2020". Aug 2022. https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1847066

Box 2: Bhopal as a Regional Educational Hub

Bhopal is a regional educational hub for higher education with reputed, national and state-level institutions. The Indian Institute of Science, Education and Research (IISER), Maulana Azad Institute of Technology (MANIT), Indian Institute of Forest Management (IIFM), National Institute of Design (NID), National Institute of Fashion Technology (NIFT), School of Planning and Architecture (SPA), Barkatullah University, Gandhi Medical College and Madhya Pradesh Bhoj Open University are some of the prominent institutions in the city. The spatial distribution of the educational institutions is illustrated in Map 4.

Map 4. Population with access to schools with a 800 m. radius

Legend

⬚ Municipal Boundary ■ Water bodies —— Road Network ⊕ Healthcare facilities ■ Healthcare facilities coverage
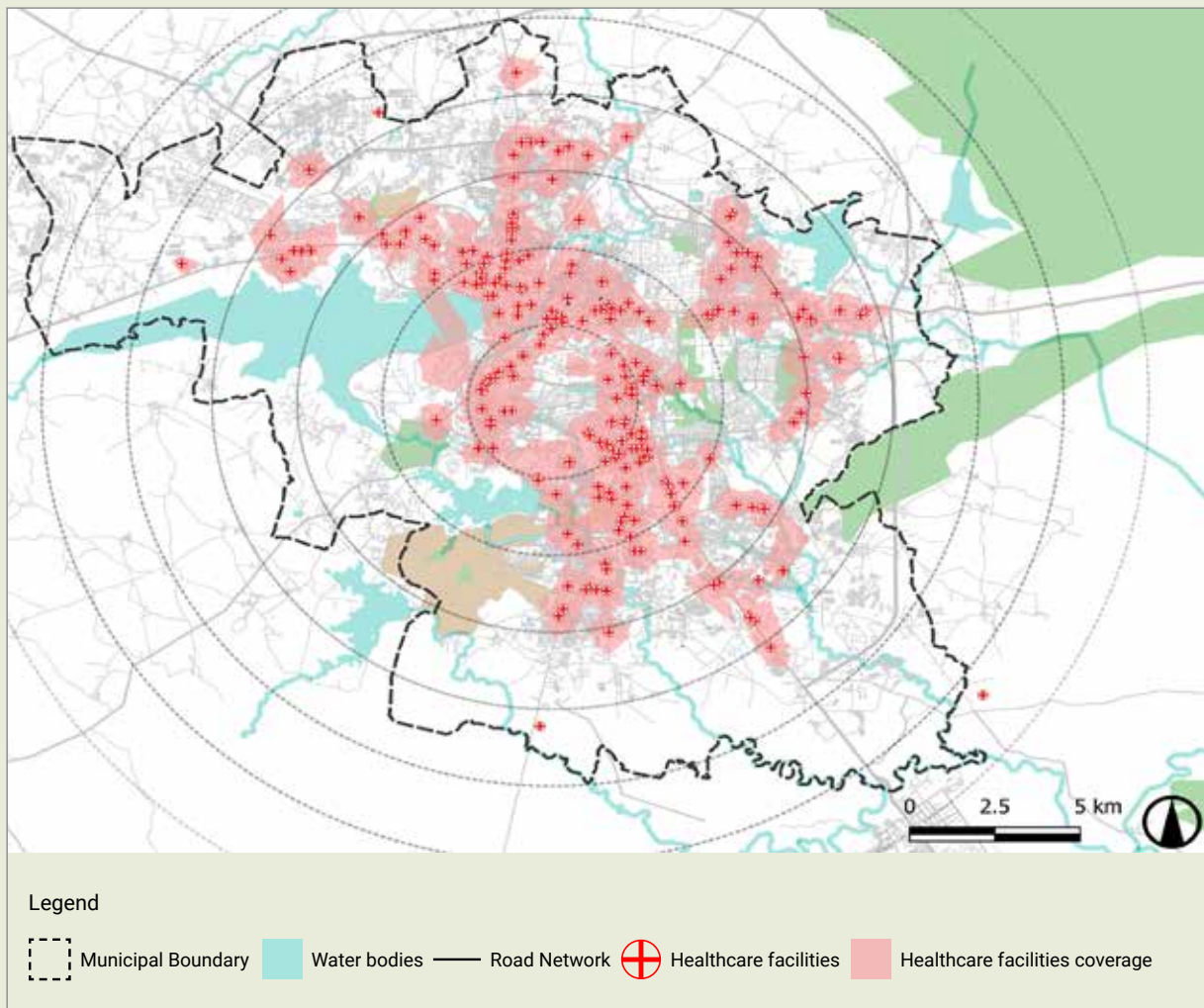
There are around 1,600 public and private educational institutions across the city, with around 92 per cent of Bhopal's residents enjoying access to these institutions within an 800-m. radius of their homes.

Source: Bhopal City Profile and Diagnostics Report, UN-Habitat India.
https://www.unhabitat.org.in/sciap-publications/city-profile-and-diagnostic-report---bhopal

M. CM Rise Schools in Bhopal

CM Rise School is a scheme for the development of innovative amenities in schools to provide holistic education. The curriculum of the schools is designed in accordance with NEP 2020 and aims to provide improved library, sports, digital and interactive learning, medical, and surveillance facilities. Eight public schools in Bhopal are being developed as CM Rise schools, while the Rashidiya School in Jahangirabad, Bhopal, has been developed as a model CM Rise School for the state. It has been jointly developed by the Department of School Education, BMC, BSCDCL, and PWD.

N. Smart Schools

The Smart School project envisages modernizing selected public schools in Bhopal. BSCDCL has helped in upgrading schools in the city by establishing smart classroom solutions and introducing digitized curriculum, which are easily accessible to all students of the school through web and mobile-based applications. The objective of this project was to create a virtual learning environment at these schools by providing the best digital learning facilities to students and faculties alike

O. Improved Sex Ratio in Bhopal

The state's Annual Health Report for 2021-22 reported that 20 districts, including Bhopal district, is witnessing a growth in sex ratio against the state average, highlighting the improving sex ratio at birth in Madhya Pradesh[87].

Further, the NFHS-5 (2019-21) data estimated the sex ratio of the population of the state to have improved to 970 from 948 in 2015-16[88]. The city reported a sex ratio of 920 (Census 2011), which is estimated to have increased to 927 in 2019-2021[89,90]. This increase in sex ratio may be attributed to improved social protection schemes for the girl child and mother, free/ subsidized education, quality healthcare, and efforts to create awareness on gender equality.

Table 2: Improvements in sex ration at birth against the overall sex ratio of the population of Bhopal district, Madhya Pradesh. *Based on 25-49 unweighted cases.

Sr. No.	Indicator	NFHS-4 (2015-16)	NFHS-5 (2019-21)
1	Sex ratio at birth for children born in the last five years (females per 1,000 males)	890	1,261*
2	Sex ratio of the total population (females per 1,000 males)	899	927

Source: National Family Health Survey (NFHS-5)

87 Directorate of Health Services, Government of Madhya Pradesh. "Annual Report: 2021-22" https://health.mp.gov.in/en/reports-manuals/annual-report

88 Ministry of Health and Family Welfare, Government of India. "National Family Health Survey—(NFHS-5), 2019-21: State Factsheet, Madhya Pradesh". http://rchiips.org/nfhs/index.shtml

89 Ministry of Health and Family Welfare, Government of India. "National Family Health Survey—(NFHS-5), 2019-21: District Factsheet, Bhopal, Madhya Pradesh". http://rchiips.org/nfhs/index.shtml

90 The estimated data on sex ratio in 2019-21 pertains to the overall Bhopal district.

P. Women's Ownership of Property under PMAY (Urban)

There is a widely recognized gender gap in ownership of property in India and across the world.[91] The gaps are more pronounced in the case of the poor.[92] Housing property is an important instrument to acquire wealth for the urban poor.[93] It is important to close this gap in the ownership of property by women. The welfare dimensions of women's ownership of property are well documented and need to be translated to reality through a conducive regulatory regime as well as developmental interventions. Bhopal has taken crucial steps in this direction under the framework of a central scheme.

PMAY has mandated the ownership or co-ownership of newly built houses by the female head of the beneficiary family.[94] This provision has had the effect of empowering women with ownership of property, particularly among poorer groups where the gender gap in ownership of property tends to be more acute.[95] The 51,694-housing units (33,284 EWS units, 14,366 LIG units and 4,044 MIG units) planned to be constructed in Bhopal will largely contribute towards empowering women with ownership of property.

Box 3: Affirmative Action for Women's Participation in Local Elections

Achieving gender equity is an important objective of Government of Madhya Pradesh and BMC. 33 per cent of the seats in the city council are reserved for women. The Bhopal City council had 41 women councillors (48 per cent) out of 85 members in early 2022.

Q. Quality Education for the Girl Child

Ensuring that all girls and young women receive a quality education as a human right, a global development priority, is a strategic priority for the national and state governments as well. *'Beti Bachao, Beti Padhao'* (save the girl child, educate the girl child) is a central government scheme that seeks to address social problems such as sex-selective abortions and advance the cause of education of the girl child across the country. Madhya Pradesh has launched several programmes to encourage women's education under the purview of the central scheme:

- **Chief Minister *Pratibha Kiran Yojana:*** The objective of the programme is to enable girls who have completed secondary education, and come from families living below the poverty line (BPL), to pursue higher education. Selected students receive a monthly stipend from the state government.

- **Chief Minister *Ladli Laxmi Yojana:*** The scheme is an innovative initiative, which provides financial assistance for a girl towards major milestones in her life, given in instalments, to encourage the pursuit of higher education and foster self-reliance. The scheme is being implemented by the State Government of Madhya Pradesh since 2007 to enhance female education and overall well-being.

- **Chief Minister *Jan Kalyan (Education Promotion) Scheme:*** This scheme provides free education for the girl child from primary school through graduation stages. A girl child from an EWS or socially marginalized background is eligible to avail free education under this scheme.

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91 Gaddis, I, R Lahoti and H Swaminathan (2020), 'Women's Legal Rights and Gender Gaps in Property Ownership in Developing Countries', World Bank Group Policy Research Working Paper 9444. https://openknowledge.worldbank.org/bitstream/handle/10986/34652/Womens-Legal-Rights-and-Gender-Gaps-in-Property-Ownership-in-Developing-Countries.pdf;sequence=1

92 Gaddis, Isis, Rahul Lahoti, and Hema Swaminathan. "Women's legal rights and gender gaps in property ownership". 23 April 2021. https://www.ideasforindia.in/topics/social-identity/women-s-legal-rights-and-gender-gaps-in-property-ownership.html

93 Ibid.

94 https://pmay-urban.gov.in/faq

95 Gaddis, Isis, Rahul Lahoti, and Hema Swaminathan. "Women's legal rights and gender gaps in property ownership". 23 April 2021. https://www.ideasforindia.in/topics/social-identity/women-s-legal-rights-and-gender-gaps-in-property-ownership.html

R. Urja Mahila Help Desk

This is a special desk for the immediate hearing, assistance, and action on violence against women. The help desks are mainly headed by women police personnel. There are around 700 help desks throughout the state, including all police stations in Bhopal, to initiate prompt action on violence against women. The desks also facilitate grievance redressal and provide a safe space for women to register their complaints without hesitation in the presence of women police officers.

3.2.2 Planet

S. Improvements in Water Supply Network

In 2022, Bhopal prepared a City Water Balance Report in accordance with the guidelines laid down as part of the central government's AMRUT scheme. The city has identified key projects to improve its household water supply network coverage and reduce the quantum of Non-Revenue Water (NRW).[96] BMC has prepared a plan to expand the water supply network—535 km of water supply lines are planned to be added to the network. BMC will also increase the treatment capacity by 30 MLD under AMRUT 2.0. Further, BMC aims to increase the coverage of metered water connections in the city from five per cent of the city's households to 100 per cent by 2023 as part of AMRUT and the Smart City Mission.

Box 4: Water Supply in Bhopal

The per day water supply requirement in Bhopal city is 530 MLD. Over 35 per cent of the city's water requirement is met by the Narmada River, which lies around 65 km away from Bhopal. The water from surface reservoirs like Upper Lake, Kerwa Dam and Kolar Dam fulfils the remaining 65 per cent of water supply demand. The city supplies around 230 litres of potable water per capita, which is higher than the prescribed quantity of 135 litres per capita as per national guidelines. About 90 per cent of city households have access to piped drinking water connections. But only five per cent of households in the city have metered, piped connections.

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96 Non-revenue water (NRW) refers to water that is "pumped and then lost or unaccounted for".
   Source: https://blogs.worldbank.org/water/what-non-revenue-water-how-can-we-reduce-it-better-water-service

T. Centralized Control of Water Supply Using SCADA

The city has created the Bhopal City Water Utility Management System (BWUMS), which has remote supervisory control of the water supply distribution system and a real-time water loss detection system integrated with the ICCC[97]. The objective of this initiative is to establish an equitable and uninterrupted water supply for people and enable automatic control and monitoring of assets from the centralized control room. This project is being implemented to achieve optimization of existing water supply networks, reduce the losses of water during distribution, and ensure uninterrupted, 24X7 water supply in the city.

U. Water Conservation Measures

BMC has taken initiatives to institutionalize household rainwater harvesting systems. Under the provisions of Madhya Pradesh *Bhumi Vikas Niyam* (Land Development Rules), 2012, BMC has included rainwater harvesting fees for newly constructed households/ properties, which may be refunded if rainwater harvesting systems are effectively incorporated in the new development.

Madhya Pradesh Water and Land Management Institute has developed water conservation techniques for commercial establishments and households to tackle water scarcity issues in the state and has constructed surface reservoirs and implemented ground water recharge projects in Bhopal.

V. Reuse of Treated Wastewater

BMC utilizes around 40 per cent of treated wastewater to maintain its public green spaces and open spaces. The treated wastewater from Sewage Treatment Plants (STP) along the Upper Lake and Lower Lake is discharged into the water bodies after treatment, which checks pollution and ensures a minimum water level in the lakes.

W. Improved Sanitation Services

Bhopal has a composite sanitation system, with both onsite and underground sewerage facilities for treating the liquid waste generated. The topography of the city poses challenges against the construction of a centralized city-wide sewerage network.

Around 34 per cent of properties in the city are connected to the underground sewerage network and the rest of the households use on-site facilities like septic tanks or twin-pit systems for disposing liquid waste. Older developments in the old city and areas adjoining the Upper Lake and Lower Lake are connected to the underground sewerage network. The informal settlements and new developments along the periphery of the city are connected to onsite facilities. BMC has implemented sewage network upgradation programmes with an outlay of INR 160 crore (over USD 19 million) funded under the AMRUT scheme in 2021.

The city generates around 320 MLD of wastewater while it has a treatment capacity for 200 MLD (65 per cent of total sewage produced). Around 120 MLD (35 per cent) of wastewater is not treated and flows into the city's lakes and waterbodies.

X. Improved Access to Toilets

A total of 46,411 urban poor households in Bhopal received financial assistance from BMC under SBM to construct individual toilets. Further, the city added over 143 public toilets and 62 community toilets under the programme to enhance the sanitation situation for the urban poor. Bhopal was declared as Open Defecation Free (ODF) in 2016.

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97 Based on Supervisory Control and Data Acquisition (SCADA) technology.

Y. Climate Action Plan

The battle against climate change is the biggest challenge confronting humankind today. Bhopal has risen to the occasion by preparing a district level Climate Action Plan that will lead the state toward a low-carbon, green energy future. The Draft Climate Change and Environment Action Plan of Bhopal District was prepared by the Environment Planning and Coordination Organisation (EPCO) in collaboration with the state's Department of Environment in 2022 and is a holistic assessment of the sectoral Greenhouse Gas (GHG) emissions, current and future climate change scenarios, and climate change drivers. A comprehensive basket of sector-wise recommendations has been identified from a climate perspective, to complement India's 2030 NDC commitments [98] and state climate action plan.

Box 5: Highlights of Bhopal's Climate Action Plan

The key climate predications highlighted in the action plan are:

- Bhopal district is projected to experience a warming of 2°C to 5°C depending upon the emission scenarios. The percentage of warm days is estimated to increase by more than 35 per cent in the forthcoming years.

- The seasonal rainfall of the district is projected to increase by 5–39 per cent depending upon the emission scenarios. The number of rainy days is also projected to increase during the monsoons, particularly during July and August.

Z. Initiatives to Reduce GHG Emissions

BMC has implemented climate-responsive projects to reduce GHG emissions arising from urban activities. An innovative solar power plant has been set up on the northern banks of Upper Lake with 1,540 solar panels spanning over 1.2 km. The capacity of the solar plant is 500 kW, and it produces around 75,000 units of electricity every month. BMC is working on a bio-CNG plant with a bottling unit, where 400 MT of wet waste will be processed to generate 6.4 MT of CNG. To complete the circular value chain of wet waste produced in the city, BMC is planning to procure CNG vehicles in its waste collection fleet and utilize the bio-CNG produced from the proposed plant.

AA. Green Transferrable Development Rights (TDR)

Growth in employment and income can be driven by public and private investment into economic activities that reduce carbon emissions, enhance energy, and resource efficiency, and prevent the loss of biodiversity. Market-based tools like the Green TDR proposed under the draft Bhopal Development Plan (BDP) 2031 seek to incentivize the conservation of waterbodies and buffer zones.

BB. Climate Smart Cities Assessment

Bhopal has actively participated in 'Climate Smart Cities Assessment Framework (CSCAF)', which is a first of its kind public assessment of cities in India on climate parameters endorsed by the Ministry of Housing and Urban Affairs (MoHUA),

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98 Nationally Determined Contribution (NDC): India has pledged to a.) reduce emissions intensity of its GDP by 45 per cent by 2030, from 2005 level; b.) achieve about 50 per cent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030, with the help of transfer of technology and low-cost international finance including from Green Climate Fund (GCF); c.) create an additional carbon sink of 2.5 to 3 billion tonnes of CO_2 equivalent through additional forest and tree cover by 2030; d.) propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation, including through a mass movement for 'LIFE'– 'Lifestyle for Environment' as a key to combating climate change. Source: https://unfccc.int/sites/default/files/NDC/2022-08/India%20Updated%20First%20Nationally%20Determined%20Contrib.pdf

Government of India. The framework in its current form aims to provide a roadmap for Indian cities to combat climate change through mitigation and adaptation measures at the city level. The normative dimension of the assessment has enabled the BMC to facilitate planting of 47 lakh trees to improve the green cover, accelerate the conversion of conventional streetlights to energy efficient LED streetlights, and a range of other initiatives including the ramping up of renewable energy capacity.

CC. Education, Awareness on Climate Change Mitigation and Adaptation

Climate change is at the forefront of all the environmental issues and motivation to take action to mitigate climate change must be instilled at the individual level. The gap between the complexity of climate science and public understanding needs to be bridged. Madhya Pradesh State Knowledge Management Centre on Climate Change under Environmental Planning and Coordination Organization (EPCO) regularly organizes awareness, capacity building, and outreach events for diverse stakeholders.

EPCO with the support of the Department of School Education conducts training programmes on climate change for teachers from public schools in all districts of Madhya Pradesh, including the public schools in Bhopal, to build their capacities. Further, the Madhya Pradesh State Council of Education Research and Training (MP SCERT) has incorporated various aspects of climate change in the state education curriculum.

DD. Clean Air Action Plan

The Clean Air Action Plan was prepared in 2019 by the Madhya Pradesh Pollution Control Board (MPPCB) in collaboration with Central Pollution Control Board (CPCB) to reduce the increasing air pollution trend and set up robust quality monitoring mechanisms in the city. The plan has suggested strategic actions like increasing green cover, monitoring of emissions from vehicles,

and promoting clean and green fuel in the city. Around 30,000 trees have been planted as a part of the action plan to improve the green cover of the city. Further, six air quality monitoring systems are active in Bhopal, which provide real time information on air quality.

EE. District Disaster Management Cell and Action Plan

Bhopal District Collectorate is the nodal agency for response and rescue activities at the district level and the District Collector is the nodal officer. BMC provides fire emergency services through six fire brigade stations across the city and works closely with the district disaster management cell during an emergency. Around 67 per cent of the city's area has access to fire stations within a 4-km radius or a 10-minute drive. The city-level disaster management plan, prepared in 2018, has documented standard operating procedures to be followed during an emergency as well as guidelines for setting up early hazard warning systems.

FF. Risk and Hazard Vulnerability Plan

The State Disaster Management Plan for Madhya Pradesh, 2014, classifies Bhopal district as 'moderately vulnerable', mainly due to the progress in socio-economic development, and infrastructure development in recent years. Bhopal is moderately vulnerable to flooding and waterlogging during the monsoons. The topography of the city drains most of the rainwater into its lakes, and BMC engages in clearing the drains well before the onset of the monsoons and undertakes preventive measures to address flooding in the city.

GG. Protection of Natural Assets

The draft BDP 2031 has proposed conservation zones along waterbodies, lakes, and forest enclaves. The BDP has identified Upper Lake and its catchment as highly sensitive and has

proposed a buffer (CZ-0) of 50 metres with dense plantation on the urban side of the lake and a buffer of 250 metres along the rural side. Similarly, conservation zones have been identified on the basis of the hierarchy of eco-sensitive natural assets—viz., CZ0, CZ1 and CZ2. Around 32 sqkm (excluding the lakes, waterbodies and forests) of BMC's area falls under conservation zones.

Box 6: Protecting Biodiversity in Bhopal

Bhopal is surrounded by the Satpura and Vindhyachal mountain ranges of Central India. The forested mountains of the Ratapani Tiger Reserve dot the landscape of the city in southern and eastern ends. The hilly terrain of the city slopes downwards to the Southeast. Bhojtal or Upper Lake, one of the largest urban lakes in the country, is spread over 34.84 sqkm with a catchment area of 361 sqkm. The lake is rich in biodiversity like macrophytes, phytoplankton, zooplankton, fish, reptiles, and migratory birds*. It was designated as a Ramsar Site in 2002. Most of the area around the lake exhibits rural characteristics where agriculture is the predominant activity. To improve the sewage treatment facilities along the lake and reduce pollution by wastewater, the city collaborated with Asian Development Bank (ADB) to implement the Urban Water Supply and Environmental Improvement Project.

*Source: Ramar Sites Information Service. "Bhoj Wetland". 19 Aug 2002.
https://rsis.ramsar.org/ris/1206

HH. Proposed Tiger Reserve

Ratapani Tiger Reserve, spread across 824 sqkm on the eastern and southern outskirts of the city, which houses around 45 adult tigers, has been notified as a Tiger Reserve by the state in January 2022. This will allow the implementation of conservation actions and regulate tourist activities along the tiger corridor. With the addition of Ratapani Tiger Reserve, Madhya Pradesh will have the highest number of tiger reserves in the country.

II. Conservation of Kerwa - Kaliasot Forest Region

The forest enclave nestled between the Kerwa and Kaliasot dams has been identified as a city forest as per the National Green Tribunal (NGT) guidelines. The forest region, spread over 32 sqkm, was earlier earmarked as Public-Semi Public Land in draft BDP 2031, where the development of educational, healthcare, and public offices was allowed. In February 2020, the NGT advised the state forest department to map out the region and protect it as a City Forest.

JJ. Improving the Green Cover

BMC and BSDCL are implementing initiatives to improve the green cover in the city to compensate for the green cover lost from development activities. For example, Miyawaki forests has been planned to be developed. Further, the city is developing a biodiversity park near Shahpura Lake and Ekant Park. It is also working with the World Wide Fund for Nature (WWF) to develop a city biodiversity index.

KK. City Forest

A city forest has been developed on 11 acres of barren land with rocky terrain to improve the green cover, protect local biodiversity and increase access to public green spaces for the people of Bhopal. Over 20,000 native trees were planted using the Miyawaki afforestation method—the city forest integrates women and child friendly recreational spaces. Further, development of 120 parks is proposed under the Urban Green Spaces component of the AMRUT programme. These interventions are estimated to increase green spaces in Bhopal by around 20 per cent.

LL. Green-Blue Master Plan for Smart City

To make Bhopal more liveable, environmentally sustainable, and self-sufficient using sustainable planning methods, BSCDCL has prepared the Green-Blue Master Plan in 2018. The key sustainable planning principles incorporated in the plan are:

- Strengthening the water and lake conservation policy and implementation methods by complementing them with the existing development framework, programmes and projects.
- Identifying options for increasing the green cover, carbon fixation and ecologically sensitive, energy-saving options across scales,

including options such as urban agriculture, green roofs, and conservation of waterbodies.
- Strategizing integration of green–blue spaces across the city with pedestrian and cycling infrastructure. Promoting public transportation and non-motorised transport (NMT) modes.
- Ensuring 100 per cent of houses and buildings incorporate green building technologies by 2030 and introducing green building policies as per LEED and GRIHA guidelines.

The proposed Green–Blue Master Plan encompasses the creation of public open spaces and urban forests, promotion of low carbon transport infrastructure, sustainable drainage systems, and flood management, and aims for interdisciplinary cooperation among key sectors covering water management, landscape planning, energy, transport, and urban design.

3.2.3 Prosperity

MM. Waste to Energy Plant

BMC has set up a decentralised biogas plant with a capacity of 5 TPD in Bittan Market to utilize the organic waste generated by the nearby vegetable market. The biogas plant was set up under the Swachh Bharat Mission and National Urban Livelihoods Mission. The biogas generated by the plant is utilized by the local community for income generation.

BMC has signed an MoU with the National Thermal Power Corporation (NTPC) for producing torrefied charcoal from the organic waste generated in the city with an estimated capacity of 400 MT per day. BMC has also initiated the construction of a bio-CNG plant under the PPP mode, where 200 MT of organic waste will be converted into 60 MT of CNG.

Image 3: A waste-to-energy bio gas plant established by the city.

Picture credit: https://smartbhopal.city/

NN. Energy-Efficient Green Buildings

BMC has planned to issue green building guidelines and ensure that all houses and buildings in the city incorporate green technologies by 2030. Green building guidelines are being drafted to streamline the accreditation process, provide applicable green technologies, and provide incentives that can enable the construction of green buildings at the household level. Several government offices in Bhopal are certified for compliance with national green building norms—the key ones being the New Secretariat Office, the Office of Environment Planning and Coordination Organisation (EPCO), and the office of the State Forest Department.

OO. Smart Street Lighting Initiative

Under the Street Lighting National Program and Smart City project, around 20,000 conventional sodium and mercury lamps were replaced by LED lamps, which can drastically reduce power consumption. These streetlights are controlled and operated centrally from the ICCC. The city aims to replace 100 per cent of its streetlights with LED lamps by 2025.

PP. Encouraging the Use of Solar Energy

BSCDCL has installed 1,540 solar panels on a key road of the city that runs along the banks of Upper Lake, spanning over 1.2 km along the lakeside. The capacity of the plant stands at 500 KW, producing around 75,000 units of electricity each month.

The electricity produced by the solar power plant is integrated with the grid and measured through net metering. The streetlights on the said road are powered by the energy generated by the solar panels. Further, the plant will provide for the day-to-day energy requirements of the Pump House near Karbala. Savings of over INR 39 lakh (approximately USD 47,000) have accrued so far against the electricity charges.

Under the Solar City Mission, BMC has signed an MoU with the Madhya Pradesh Urja Vikas Nigam Limited and Solar Energy Corporation of

Image 4: Bhopal has installed 1,540 solar panels on a key road of the city, VIP Road, which runs along the banks of Upper Lake, spanning over 1.2 km along the lakeside.

Picture credit: https://smartbhopal.city/

India to produce green power by installing two rooftop solar plants of 3 MW and 1 MW capacity. To encourage installation of rooftop solar panels at the domestic household level, BMC is offering incentives in the form of rebates on property taxes. Bhabha University, a private educational institution, has set up a 100-kW solar power plant at its campus, which produces electricity at an average of 500 kWh (units) a day. It has achieved an estimated reduction in carbon footprint by 136 tonnes annually.

QQ. 20 MW Solar Plant at Neemach

BMC has planned to install a 20-MW capacity solar plant over a 40-hectare area in Neemach, in the north-western part of the state, which is estimated to cost INR 80 crore (approximately USD 9.8 million). The power from the solar plant will feed the water supply pumping stations used by BMC as part of its water supply network, which has high levels of energy consumption and associated energy costs. The solar plant will enable BMC to reduce these costs and partly switch to a renewable source of energy. Of the total capital investment required for the project, BMC will provide INR 30 crore (approximately USD 3.6 million) while the remaining costs will be covered for the successful bidder appointed for the project.

RR. Incubation Centre for Start-Ups

BSCDCL has sought to support and facilitate the initiatives focussed on developing the city's economy. A key element of its strategy is to encourage start-ups with innovative ideas to create a conducive ecosystem for local entrepreneurs. To achieve this, BSCDCL has established the 'B-Nest Foundation' as a not-for-profit company under the country's company law that functions as an incubator to support and encourage start-ups from the city as well as the state. The initiative promotes start-ups in the IT sector.

Over the last four years, it has sought to foster an entrepreneurial spirit among the youth, researchers, engineers, and society at large. It has

also served as a platform for the convergence of various stakeholders such as policymakers, industrialists, investors, academicians, and mentors, to further entrepreneurship in Bhopal. Since its establishment in 2018, B-Nest Foundation has incubated 132 start-ups, with 55 start-ups having graduated across multiple business cycles.

SS. Safeguarding Livelihoods

The National Urban Livelihood Mission (NULM) and state government initiatives like *Mukya Mantri Swarozgaar Yojana* (Chief Minister's Scheme for Self-Employment) and *Mukhya Mantri Arthik Kalyan Yojana* (Chief Minister's Scheme for Economic Welfare) enable creation of livelihood opportunities in the city. The schemes provide financial assistance of up to INR 5 lakh (over USD 6,000) for small businesses and street vendors. BMC has identified 8,066 street vendors and provided them with identifications, which will enable them to avail financial aid and other benefits under various social protection schemes floated by the government

3.3 Review of SDG 11: Make Cities Inclusive, Safe, Resilient, and Sustainable

The population of the city of Bhopal stood at 1.79 million in 2011. It is projected to grow to 3.6 million by 2030. The competing claims to public resources that may arise in the areas of housing, transport systems, human settlements planning, waste management, and open spaces need to be reconciled with the SDG framework.
In accordance with the methodology of this VLR as outlined in Section 2.3, we now delve into various city level metrics pertaining to SDG 11 to understand where the city stands today and how it could chart a way to achieve Agenda 2030 at the local level. As the city works with numerous central, state, and own schemes to improve the everyday lives of its citizens, we evaluate and reaffirm their alignment with SDG 11 in the subsequent pages.

3.3.1 Access to Adequate, Safe, Affordable Housing

Housing insecurity is one of the complex challenges facing Bhopal. An inadequate supply of affordable housing and shelter leaves many of the vulnerable residents in Bhopal without the stability they need to secure employment, education, and healthcare.

Bhopal has historically had a high incidence of population living without adequate housing and infrastructure, which has grown over the years.[99,100] In 2000, an estimated 8.81 per cent of the city's population lived in notified slums.[101] In 2005, studies mapped over 380 informal settlements, which included notified slums (209) and irregular colonies or unnotified slums (171) spread across 1,28,170 households.[102] Further, 49.8 per cent of the households were estimated to be living below the poverty line. In 2019, the city mapped 388 informal pockets as part of the Housing for All survey. These areas had around 5.68 lakh people (25 per cent of the city's population) living in 1.56 lakh households (36 per cent of total households) that were spread over 11 per cent of the municipal area.[103] While there is sharp increase in the absolute number of people living without adequate shelter and infrastructure, rising from 8.81 per cent of the population in 2001 to 25 per cent of the population in 2019, the share of such households has come down to 36 per cent in 2019 from 49.8 per cent in 2005.

99 Gautam Bhan and Arindam Jana (2013) have cautioned against the seemingly obvious correlation between "slums" (as defined by Census 2011) and poverty. The data on housing and poverty in this report should be read with the same notes of caution. Bhan, Gautam, and Arindam Jana. "Of slums or poverty: Notes of caution from Census 2011." Economic and Political Weekly (2013): 13-16. https://www.epw.in/journal/2013/18/commentary/slums-or-poverty.html

100 UN-Habitat. "Poverty Mapping: A Situation Analysis of Poverty Pockets in Bhopal". 2006. https://unhabitat.org/poverty-mapping-a-situational-analysis-of-poverty-pockets-in-bhopal

101 Ibid.

102 Ibid.

103 As per the Housing for All (HfA) survey carried out in 2019. The survey is a demand analysis of housing shortage in urban areas conducted by a ULB as part of the central government's flagship housing programme, PMAY.

The spatial distribution of informal settlements is illustrated in Map 5.

Map 5: Location of slums in Bhopal
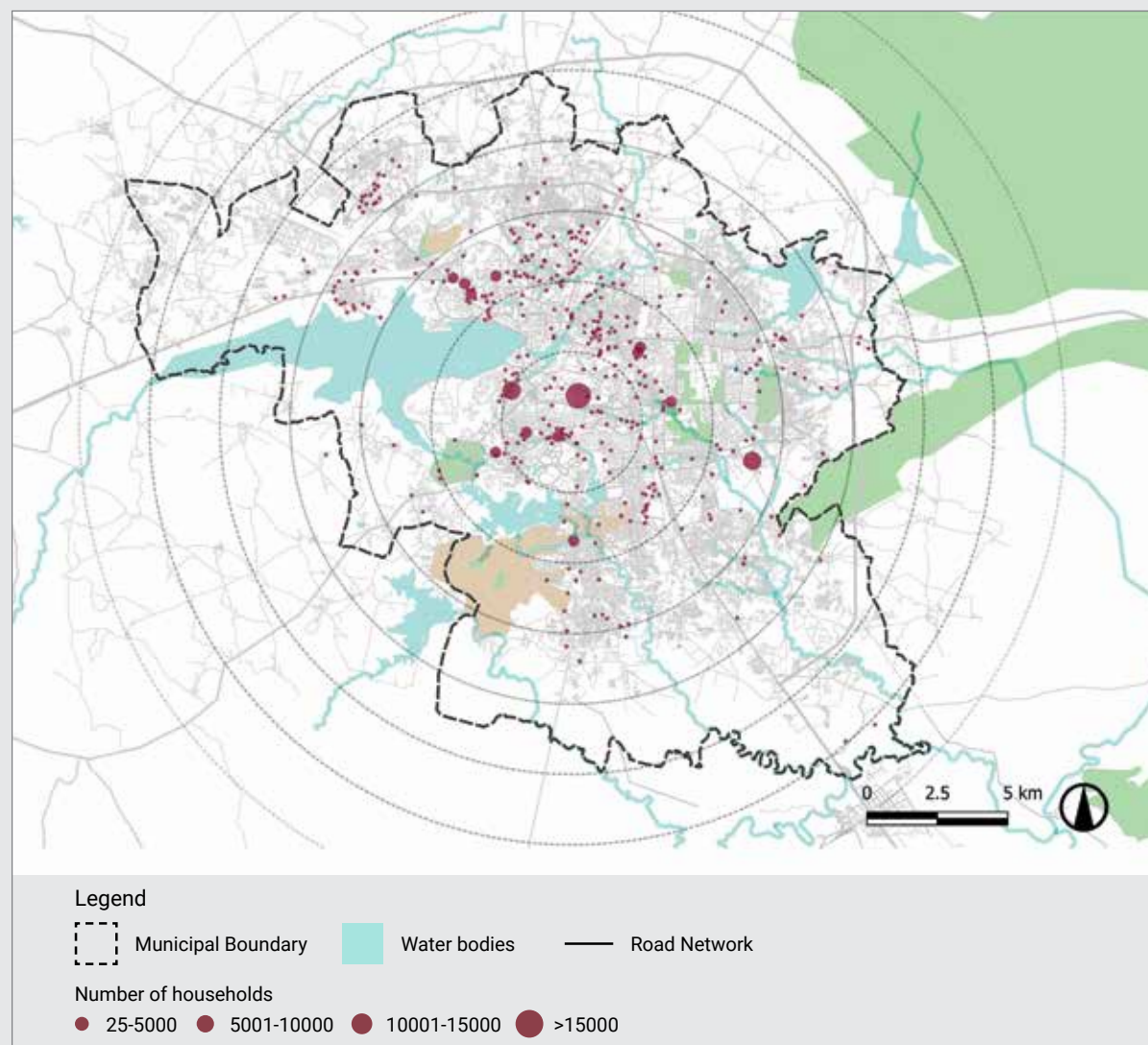
Legend

Municipal Boundary   Water bodies   Road Network

Number of households

● 25-5000   ● 5001-10000   ● 10001-15000   ● >15000

Source: Bhopal City Profile and Diagnostics Report, UN-Habitat India.
https://www.unhabitat.org.in/sciap-publications/city-profile-and-diagnostic-report---bhopal

Housing for All – *Pradhan Mantri Awas Yojana* (PMAY)

Pradhan Mantri Awas Yojana (PMAY) (Urban), a national housing scheme launched in 2015 and overseen by the Government of India's Ministry of Housing and Urban Affairs, intends to provide housing for all in urban areas. BMC has been facilitating the development of affordable houses across four categories under the scheme.[104] As part of the Affordable Housing through Partnership (AHP) component of the scheme, BMC will provide 33,284 housing units by 2024

to EWS beneficiaries,14,366 LIG housing units to vulnerable groups at subsidised costs, and 4,044 MIG housing units. The total estimated expenditure under this component is INR 4,750 crore (around USD 574 million). The credit-linked subsidy component of PMAY will provide financial assistance of INR 1.5 lakh (USD 1,800) for the owner-led construction of new EWS housing units. The state government will provide an additional INR 1.5 lakh (USD 1,800) grant for the construction of housing units. BMC has collaborated with leading banks and financial institutions to provide housing loans with subsidized interest rates.

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104 The four categories of PMAY(U) are—(a.) in-situ slum redevelopment, (b.) affordable housing through credit-linked subsidy, (c.) affordable housing through partnership, and (d.) subsidy for beneficiary-led individual housing construction.

In the present scenario, monetization of the under-construction housing units, equipped with all basic facilities, located in the central and peripheral areas, is not taking place as expected. Non-availability and feasibility of adequate land is another issue in the housing projects. Of the total 51,694 (33,284 EWS, 14,366 LIG and 4,044 MIG) houses approved by the Government of India, only 8278 (4,664 EWS, 2,484 LIG, 1,130 MIG) are under construction.

SDG Target 11.1	By 2030, ensure access for all to adequate, safe and affordable housing and basic services; and upgrade slums
Global Indicator	Proportion of urban population living in slums, informal settlements or inadequate housing
National Indicator	Proportion of urban population living in slums, informal settlements or inadequate housing
City Level Indicator	Percentage of urban households living in slums/ squatter settlements (%)
Bhopal's Performance	36%
National Average/ Benchmark	17.4%
Source:	Census 2011

% of Urban Households Living in Slums/Squatter Settlements

National Average: 17.4
Bhopal: 36.4
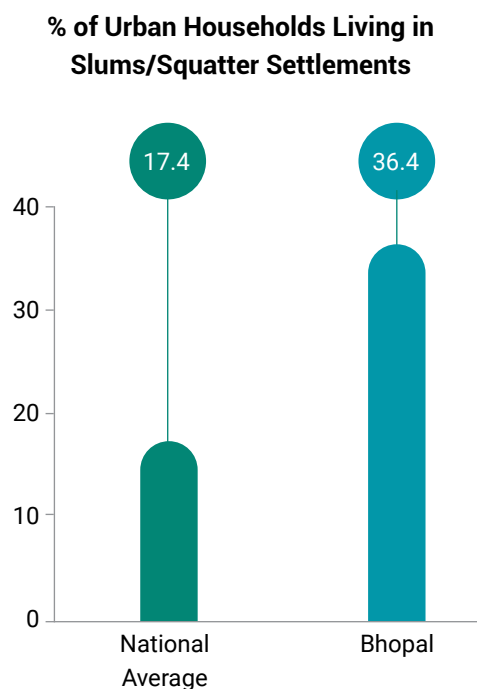
Image 5: The ongoing construction of a housing unit in Bhopal as part of the Housing for All programme of the Government of India.

Picture credit: UN-Habitat India

3.3.2 Access to Safe, Affordable, Accessible and Sustainable Transport Systems

The availability of affordable and efficient public transportation is an important welfare objective that the city constantly strives to pursue for its residents. Compared to cities of similar scale in India, Bhopal has an enviable coverage of public transportation, which will be expanded soon through various initiatives being implemented at the time of this review.

Multimodal Transportation

Bhopal City Link Limited (BCLL), a subsidiary of BMC, operates the city bus transportation system with a network spanning over 400 km with 115 buses operating along 11 identified bus routes. A dedicated 24-km lane has been developed as a Bus Rapid Transit System (BRTS) corridor along the Bhopal–Indore and Bhopal–Hoshangabad roads. The existing public transport facilities provide 74 per cent of the city's population with access to transit stops within a 500-m walking distance.

BSCDCL has implemented a public bike-sharing initiative, 'Chartered Bike', on PPP basis. There are around 500 GPS tagged cycles, accessible through smart cards and mobile apps, at 98 cycle docking stations across the city. BSCDCL has constructed 22 km of dedicated cycle tracks as a pilot initiative and intends to develop a complete cycling network in the city.

Image 6: Bhopal has developed 22 km of cycle track as a pilot initiative and intends to develop a network of cycle tracks in the city.

Picture credit: https://smartbhopal.city/

Under AMRUT, 600 new buses will be procured to cater to the city's future demand for public transportation, about half of which will operate on CNG. The city is studying the feasibility of including 100 electric buses (e-buses) in its fleet.

Bhopal Metro or Bhoj Metro is being constructed by the Madhya Pradesh Metro Rail Corporation Limited. Phase-1 of the development (Red and Blue lines), spanning over 28 km, is currently under construction.[105] Phase 1 is expected to become operational by 2023. The draft BDP 2031 has identified a high-density, mixed-use, transit-oriented development (TOD) strategy along the proposed metro corridor.

Image 7: Ongoing construction works as part of the metro rail project in Bhopal that will add to the public transport coverage.

Picture credit: UN-Habitat India.

Intelligent Traffic Management System (ITMS)

To address the violation of traffic rules in the city, BSCDCL has implemented ITMS in the city covering 29 road intersections. The project includes the first-of-its-kind analytics in traffic surveillance in India, which includes features like video surveillance cameras, Automatic Number Plate Recognition (ANPR) system, Red Light Violation Detection (RLVD) system, Speed Violation Detection (SVD) system, no helmet detection system for two wheelers, Public Address System (PAS), e-challan and e-payment systems and a 360-degree automation of the traffic system. Further, Intelligent Traffic Solutions (ITS) such as Adaptive Traffic Control System (ATCS) at 69 junctions across the city are also included in the project

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105 The Red Line connects Karond Circle in North Bhopal to AIIMS in the East, and the Blue Line connects Bhadbhada Square in West Bhopal to Ratnagiri Tiraha in the East.

Image 8: ITS has been implemented across 69 traffic junctions in Bhopal, including this one.

Picture credit: UN-Habitat India.

Image 9: A view of the ICCC centre developed by the city to host different ULB services such as the ITMS on one platform.

Picture credit: UN-Habitat India.

Complete Streets with Universal Accessibility

A 2.21-km stretch of the city has been developed as an exemplar to be emulated in different parts of Bhopal.[106] Atal Path, also known as Boulevard Street, is based on the concept of 'Complete Streets'. The 45-metre wide road is provided with a 17-metre carriageway, 2-metre wide green verge, 5-metre wide cycle tracks, and 4-metre wide underground drains and ducts along with service lanes and various ICT components.

A safe, affordable, integrated, and inclusive transport system will always be a priority for Bhopal.

SDG 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 the elderly
Global Indictor	Proportion of population with convenient access to public transport, by sex, age and persons with disabilities
National Indicator 1	Proportion of urban households with convenient access to public transport
National Indicator 2	People killed/injured in road accidents (per 100,000 population)
City Level Indicator 1	Percentage of population within 500-m of public transport stops (%)
Bhopal's Performance	72%
National Average/ Benchmark	N/A; 500-m benchmark as per MoHUA's SLBs for urban transport
City Level Indicator 2	People killed/injured in road accidents (per 1,00,000 population)
Bhopal's Performance	68 injured (per 100,000 population) in 2020
5 killed (per 100,000 population) in 2020	28 injured (per 100,000) population in 2020 11 killed (per 100,000) population in 2020
National Average	28 injured (per 100,000 population) in 2020
11 killed (per 100,000 population) in 2020	11.26 km
City Level Indicator 3	Kilometres of road with public transit per 100,000 population (km)
Bhopal's Performance	11.26 km
Benchmark	Above 40 km
Source:	National Crime Records Bureau (NCRB) and UN-Habitat India

Public Transport Coverage in Bhopal (%)

72

0   10   20   30   40   50   60   70   80

■ % of Population Within 500 m Distance to Public Transport Stops

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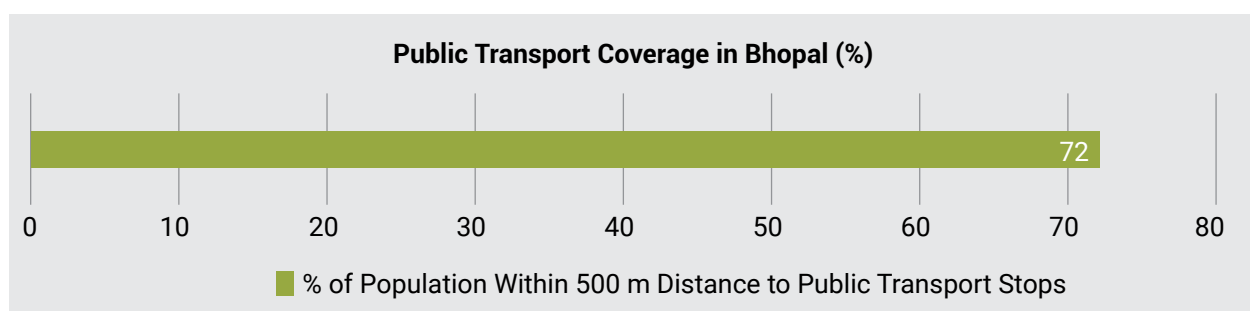
[106] It connects two major junctions—Bharat Mata Chauraha to Polytechnic Chauraha.

People Killed/Injured in Road Accidents
(per 100,000 population)

National Average
- Fatalities: 11
- Injuries: 28

Bhopal
- Fatalities: 5
- Injuries: 68

Legend: ■ Fatalities ■ Injuries

Kilometres of Road with Public Transit
(per 100,000 population)

Benchmark: 40

Bhopal: 11.26

Legend: ■ Kilometres

Image 10: A part of the 2.21-km Atal Path, also called Boulevard Street, which has been developed as a 'Complete Street' with cycle track, underground drains and ducts for utilities.

Picture credit: UN-Habitat India.

3.3.3 Inclusive and Sustainable Urbanization

Bhopal's vision of an urban future seeks to conserve the legacy of its environment as well as heritage and promote an inclusive development that responds to the needs and aspirations of its residents. Conservation of lakes and forests, integrating multi-modal transport systems and various developments proposed under national missions feature prominently in spatial planning strategies.

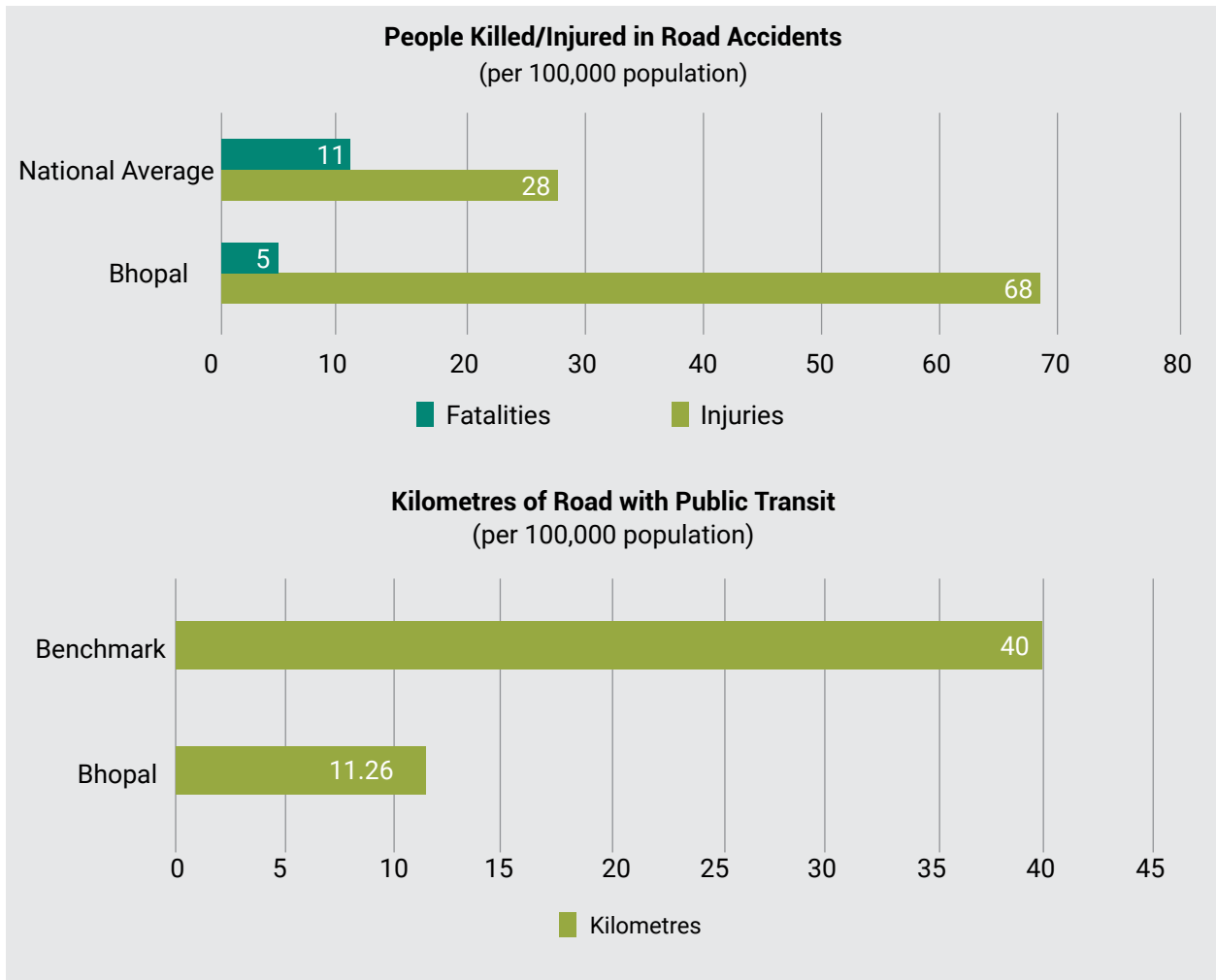## GIS-based Master Plan for City Development

The Directorate of Town and Country Planning (TNCP), a parastatal agency, in partnership with BMC and Bhopal Development Authority (BDA) have crafted a GIS-based draft BDP 2031 for the Bhopal region.[107] The approval and acceptance of the draft plan is pending with the state government. The BDP 2005, which was prepared in 1999, is still being utilized to guide development in the city. The city-specific Development Control Regulations (DCR) providing guidelines for building use, FARs, and ground coverage has been prepared as part of the draft BDP 2031. Madhya Pradesh *Bhumi Vikas Niyam* (Land Development Rules), 2012, is the state-level policy guideline for standards and control regulations for land development.

SDG 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
SDG Target 11a	Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning
Global Indicator 1	Ratio of land consumption rate to population growth rate
Global Indicator 2	Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically
Global Indicator 3	Proportion of population living in cities that implement urban and regional development plans integrating population projections and resource needs, by size of city
National Indicator	Proportion of cities with master plans
City Level Indicator 1	Number of planners per capita (number per 14,000)
Bhopal's Performance	0.09
Benchmark	1 planner per 14,000 population
City Level Indicator 2	Years since enforced master plan/ development plan was last reviewed and updated (number of years)
Bhopal's Performance	15
Benchmark	Every 5 years
City Level Indicator 3	Number of services being managed through command and control system in the ULB (e.g., SCADA, ICCC) (number)
Bhopal's Performance	12
National Average/ Benchmark	N/A

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107 It includes the urban area governed by BMC and 121 villages.

City Level Indicator 4	Number of functions being implemented by ULB out of 18 functions stipulated in the 12th schedule of the Indian Constitution (number)
Bhopal's Performance	Between 15 and 17
Benchmark	In accordance with 74th Constitutional Amendment Act of India, the ULBs need to perform 18 functions stipulated in the 12th schedule of the Indian Constitution
City Level Indicator 5	Existence of GIS-based master plan for the city
Bhopal's Performance	Absence of GIS-based master plan (prepared and pending approval)
Benchmark	AMRUT reform agenda – Formulation of GIS-based master plan for AMRUT cities
City Level Indicator 6	Environmental status report with action plans published by the ULB for the last three years (Y/N)
Bhopal's Performance	N
National Average/ Benchmark	N/A
City Level Indicator 7	Number of stipulated committees in the ULB: 1) Municipal Committee/ Council 2) Ward Committee 3) Metropolitan Planning Committee/ District Planning Committee 4) Project Coordination/ Monitoring Committee 5) Town Vending Committee (street vendors) 6) Heritage Conservation Committe
Bhopal's Performance	5
National Average/ Benchmark	N/A
City Level Indicator 8	ULB's citizen charter and appeal mechanisms
Bhopal's Performance	Exists offline and online
National Average/ Benchmark	N/A
City Level Indicator 9	Proportion of women councillors in municipal corporation (%)
Bhopal's Performance	48%
National Average/ Benchmark	At least 33 per cent (women representation shall not be less than one-third of the total number of seats) as per 74th Constitutional Amendment Act of India
Source:	URDPFI guidelines, MoHUA, GoI; 74th Constitutional Amendment Act of the Indian Constitution; UN-Habitat India

Number of Planners Per Capita

(number per 14,000 of population)

Benchmark	1
Bhopal	0.09

Number of Planners Per Capita (number per 14,000 of population)

**Years Since Enforced Master Plan /Development Plan Was
Last Reviewed and Updated**

	Number of Years
Benchmark	5
Bhopal	15

■ Number of Years

**Proportion of Women Councillors in
Municipal Corporation (%)**

	% Percentage
Legally Mandated	33
Bhopal	48

■ % Percentage

3.3.4 Protection of Cultural and Natural Heritage

Bhopal region is known for its historical monuments, national parks, and lakes.[108]

Most of the city's heritage structures are traced to the era of the Nawabs of Bhopal, extending from 1707 to 1949. The 14 historic gates of Bhopal opened to the old city, earlier known as *'Shehr-e-Khas'* (unique city). The core old city area, also the densest part of Bhopal in contemporary times, is constituted by the extensions of *Shehr-e-Khas* (Shahjahanabad and and Jehangirabad), developed by successive nawabs.

Conservation of Historical Places

Under the heritage conservation component of the Smart City Mission, the conservation of the Sadar Manzil complex was recently completed. A famous historical structure, it has been conserved and developed into a tourist hotspot with a museum, gallery, space for performing arts and other amenities for visitors. The Taj-ul-Masajid (or 'the crown of all mosques') is an architectural marvel and an important landmark of the city. The Taj Mahal of Bhopal, Gauhar Mahal, Sadar Manzil, and Moti Masjid along with the 14 historic gates are other prominent heritage features of the

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108 UN-Habitat India. "Bhopal City Profile Diagnostic Report". August 2021. https://www.unhabitat.org.in/sciap-publications/city-profile-and-diagnostic-report---bhopal

Image 11: The Sadar Manzil complex, a historical monument in Bhopal, has been conserved by the city and developed into a tourist hotspot with a museum, gallery, space for performing arts and other amenities for visitors.

Picture credit: https://smartbhopal.city/

modern city. The Taj Mahal, Shaukat Mahal and Teen Mohre Gate are some prominent heritage structures that require immediate restoration efforts. The state tourism department is exploring opportunities to establish public and private partnerships to restore and enable viable adaptive reuse of these heritage structures. The draft BDP 2031 has introduced a heritage TDR to incentivize the efforts of heritage conservation.

Conservation of Natural Heritage

The city has a unique topographic character with an abundance of rare flora and fauna, and a panoramic landscape of hills and lakes. The eastern and southern parts of the city border the Ratapani Tiger Reserve, which shelters around 45 tigers. The Van Vihar National Park (4.45 sqkm), situated along the southern banks of Upper Lake, has been developed as a zoological garden, wildlife conservation centre and ecotourism destination. The dense natural heritage in Bhopal has a significant footprint that is sought to be

protected. Close to 23 per cent of the city area is occupied by protected areas and waterbodies. The protected forests in the city, comprising 17 per cent of the city area, have natural grasslands that functions as effective carbon sinks.[109]

The draft BDP 2031 has proposed conservation zones along waterbodies, lakes, and forest enclaves, which add up to 32 sqkm (excluding the area of lakes, waterbodies and forests) of the BMC area. It also features market-based tools like the Green TDR that seek to incentivize the conservation of waterbodies and buffer zones. Further, a Green-Blue Master Plan has been prepared as part of the Smart City project to strengthen the city's water and lake conservation efforts.

3.3.5 Disaster Management

The institutional structure for disaster management in Bhopal functions under the aegis of the Disaster Management Act, 2005, a

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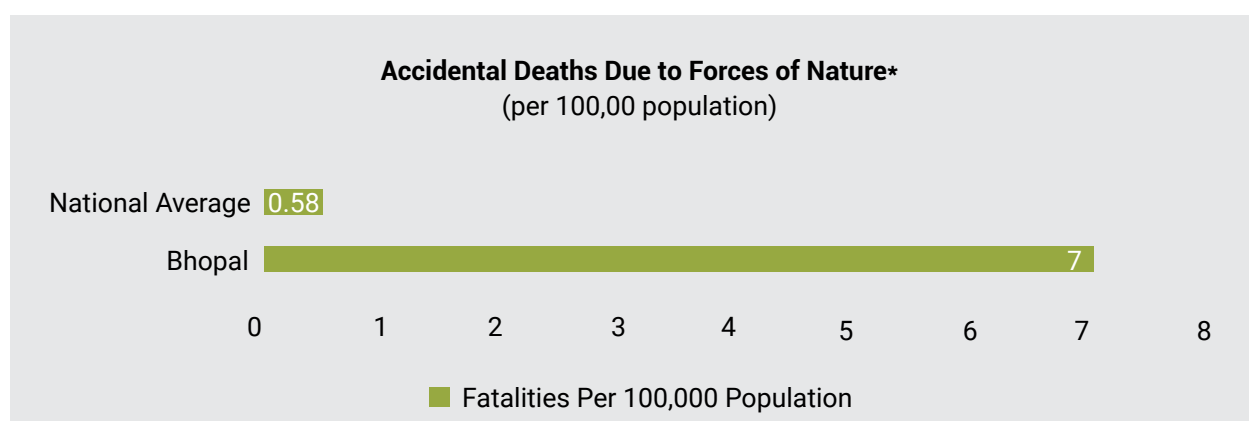109 Ibid.

SDG Target 11.4	Strengthen efforts to protect and safeguard the world's cultural and natural heritage
Global Indicator	Total expenditure (public and private) per capita on the preservation, protection and conservation of all cultural and natural heritage, by type of heritage (cultural, natural, mixed and World Heritage Centre designation), level of government (national, regional and local/municipal), type of expenditure (operating expenditure/investment) and type of private funding (donations in kind, private non-profit sector and sponsorship)
National Indicator	Total per capita expenditure on the preservation, protection and conservation of all cultural and natural heritage
City Level Indicator	Total per capita expenditure on the preservation, protection and conservation of all cultural and natural heritage
Bhopal's Performance	Data not available.
National Average/ Benchmark	Data not available.
Source:	N/A

national law, and its subsequent amendments. The Bhopal district collectorate play a key role in the institutional architecture at the city/district level; however, functions such as emergency fire response and management of urban flooding, are overseen by BMC. The guiding framework at the state level is provided by the Madhya Pradesh State Disaster Management Authority (MPSDMA), a statutory body.

SDG 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 those in vulnerable situations
SDG Target 11b	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
Global Indicator 1	Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
Global Indictor 2	Direct economic loss in relation to global GDP, damage to critical infrastructure and number of disruptions to basic services, attributed to disasters
Global Indicator 3	Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015–2030
Global Indicator 4	Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies
National Indicator 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
National Indicator 2	Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies

National Indicator 3	Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
City Level Indicator 1	Accidental deaths due to forces of nature* per 100,000 population
Bhopal's Performance	7 per 100,000 population
National Average	0.58 per 100,000 population
City Level Indicator 2	Presence of City Disaster Management Plan prepared/ updated in last five years
Bhopal's Performance	Plan prepared after year 2016
National Average/ Benchmark	Plan prepared after year 2016
City Level Indicator 3	Existence of hazard vulnerability maps/risk maps (at city level) prepared/ updated in the last five years for the main hazards threatening the city
Bhopal's Performance	Maps not prepared
National Average/ Benchmark	Maps prepared/ updated in or after year 2016
	Existence of urban flood / water stagnation risk assessment and management plan
City Level Indicator 4	Existence of urban flood/ water stagnation risk assessment and management plan
Bhopal's Performance	City has carried out flood risk assessment and is implementing the flood risk management plan. However, it is yet to conduct a rapid flood risk assessment to ascertain flood levels, flooding hotspots, threats to life and property, etc.
National Average/ Benchmark	City should conduct rapid / detailed flood risk assessment every five years
Source:	NCRB and UN-Habitat *Sourced from city level NCRB dataset on accidental deaths due to forces of nature. 'Forces of nature' include floods, torrential rains, earthquakes, landslides, lightning, exposure to cold, etc.

Accidental Deaths Due to Forces of Nature*
(per 100,00 population)

National Average 0.58
Bhopal 7

0   1   2   3   4   5   6   7   8

■ Fatalities Per 100,000 Population

3.3.6 Air Quality and Waste Management

Bhopal is known across the country for its stellar performance in implementing successful, viable, sustainable, and scientific waste management practices. It has consistently emerged as a top performer in the official countrywide assessments such as the *Swachh Survekshan* conducted by the Ministry of Housing and Urban Affairs, Government of India. The work done by the local government in waste management has won it several accolades and is today a matter of pride for the residents of the city. The virtuous cycle of good waste management practices will propel the city towards the achievement of Agenda 2030.

Effective Solid Waste Management

The city generates around 850 tonnes of waste every day. It uses 450 tipper autos for the door-to-door collection of waste and the service covers close to 96 per cent of the households in the city. Around 60 per cent of the waste generated is segregated at source, before being further segregated in six transfer stations and sent to treatment sites. There are nine Material Recovery Facilities (MRF) with processing capacity of 515 MT of dry waste per day. After segregation, the waste with high recycle value is sold while those with high calorific value are sent to Refuse-Derived Fuel (RDF) plants.

BMC has signed an MoU with NTPC for manufacturing torrefied charcoal, where the wet waste will be used for production of thermal energy. As per the plan, BMC will allocate 400 MT of waste to NTPC and has estimated to generate around INR 4.8 crore (USD 0.58 million) revenue annually.

BMC is setting up a bio-CNG plant with a bottling unit where 400 MT of wet waste will be processed to generate 6.4 MT of CNG. The project will cater to the growing demand for waste management services and will be implemented in PPP mode. The Chief Minister of the state recently inaugurated the commencement of construction of the plant. The CNG produced from the plant will be used for CNG vehicles in BMC's fleet, culminating the circular value chain of wet waste produced in the city.

BMC has drafted city specific waste management rules to streamline the operations and responsibilities of the stakeholders. The rules have strengthened the monitoring and enforcement frameworks and will enable the implementation of several central government initiatives like extended producer responsibility and ban on single use plastic.

Reclaimed Landfill Site

Before the city started and successfully enforced waste segregation, unsegregated waste accumulated at a 37-acre dump site called, Bhanpur Khanti, which had existed for over 30 years. With over 7.5 lakh tonnes of legacy waste, the site had become a major health and environmental hazard. Efforts to scientifically treat the waste started in 2018. BMC decided to execute the project on PPP basis and appointed a concessionaire to treat the waste and reclaim the site. The scientific treatment of waste involved methods of bio-mining to recover a 21-acre contiguous part of the site and bio-capping to recover the remaining 16-acre site.[110]

The city successfully reclaimed the erstwhile 37-acre dumpsite at Bhanpur Khanti by scientifically treating more than 7.5 lakh tonnes of legacy waste. In doing so, it drastically changed the lives of the communities living around the site and earned a reputation for it solid waste management practices at the national stage. A 16-acre area at the reclaimed site has been developed as a green open space.

110 Down to Earth. "Cleanest Cities of India: Bhopal reclaimed 37 acres of wasteland by clearing legacy waste". February 2022. https://www.downtoearth.org.in/video/waste/cleanest-cities-of-india-bhopal-reclaimed-37-acres-of-wasteland-by-clearing-legacy-waste-81654

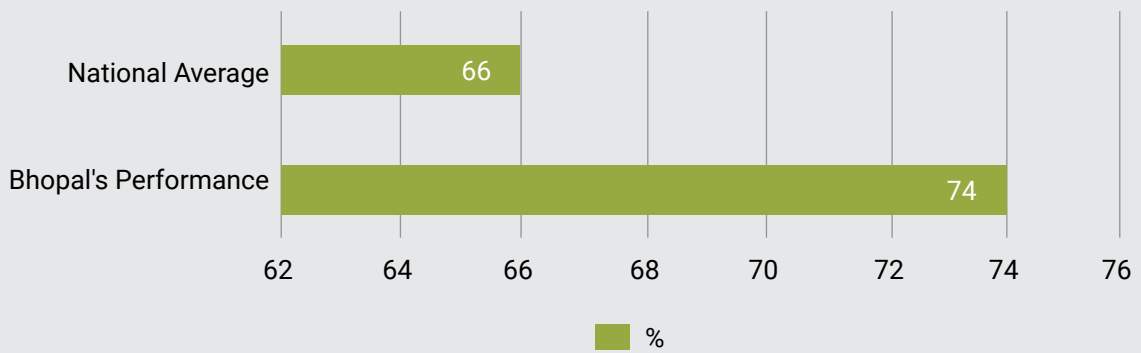|	
SDG Target 11.6	By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management
Global Indicator 1	Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated, by cities
Global Indicator 2	Annual mean levels of fine particulate matter (e.g., PM2.5 and PM10) in cities (population weighted)
National Indicator 1	Proportion of households from where solid waste is regularly collected, by agency of collection, by frequency of collection
National Indicator 2	Annual mean levels of fine particulate matter (e.g. ,PM2.5 and PM10) in cities (population weighted)
National Indicator 3	Number of days the levels of fine particulate matter (PM2.5 and PM10) above mean level
National Indicator 4	Percentage of wards with 100% door-to-door waste collection
National Indicator 5	Percentage of waste processed
City Level Indicator 1	Percentage coverage of wards under door-to-door collection system (%)
Bhopal's Performance	96%
National Average	96%
City Level Indicator 2	Annual mean levels of PM2.5 PM10 (μg/m3)
Bhopal's Performance	PM2.5: 51.8 (μg/m3)
PM10: 113 (μg/m3)	Annual mean standard (PM2.5): CPCB—40 μg/m3, WHO—10 μg/m3 Annual mean standard (PM10): CPCB—60 μg/m3, WHO—20 μg/m3
Benchmark	Annual mean standard (PM2.5): CPCB—40 μg/m3, WHO—10 μg/m3
Annual mean standard (PM10): CPCB—60 μg/m3, WHO—20 μg/m3	74%
City Level Indicator 3	Percentage of city's wet waste processed (%)
Bhopal's Performance	74%
National Average	66%
City Level Indicator 4	Percentage of the city's dry waste that is separated and classified for recycling/material recovery (%)
Bhopal's Performance	95%
National Average	60%
City Level Indicator 5	Percentage of hazardous waste processed (%)
Bhopal's Performance	75%
National Average	About 7.17 million MT of hazardous waste have been generated during April 2016—March 2017; 51.3% has been processed and 39.7% disposed off till 2018
Source:	PIB - Swacch Survekshan 2020: https://pib.gov.in/PressReleasePage.aspx?PRID=1598071 ; CPCB Annual Report 2018-19; UN-Habitat India

% Coverage of Wards Under Door-to-Door Collection System

National Average	96
Bhopal's Performance	96

0   20   40   60   80   100   120

■ % Coverage of Wards Under Door-to-Door Collection System

Annual Mean Levels of PM2.5 PM10 (ug/m3)

Category	CPCB Benchmark	Bhopal's Performance
PM10	60	113
PM2.5	40	51.8

Legend: ■ CPCB Benchmark ■ Bhopal's Performance

% of City's Wet Waste Processed

Category	%
National Average	66
Bhopal's Performance	74
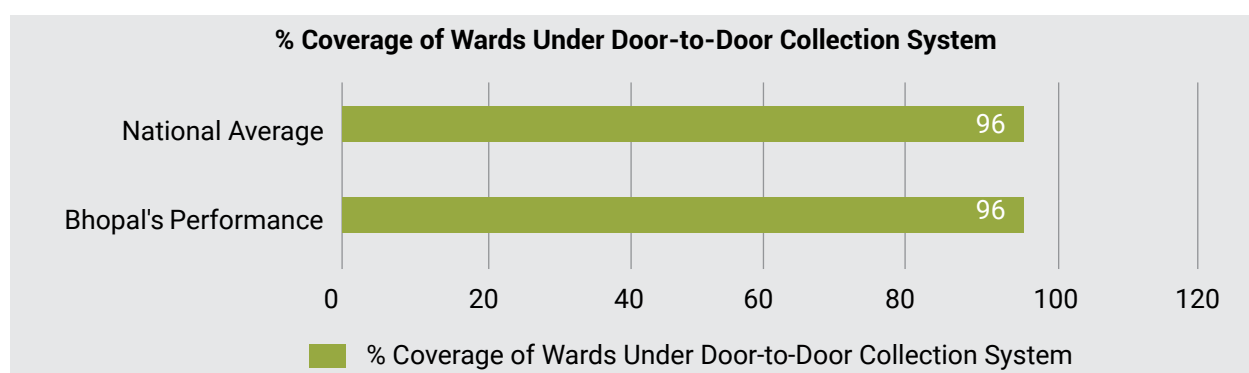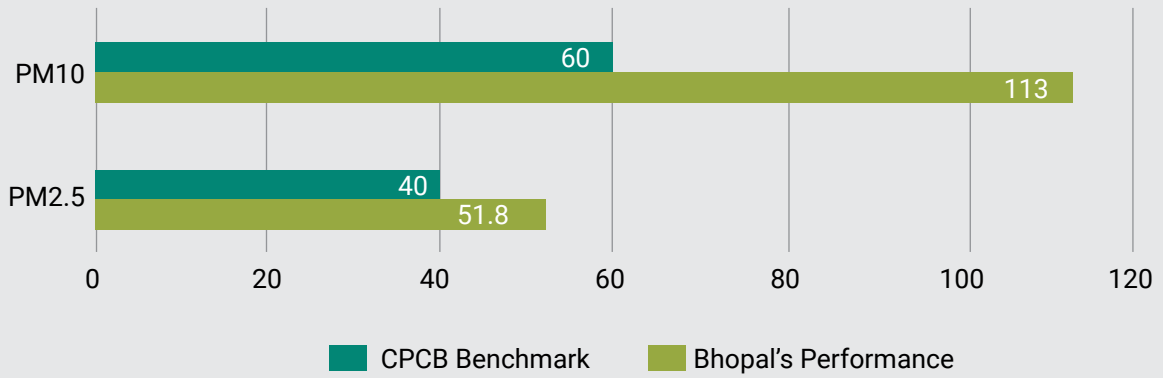
Legend: ■ %

% of the City Dry Waste Separated and Classified for Recycling/Material Recovery

Category	%
National Average	60
Bhopal's Performance	95

Legend: ■ %

% of Hazardous Waste Processed

Category	%
Bhopal's Performance	75

Legend: ■ %

56
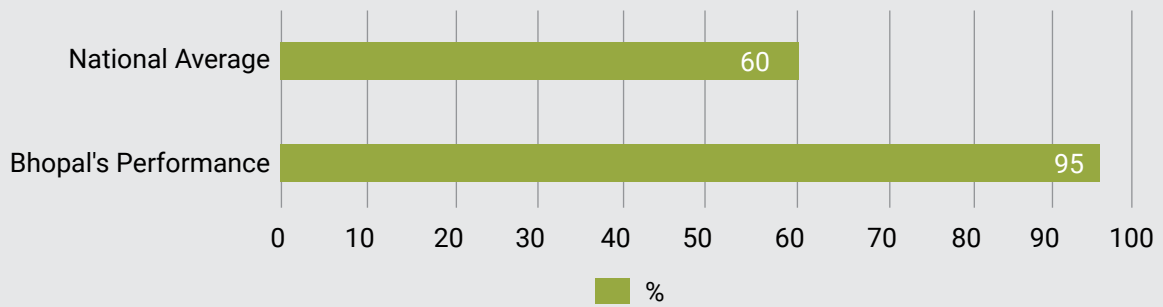
Image 12: A view of the 37-acre landfill site at Bhanpur Khanti, Bhopal, after it was reclaimed by the city by scientifically treating over 7.5 lakh tonnes of legacy waste.

Picture credit: https://www.downtoearth.org.in/

3.3.7 Availability of Open Spaces

Bhopal has a reputation for its iconic public spaces, including lakefront development along the Upper Lake and urban forests. Some prominent sites that attract residents and visitors alike include Sair Sapata (lakefront development along Bhadbhada Lake), Van-Vihar National Park, Madhya Pradesh Tribal Museum, Indira Gandhi Manav Sangrahalaya, Boat Club, VIP Road, dancing fountains, Raja Bhoj Statue, Raja Bhoj Bridge, etc.

Development of Public Parks

Bhopal is further slated to witness an increase in its already abundant open and green spaces by about 20 per cent as per BMC's plans. The city will soon see the development of over 120 parks under the Urban Green Spaces component of AMRUT. In addition, Bhopal's urban green spaces are sought to be enhanced 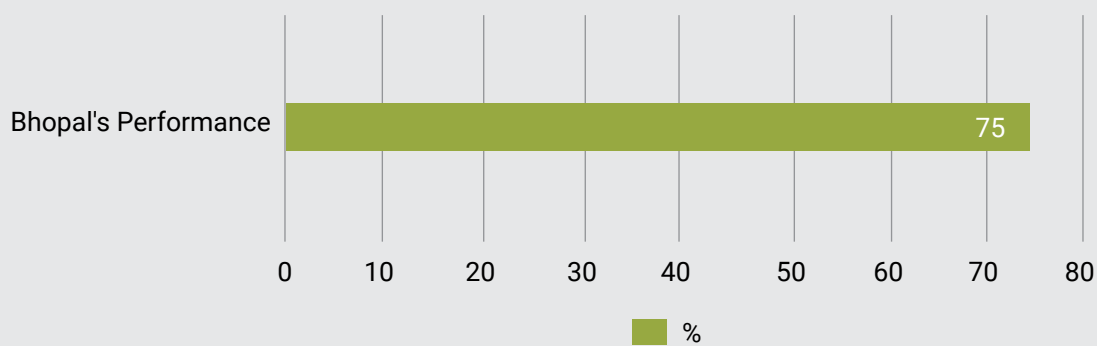by using the Miyawaki afforestation method. As an example, an 11-acre barren, rocky area was recently developed as a city forest using the Miyawaki method with recreational spaces for children and women.

Image 13: The city is working to enhance the accessibility of green open spaces through public parks such as this one.

Picture credit: UN-Habitat India.

Smart Street Lighting with Smart Poles

The city has been decked with intelligent multi-functional Smart Poles, which facilitate several utility and connectivity services. These futuristic Smart Poles are integrated with a 200-km Optical Fibre Network, which will enable real-time monitoring and surveillance for safety throughout the city. The poles empower and add to the infrastructural offerings with unique solar powered LED lights and surveillance cameras to improve safety with environmental sensors for monitoring the ambient environment and free WI-FI hotspots to help people connect and access the city's public utility services.

This is a first-of-its-kind public-private partnership initiative in the country to deliver bundled smart services to people. Under the smart street lighting initiative, BSCDCL has installed 20,000 smart LED lights across the city. These streetlights are integrated with the ICCC to ensure better monitoring of any breakdown in service delivery. To monitor the ambient air quality in real-time, environmental sensors have been installed along with the Smart Poles. The data generated has been assisting BSCDCL to take corrective actions in vulnerable areas of the city.

Image 14: A 'Smart Pole' installed in Bhopal that facilitates several utility and connectivity services.

Picture credit: https://smartbhopal.city/

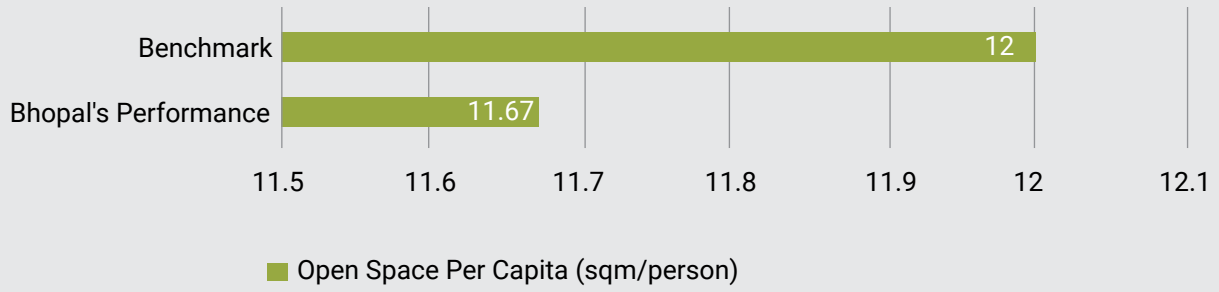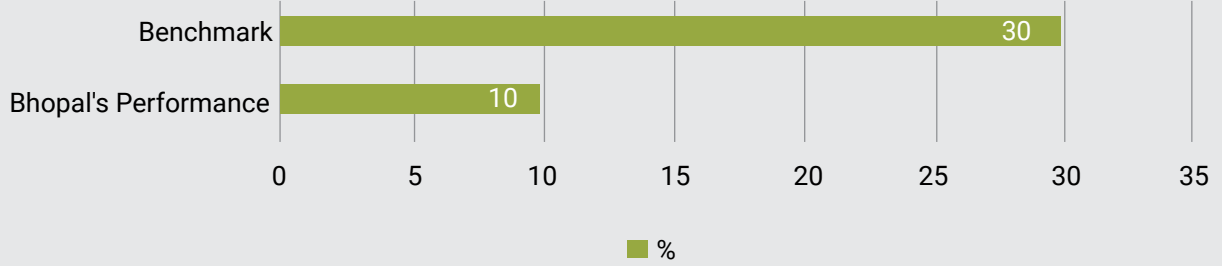|	
SDG Target 11.7	By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, the elderly and persons with disabilities
Global Indicator 1	Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities
Global Indicator 2	Proportion of persons victim of physical or sexual harassment, by sex, age, disability status and place of occurrence, in the previous 12 months
National Indicator	Proportion of households reporting an open space within 500 m from premises (urban)
City Level Indicator 1	Percentage of population within 500-m distance to public park/open space (%)
Bhopal's Performance	25%
Benchmark	Everyone should have access to public park/ open space within 300–800 m walkable distance located 5–15 minutes away (URDPFI guidelines)
City Level Indicator 2	Open space (includes recreational space, organized green, other common spaces) per capita (sqm/person)
Bhopal's Performance	11.67 sqm/person
Benchmark	12 sqm/person (URDPFI guidelines)
City Level Indicator 3	Percentage of recreational and open space (includes stadiums, theme parks, playgrounds, *maidan*) of total developable area (%)
Bhopal's Performance	10%
National Average/ Benchmark	25-30% of total developable area should be earmarked as recreational and open spaces (URDPFI guidelines)
City Level Indicator 4	Percentage of city roads covered with street lighting (%)
Bhopal's Performance	83%
Benchmark	100% (provision of street lighting is one of the mandatory functions of a ULB as per the 12th Schedule of the Indian Constitution
City Level Indicator 5	Percentage share of pedestrian fatalities to total fatalities (motorized/ non-motorized transport) in road accidents during a year (%)
Bhopal's Performance	20.19% in 2021
National Average/ Benchmark	Should be zero per 100,000 population as per SLBs for Urban Transport published by MoHUA, Government of India National average: 12.16% in 2021
Source:	NCRB and UN-Habitat India

% of Population Within 500m Distance to Public Park/Open Space

%

Open Space Per Capita (sqm/person)

Benchmark	12
Bhopal's Performance	11.67

Scale: 11.5, 11.6, 11.7, 11.8, 11.9, 12, 12.1
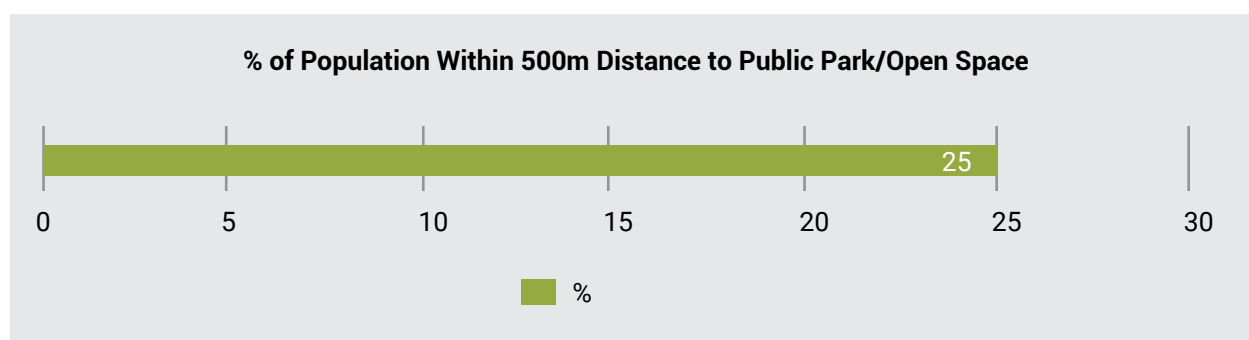
■ Open Space Per Capita (sqm/person)

% of Recreational and Open Space of Total Developable Area
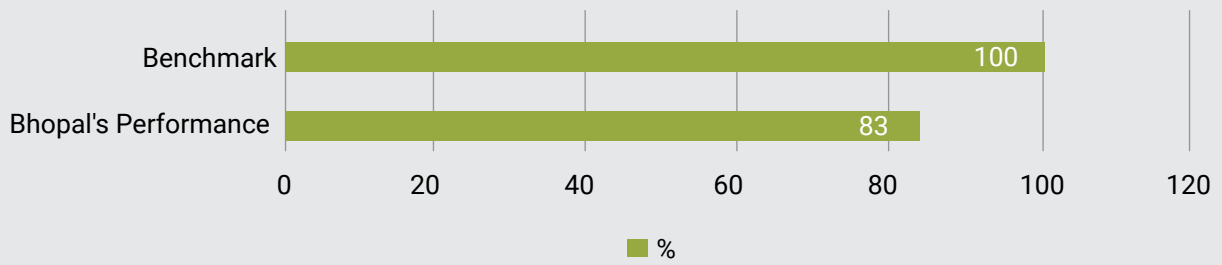
Benchmark	30
Bhopal's Performance	10

Scale: 0, 5, 10, 15, 20, 25, 30, 35

■ %

% of City Roads Covered with Street Lighting

Benchmark	100
Bhopal's Performance	83

Scale: 0, 20, 40, 60, 80, 100, 120

■ %

% Share of Pedestrian Fatalities to Total Fatalities (Motorized/Nonmotorized Transport) in Road Accidents in 2021

National Average	12.16
Bhopal's Performance	20.19

Scale: 0, 5, 10, 15, 20, 25

■ %
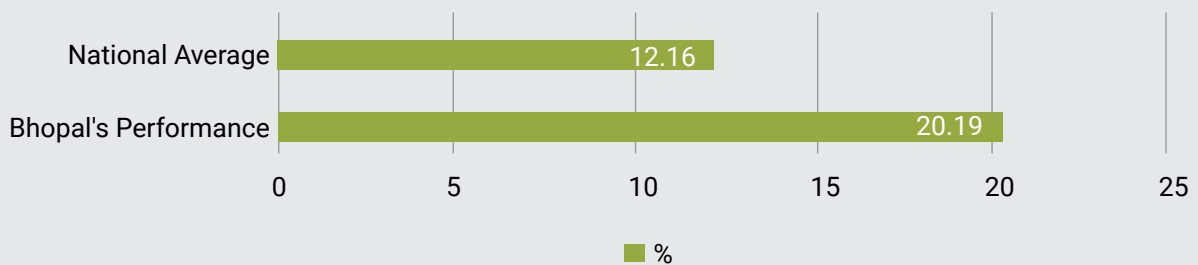
3.4 Key VLR Findings

In this section, the key findings from the two analytical layers in this report (SDG clustering and in-depth review of SDG11) are summarized.

3.4.1 SDG Clustering

The VLR process for Bhopal includes mapping of 56 developmental initiatives across the three pillars of people (SDGs 1, 3, 4, 5), planet (SDGs 6, 13, 15) and prosperity (SDGs 7, 8, 11). An overview of the number of projects across the three pillars is provided in Figure 14.

Figure 14: The share of the three pillars—people, planet, prosperity—in the clustering of 56 developmental projects in Bhopal as part of the VLR

Clustering of 56 Developmental Projects in Bhopal

20% Planet (SDGs 6,12,13,15)

18% Prosperity (SDGs 7,8,11,17)

18% People (SDGs 1,3,4,5)

The key initiatives under the 'people' pillar include improved access to basic amenities under SBM, shoring up the health infrastructure at the time of the pandemic by building on the coverage of existing PHCs a new additions like fever clinics, and augmented oxygen capacity. Further, initiatives that seek to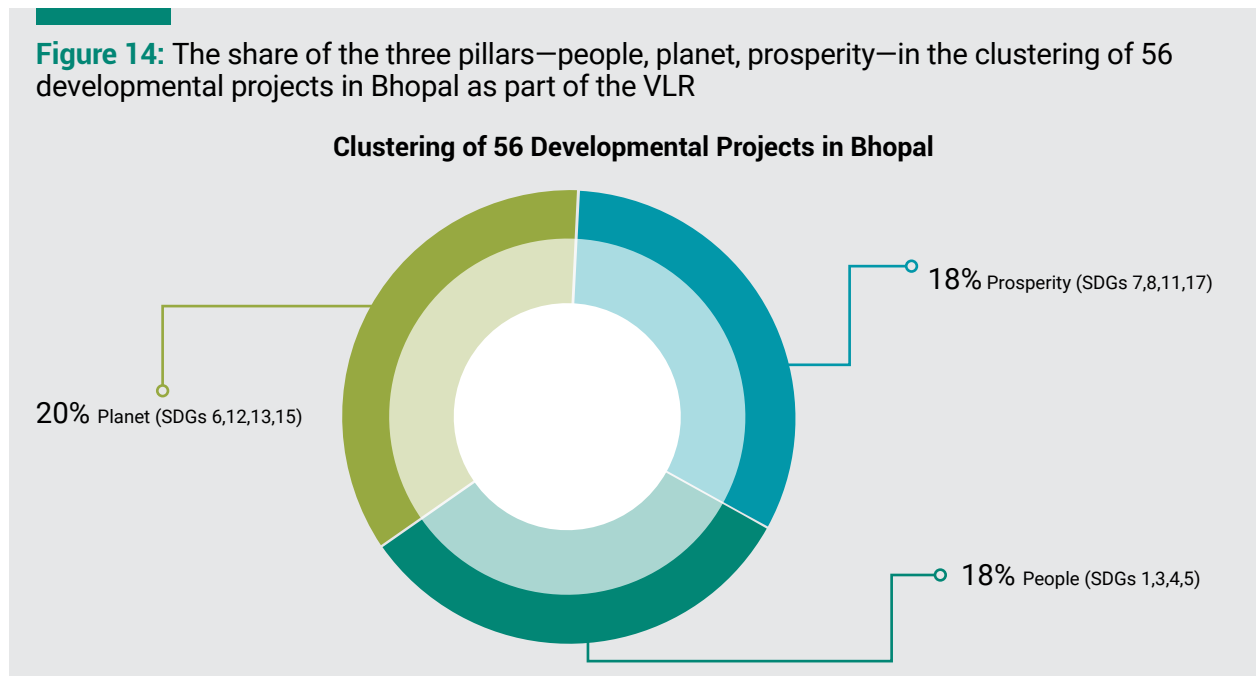 address the quality and availability of education such as implementation of NEP 2020 and Smart Schools are included too. The SDG-wise performance under the 'people' pillar is presented in Figure 15.

Figure 15: SDGs covered by 18 developmental initiatives in Bhopal under the 'people' pillar.

SDG Clustering of 18 Projects under "People"

- SDG 1 — No Poverty: 1
- SDG 3 — Good Health & Well Being: 8
- SDG 4 — Quality Educaion: 5
- SDG 5 — Gender Equality: 4

Number of Developemental Projects
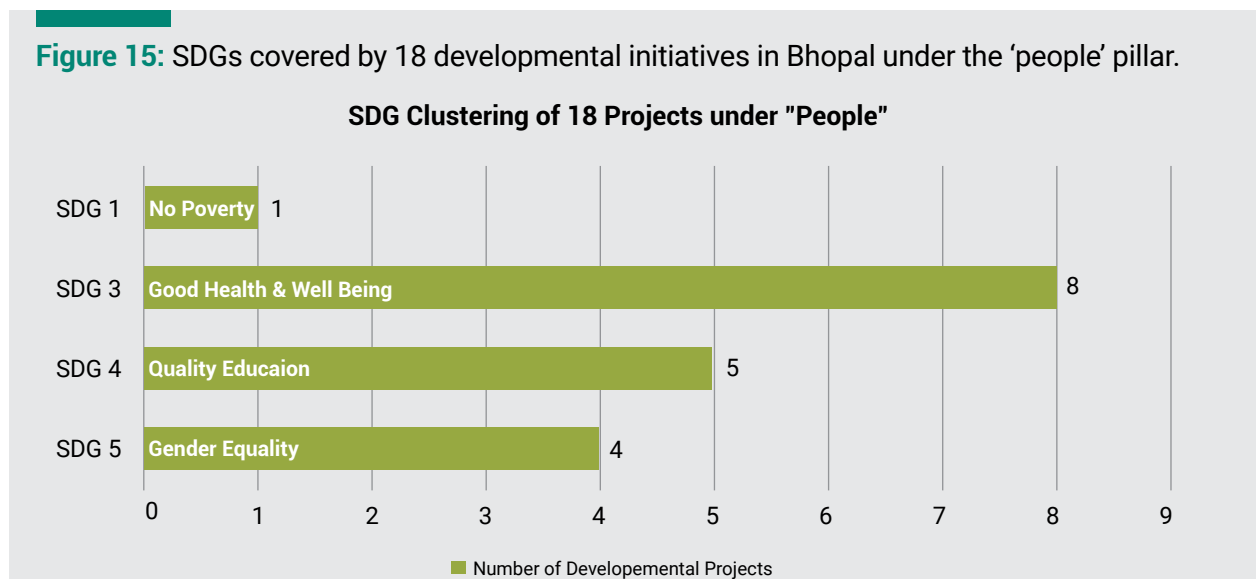
Improved water conservation, wastewater reuse, Bhopal's climate action plan, interventions to reduce GHGs, and the protection of the city's natural heritage are some prominent initiatives under the 'planet' pillar. The SDG-wise performance under this pillar is shown in Figure 16.

Figure 16: SDGs covered by 20 developmental initiatives in Bhopal under the 'planet' pillar.
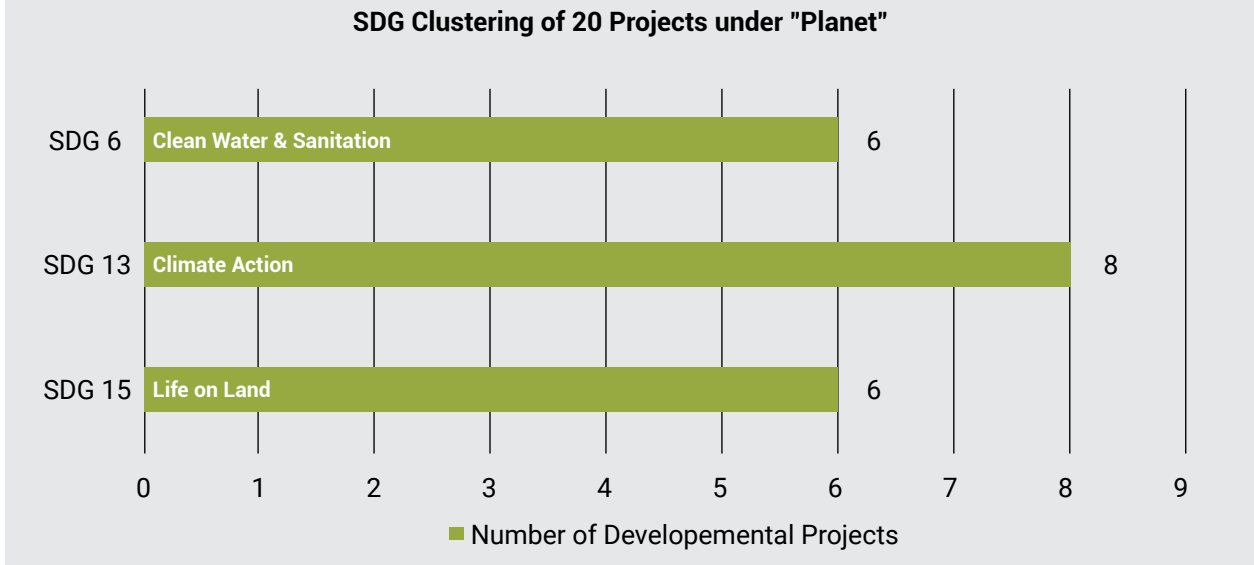
The highlights of the 'prosperity' pillar include ramping up the city's renewable energy capacity, an incubation centre for start-ups, and various centrally sponsored schemes such as the Smart City Mission, AMRUT, and SBM, among others. The preparation of a GIS-based master plan is another important initiative under this pillar. The SDG-wise performance under the 'prosperity' pillar is presented in Figure 15.

Figure 17: SDGs covered by 18 developmental initiatives in Bhopal under the 'prosperity' pillar.
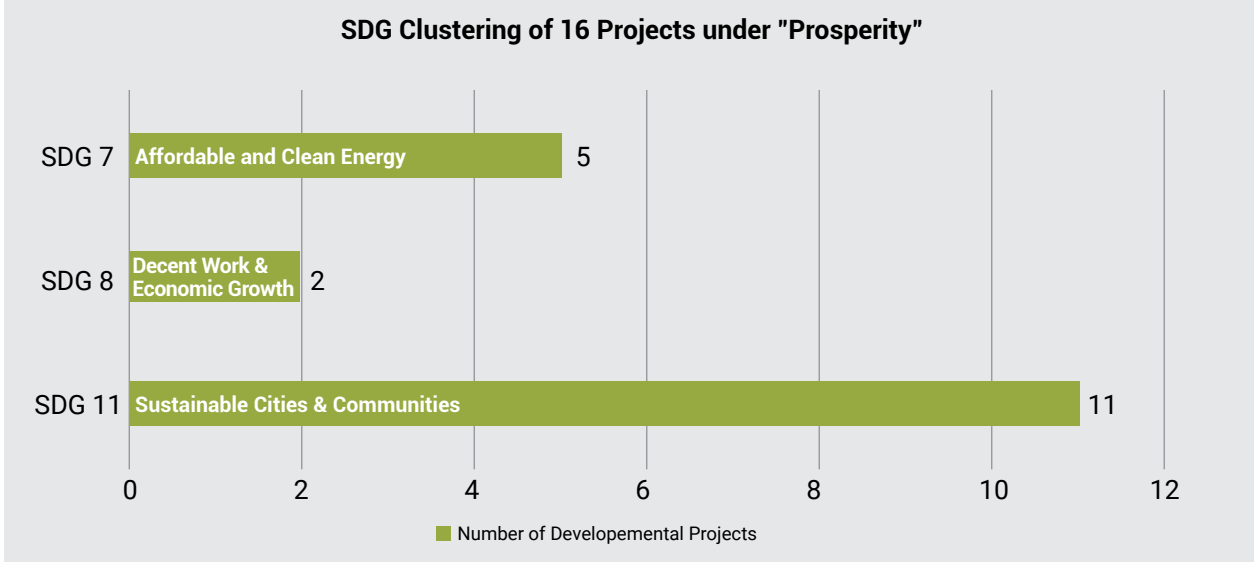
The 56 projects cut across the following four areas of intervention, which is illustrated in Figure 16—(a.) safety and innovation (9); (b.) basic infra/ social security (24); (c.) resilience (17); and (d.) digital governance (6).

Basic infrastructure and resilience figures as a priority in terms of the number of developmental projects have been taken across the city, which also reflects in the various projects clustered under the pillars of 'planet' and 'prosperity'.

Figure 18: The graph captures the clustering of the projects across four key areas of intervention.

Key Areas of Intervention for Bhopal City
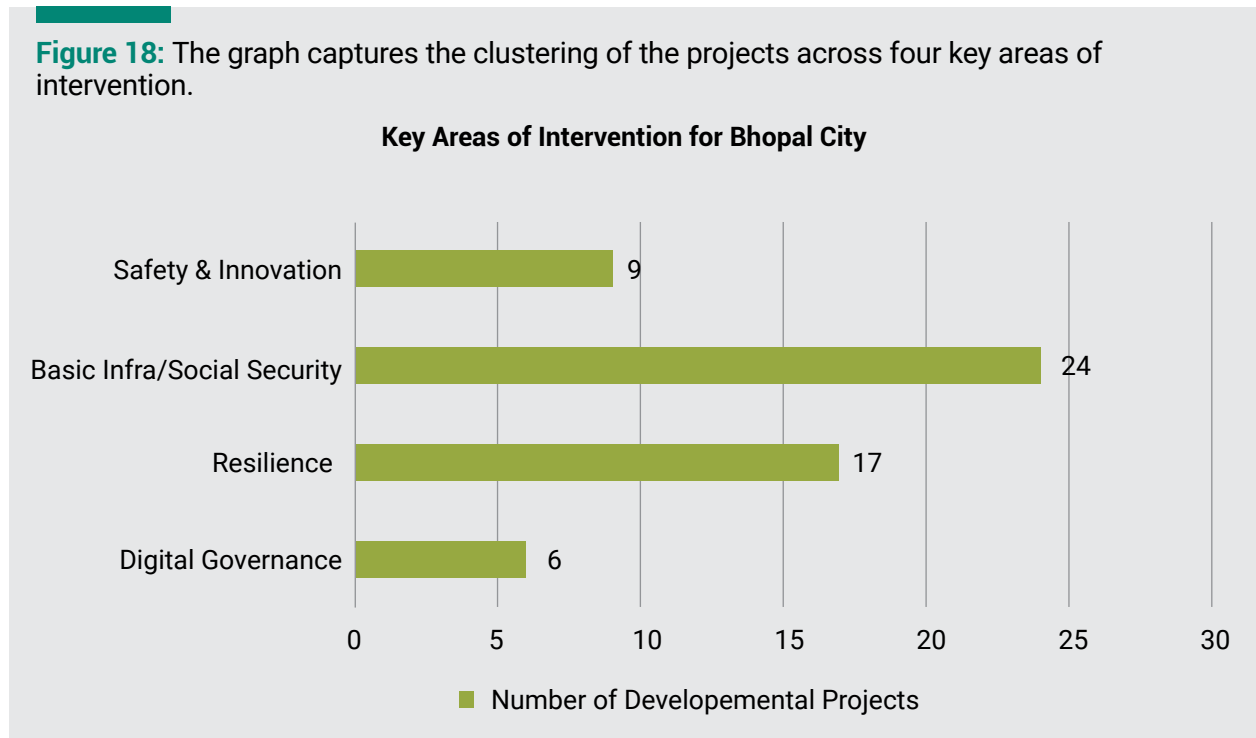
3.4.2 In-Depth Review of SDG 11

The following are the highlights from the detailed review of targets under SDG 11 conducted as part of the VLR process for Bhopal City:

Target 11.1 (Access to housing)

Even though the city has made progress in the provisioning of shelter, there remains a considerable shortfall in the availability of adequate, safe, and affordable housing. The percentage of households in slums/squatter settlements is 36 per cent, which is almost twice the national average. The city needs to work further to upgrade the existing slums/ squatter settlements and enhance the availability of basic services in these areas to improve performance on this parameter. At the same time, work under PMAY may be expedited and improved.

Target 11.2 (Sustainable Transport Systems)

The city performs well compared to cities of similar scale/ benchmarks in terms of public transport coverage; however there remains a gap in provisioning of public transport as seen from kilometres with public transit per lakh of the population. Bhopal has 11.2 km of roads with public transit per 100,000 population, which is only about a fourth of the benchmark figure at 40 km. Planned fleet expansion of city bus and metro corridors are steps in the right direction. The city, however, needs to work on road safety as the number of injuries per lakh population from road accidents at 68 in 2020 is almost twice the national average of 28.

Target 11.3 (Sustainable Urbanization and Human Settlements Planning)

There is a notable shortfall in the number of planners in Bhopal, as required by the benchmarks in relation to the size of the city. The lag in the review and revision of the master plan is also an area of concern for Bhopal. However, the city does well with the participation of people through local elected representatives in city management, under the provisions of the 74th CAA.

Target 11.4 (Protection of Natural and Cultural Heritage)

It is imperative to consolidate data from the state as well as city on the schemes for protection of the natural and cultural heritage of the city. The consolidated numbers remain unavailable due to multiple agencies operating at different levels of the government. However, the city has taken important initiatives in recent times to preserve its flora and fauna and conserve/ restore its heritage precincts in the old city area.

Target 11.5 (Disaster Management)

While the city has in place the essential elements under the disaster management architecture of the state/ country, it needs to work further to have hazard vulnerability maps/ risk maps and improve its flood risk management plan further by modelling various scenarios using appropriate tools.

Target 11.6 (Environmental Impact of Cities)
The city stands tall as an exemplar for its progress towards the achievement of this target, which is attributable to its solid waste management practices that have brought national acclaim for the city. However, it needs to work on its air pollution levels (PM 2.5 and PM 10), which exceed the acceptable levels by far. It should be an area of concern and action in the coming years.

Target 11.7 (Safe, Inclusive, Accessible Public Spaces)
The city does commendably well in terms of availability of open spaces—it has 11.67 sqm of open spaces per person, which is a metric that can serve as a benchmark for other cities. However, the distribution of open   needs to be even as only 25 per cent of the population is within 500 m of a public park/ open space. The percentage of recreational spaces as part of developable area (10 per cent) needs to be improved too.

3.4.3 Conclusion

There is a strong focus on good health and well-being, climate action, and creating a sustainable urbanization trajectory, as seen from the clustering of projects. While the availability of basic services has seen considerable improvements, a sizeable gap remains to be fulfilled.

The momentum built in the area of basic infrastructure/social security needs to be sustained and augmented. The interventions pertaining to digital governance need to be scaled and expanded. Considerable resources and planning energies have been devoted towards embedding resilience in the city's growth trajectory. The initiatives need to be sustained and consolidated to demonstrate changes in key city level climate indicators in the coming years.

As a city and community, Bhopal does well in providing solid waste management services, public transportation, and open spaces per capita. However, air pollution, city planning, housing, vulnerability/ risk mapping are some areas where it needs to work in the coming years to achieve the targets under Agenda 2030.

These findings come with some important disclaimers. One may notice gaps in the number of projects under SDG 1 (No Poverty), for example. It has more to do with the fact that the poverty alleviation initiatives are led by the district administration rather than the municipal body, even though there are important linkages in their work. Most of the data, therefore, is collected for the district as a whole rather than the municipal area in a disaggregated way. The gaps in the coverage of SDGs, therefore, have more to do with jurisdictional differences in the way the country is administered and the limited availability of disaggregated data rather than a lack of meaningful efforts by the city towards the achievement of the SDGs. It is for these reasons that convergence with frameworks for review and monitoring of the SDGs at the central and state level holds the key to providing a more comprehensive picture of the efforts to achieve the SDGs.

4 WAY FORWARD

Bhopal's VLR has identified priority areas for action as part of the city's quest to achieve the SDGs by 2030. The VLR has enabled an assessment of the developmental projects in Bhopal as they manifest themselves in the various city level sustainability indicators. In this section, the insights are translated into a blueprint for action using the pillars of the NUA as levers of implementation.[111]

First, under the pillar on urban legislation and regulations, there is an opportunity to ensure a more even distribution of open spaces in Bhopal by using regulations for enhanced access to open spaces in the spirit of 'leave no one behind'. This is to ensure that all communities in the city have equitable access to open spaces. Further, regulation may be used to also increase the share of recreational and open spaces as a proportion of total developable area in the city. Transparent and accountable processes are important elements

under this pillar of NUA—this VLR presents an opportunity to the city to use it in conjunction with existing technology platforms such as the ICCC to track the SDGs at the city level. One of the objectives of the ICCC is to enable people to constantly engage in and contribute to governance using technology. In line with this objective, Bhopal has undertaken to host a city level SDG dashboard at the ICCC that allows people to engage with the SDGs and participate in the review and monitoring of the city's progress towards the achievement of Agenda 2030.

Second, as part of the pillar pertaining to urban planning and design, this VLR points to the urgent need for augmenting the planning capacity of the city level agencies. The city needs more planners as well as processes that allow it to routinely review and update its master plan. It is a way for the city to materialize the findings of VLR in the physical layout of the city. Bhopal is one of the

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111 New Urban Agenda is a voluntary, non-binding agreement that sets the global standards towards the achievement of Sustainable Urban Development. It includes five pillars of implementation: a.) National Urban Policy, b.) Urban Legislation, Rules and Regulation, c.) Urban Planning and Design, d.) Urban Economy and Municipal Finance, and e.) Local Physical Implementation. It focuses on the achievement of SDGs with respect to cities and urbanization and includes a focus on spatial and territorial planning. It supports the implementation of Agenda 2030 through its three transformative commitments:

1.) Leave no one behind in the cities and fighting against poverty; 2.) Urban prosperity and opportunities for all; and 3.) Ecological and resilient cities and human settlements.

cities that has collaborated with UN-Habitat for a granular assessment of urban sustainability, using a spatial lens among others. It is an opportunity for the city to incorporate the knowledge and suggested interventions in its planning and design to further the cause of this VLR.

Third, the pillar on local economy and municipal finance points to an invaluable opportunity for the city to create an enabling governance structure that can incorporate VLR findings and use it as one of the tools to guide the allocation of resources by the ULB. As an example, the city could draw on global good practices to align the municipal budget with the SDGs. It could be a tool in the hands of administrators and elected representatives to improve the efficiency of resource allocation. Furthermore, the VLR may also be used as an accelerator to help Bhopal obtain financial resources from the state and

national governments for projects that put it on course to achieve the SDGs. It may also enable the city to source financial resources from non-government entities across the world that prioritize local action for the achievement of SDGs that this VLR represents.

Fourth, relevant to the NUA pillar on local implementation, BMC has undertaken to constitute a City SDG Action Committee of local elected representatives, members of administration, representatives of different communities and groups in the city, and other relevant stakeholders. With people's participation, this committee will regularly interact to further the steps initiated by the VLR and review the city's progress and alignment of projects with the SDGs. The city will endeavour to establish partnerships with all stakeholders to guide its local action towards Agenda 2030.

ANNEXURE

Annexure I: Mapping Projects to SDGs

Table 3: Mapping the Bhopal city projects to the SDGs and the relevant targets and NIF indicators.

SDG1:	No Poverty
Relevant Targets	Target 1.2: By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions
	Target 1.3: Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable
	Target 1.4: By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance
	Target 1.b: Create sound policy frameworks at the national, regional, and international levels, based on pro-poor and gender- sensitive development strategies, to support accelerated investment in poverty eradication actions
Relevant NIF Indicators	1.2.1: Proportion of population living below the national poverty line
	1.3.1: Percentage of households with any usual member covered by a health scheme or health insurance
	1.4.1: Percentage of Population getting safe and adequate drinking water within premises through Pipe Water Supply (PWS) (similar to 6.1.1)
	1.4.2: Proportion of population (Urban) living in households with access to safe drinking water & sanitation (toilets)
	1.4.4: Proportion of homeless population to total population
	1.a.2: Proportion of total government spending on essential services (education, health and social protection)

Projects	
1.	Improved Access to Basic Amenities (A)
SDG3	**Good health and well being**
Relevant Targets	Target 3.1: By 2030, reduce the global maternal mortality ratio to less than 70 per 1,00,000 live births
	Target 3.2: By 2030, end preventable deaths of new born and CUFs, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and CUF mortality to at least as low as 25 per 1,000 live births
	Target 3.3: By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water- borne diseases and other communicable diseases
	Target 3.4: By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being
Relevant Indicators NIF	3.1.1: MMR (per 1,00,000 live births)
	3.1.2: Percentage of births attended by skilled health personnel (Period 5 years)
	3.1.3: Percentage of births attended by skilled health personnel (Period 1 year)
	3.1.4: Percentage of women aged 15-49 years with a live birth, for last birth, who received antenatal care, four times or more (Period 5 years/1 year)
	3.2.1: CUF mortality rate (per 1,000 live births)
	3.2.2: Neonatal mortality rate (per 1,000 live births)
Projects	
1.	Poshit Parivar Suposhit Madhya Pradesh Scheme (B)
2.	Improving Children's and Women's Health (C)
3.	Achieving Full Immunization Coverage Milestones (D)
4.	Covid 19 Local Action (E)
5.	Fever Clinics (F)
6.	Interventions to Meet the Demand for Oxygen (G)
7.	ICCC for Pandemic Management (H)
8.	Nirmay Bhopal Mobile Application (I)
SDG4	Quality Education
Relevant Targets	Target 4.1: By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes
	Target 4.3: By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university
	Target 4.4: By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship
	Target 4.7: By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development
	Target 4.a: Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all
	Target 4.c: By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing states

SDG4	Quality Education
Relevant Indicators NIF	4.1.1: Percentage of students in grade 3, 5, 8 and 10 achieving at least a minimum proficiency level in terms of nationally defined learning outcomes to be attained by pupils at the end of each of above grades
	4.1.8: Number of years (i) free and (ii) compulsory education guaranteed in legal frameworks
	4.3.1: Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months
	4.3.2: Proportion of male-female enrolled in higher education, technical and vocational education
	4.4.1: Proportion of youth and adults with ICT skills
	4.7.1: Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment
	4.a.1 Proportion of schools with access to:(a) electricity; (b) computers for pedagogical purposes;(c) adapted infrastructure and materials for students with disabilities/ disabled friendly ramp and toilets;(d) basic drinking water;(e) single-sex basic sanitation facilities; and (f) basic hand washing facilities (as per the WASH indicator definitions), (in percentage)
	4.c.1: Proportion of trained teachers, by education level (primary, upper primary, elementary, secondary and higher secondary education)
Projects	
1.	Implementing the National Education Policy 2020 (J)
2.	State Programmes for Quality Education (K)
3.	Free Education for Children Orphaned by the Covid-19 Pandemic (L)
4.	CM Rise Schools in Bhopal (M)
5.	Smart Schools (N)
SDG5	Gender Equality
Relevant Targets	Target 5.1: End all forms of discrimination against all women and girls everywhere
	Target 5.2: Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation
	Target 5.5: Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life
	Target 5.a: Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws
Relevant Indicators NIF	5.1.3: Sex ratio at birth (per 1,000 male live births)
	5.1.4: Rate of crimes against women per 1,00,000 female population
	5.2.1: Proportion of crime against women to total crime reported in the country during the calendar year
	5.5.1: Proportion of seats held by women in national Parliament, State Legislation and Local Self Government (similar to Indicators 10.2.2 and 16.7.1)
Projects	
1.	Improved Sex Ratio in Bhopal (O)
2.	Women's Ownership of Property under PMAY (Urban) (P)
3.	Quality Education for the Girl Child (Q)
4.	Urja Mahila Help Desk (R)

SDG6	Clean Water and Sanitation
Relevant Targets	Target 6.1: By 2030, achieve universal and equitable access to safe and affordable drinking water for all
	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
	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
	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
Relevant Indicators NIF	6.1.1: Percentage of Population getting safe and adequate drinking water within premises through Pipe Water Supply (PWS)
	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
	6.3.1: Percentage of sewage treated before discharge into surface water bodies, 2020
	6.3.3: Proportion of wastewater treatment capacity created vis-a-vis total generation

Projects	
1.	Improvements in Water Supply Network (S)
2.	Centralized Control of Water Supply Using SCADA (T)
3.	Water Conservation Measures (U)
4.	Reuse of Treated Wastewater (V)
5.	Improved Sanitation Services (W)
6.	Improved Access to Toilets (X)

SDG7	Affordable and Clean Energy
Relevant Targets	Target 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix
	Target 7.3: By 2030, double the global rate of improvement in energy efficiency
	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
Relevant Indicators NIF	7.2.1: Renewable energy share in the total installed electricity generation
	7.b.1: Installed renewable energy generating capacity in the country (in watts per capita) (Similar to 12.a.1)

Projects	
1.	Waste to Energy Plant (MM)
2.	Energy Efficient Green Buildings (NN)
3.	Smart Street Lighting Initiative (OO)
4.	Encouraging the Use of Solar Energy (PP)
5.	20 MW Solar Plant at Neemach (QQ)

SDG8	Decent work and economic growth
Relevant Targets	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
	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
	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
	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
Relevant Indicators NIF	8.3.1: Percentage of workers in informal sector among total workers engaged in non-agriculture sector
	8.3.5: Number of start-ups recognized under Start-up India, (in number)
	8.5.2: Unemployment rate
	8.8.1: Percentage of households receiving social protection benefits under Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)
	8.b.2: Number of person days created under Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), (in lakh)
Projects	
1.	Incubation Centre for Start-Ups (RR)
2.	Safeguarding Livelihoods (SS)
SDG11	Sustainable cities and communities
Relevant Targets	Elaborated in VLR draft
Relevant Indicators NIF	Elaborated in VLR draft
Projects	
1.	Housing for All—Pradhan Mantri Awas Yojana (PMAY) (3.3.1)
2.	Multi-Modal Transportation (3.3.2)
3.	Intelligent Traffic Management System (3.3.2)
4.	Complete Streets with Universal Accessibility (3.3.2)
5.	GIS-based Master Plan for City Development (3.3.3)
6.	Conservation of Historical Places (3.3.4)
7.	Conservation of Natural Heritage (3.3.4)
8.	Effective Solid Waste Management (3.3.6)
9.	Reclaimed Landfill Site (3.3.6)
10.	Development of Public Parks (3.3.7)
11.	Smart Street Lighting Smart Poles (3.3.7)
SDG13	Climate action
Relevant Targets	Target 13.1: Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries
	Target 13.2: Integrate climate change measures into national policies, strategies and planning.
	Target 13.3: Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

SDG13	Climate action
Relevant Indicators NIF	13.1.3: 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 11.b.2)
	13.2.2: Achievement of Nationally Determined Contribution (NDC) Goals in post 2020 period
	13.3.1: Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment (Similar to Indicators 4.7.1 and 12.8.1), 2020
Projects	
1.	Climate Action Plan (Y)
2.	Initiatives to Reduce GHGs Emissions (Z)
3.	Green Transferable Development Rights (TDR) (AA)
4.	Climate Smart Cities Assessment (BB)
5.	Education, Awareness on Climate Change (CC)
6.	Clean Air Action Plan (DD)
7.	Disaster Management Cell and Action Plan (EE)
8.	Risk & Hazard Vulnerability Plan (FF)
SDG15	Life on Land
Relevant Targets	Target 15.1: By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and dry lands, in line with obligations under international agreement
	Target 15.9: By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts
	Target 15.b: Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation
Relevant Indicators NIF	15.1.1: Forest cover as a percentage of total geographical area
	15.1.2: Protected area as percentage of total geographical area
Projects	
1.	Protection of Natural Assets (GG)
2.	Proposed Tiger Reserve (HH)
3.	Conservation of Kerwa-Kaliasot Forest Region (II)
4.	Improving the Green Cover (JJ)
5.	City Forest (KK)
6.	Green-Blue Master Plan for Smart City (LL)

Annexure II: SDG Advisory Group

Image 15: An excerpt from the administrative order issued by the Bhopal Municipal Corporation to constitute a core group to conduct VLR activities.

कार्यालय नगर पालिक निगम भोपाल
सामान्य प्रशासन विभाग

::: आदेश :::

नगर निगम भोपाल में VLR (**Voluntary Local Review**) परियोजना मे कार्य करने हेतु निम्नानुसार कोर टीम का गठन किया जाता है, तदनुसार नगर निगम भोपाल मे होने वाली VLR की समस्त गतिविधियों मे भाग लेने हेतु अधिकृत किया जाता है:—

क्रं.	नाम	पद नाम	विभाग	संपर्क सूत्र
01	श्री चन्द्रप्रताप गोहल	अपर आयुक्त	—	
02	श्री राजीव कुमार	जी.आई.एस. विशेषज्ञ	एच.एफ.ए.	
03	श्री मनीष चौबे	बी.सी.एल.एल. मैनेजर	बी.सी.एल.एल.	
04	श्री जेड.ए. खान	नगर यंत्री	जलकार्य विभाग	
05	श्री सौरभ सूद	सहायक यंत्री	स्वास्थ विभाग	
06	सुश्री शालिनी सिंह	सहायक यंत्री	सीवेज प्रकोष्ठ	
07	श्री ईशु मंडराई	उपयंत्री	भवन अनुज्ञा शाखा	
08	श्री मंयक शर्मा	उपयंत्री	एच.एफ.ए.	
09	श्री अजय सोलंकी	उपयंत्री	एच.एफ.ए.	
10	श्री शरद द्विवेदी	उपयंत्री	एच.एफ.ए.	

तदनुसार आवश्यक कार्यवाही की जाये।

Source: Bhopal Municipal Corporation.

The SDG Advisory Group of the Bhopal Municipal Corporation, which is tasked with conducting and participating in the VLR activities, includes the following members:

Sr. No	Name	Designation	Department
1	Mr Chandrapratap Gohel	Additional Commissioner, BMC	N/A
2	Mr Rajiv Kumar	GIS Expert	Housing for All (HFA)
3	Mr Manish Chaubey	Manager, Bhopal City Link Limited (BCLL)	BCLL
4	Mr Z.A. Khan	City Engineer	Water Supply Department
5	Mr Saurabh Sood	Assistant Engineer	Health Department
6	Ms. Shalini Singh	Assistant Engineer	Sewage Cell
7	Mr Ishu Mandrai	Deputy Engineer	Building Permission Department
8	Mr Mayank Sharma	Deputy Engineer	Housing for All (HFA)
9	Mr Ajay Solanki	Deputy Engineer	Housing for All (HFA)
10	Mr Sharad Dwivedi	Deputy Engineer	Housing for all (HFA)

Annexure III: Stakeholder Consultation Workshop Programme

Bhopal Municipal Corporation

INVITATION

Stakeholder consultation workshop on Voluntary Local Review for Bhopal city under the Sustainable Development Goals framework

Letter No – Q1   Date – 05/01/2023

Dear Sir/Madam,

We are pleased to invite you to a stakeholder consultation workshop concerning the preparation of a Voluntary Local Review (VLR) for Bhopal city, scheduled to be held on **Monday, 09th January 2023 at BMC Conference Hall (ISBT). The event will start at 3:30 PM**

A Voluntary Local Review (VLR) document seeks to represent an aspirational statement and the commitment of a community to a global endeavor: the Sustainable Development Goals (SDGs). It serves to localize the SDGs and enables a city to review and plan its progress towards achievement of SDGs.

The Sustainable Development Goals are a collection of 17 interlinked global goals designed to achieve a better and more sustainable future for all The SDGs were set up in 2015 by the United Nations General Assembly and are intended to be achieved by the year 2030. They are included in the UN general Assembly resolution (UN resolution A/RES/70/1) known as Agenda 2030 .

The 2030 Agenda for sustainable development calls for stakeholders and citizen groups, including local authorities, to report on their contribution to the implementation of the Agenda. In this spirit, **Bhopal Municipal Corporation and United Nations Human Settlements Program (UN-Habitat)** have collaborated to engage in the reviews of SDG implementation in Bhopal, which is referred to as Voluntary Local Review (VLRs). Bhopal is the first city in India to prepare such a voluntary local assessment on the implementation of SDGs.

The VLR, to be truly transformative, needs to be based on inclusive participatory process where communities and territorial stakeholders are consulted and involved. We thus invite you to participate in the aforementioned workshop, as a part of the VLR process for Bhopal city.

Objectives of the stakeholder consultation workshop:

1. The main objective of stakeholder consultation workshop is to initiate a dialogue on the SDGs and 2030 Agenda and pave way for adaptation of SDG principles in day-to-day activities at the city level which may sum up to achieving overall sustainable goals.

2. Review and provide feedback on the draft Voluntary Local Review framework prepared for Bhopal

3. Contribute towards identifying way-forward for the successful implementation of 17 SDGs

4. Participate in Bhopal SDG Forum and support BMC to maintain an SDG Dashboard by providing relevant data periodically.

"Leave no one behind" (LNOB) is the central, transformative promise of the 2030 Agenda. It requires prioritizing the most marginalized and reaching them first. The planned stakeholder engagement is envisioned to build ownership of the VLR process, invite expertise, understand key issues and demands of residents, and gain a better understanding of what the data are suggesting and what it means for policy etc.

We look forward to your participation in the workshop.

Thanking You,

Additional Commissioner
Municipal Corporation

Bhopal Municipal Corporation

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The Agenda for the event is as follows:

Date of the event -   09-01-2022.
Time –   3:30 PM
Location –   Bhopal Municipal corporation Conference Hall (at ISBT)

Agenda:

Time	Particulars	Moderator / Speakers
3.30 pm to 3.40 pm	**Opening remarks setting the tone** Introduction to 17 SDGs, 2030 Agenda and VLR process	UN-Habitat/Lead Expert
3.40 pm to 3.45 pm	**Address by Municipal Commissioner** Welcome Address and Summarizing key actions to be taken	BMC
3.55 pm to 4.15 pm	**Address by Mayor** Highlighting the importance of stakeholder participation and sustainable development	BMC
4.15 pm to 4.30 pm	**Methodology of VLR and key findings** Summarize VLR methodology and present the key findings from Bhopal VLR Bhopal	UN-HABITAT/ Lead Expert
4.30 pm to 4.45 pm	**Localization of SDGs**	UN-Habitat
4.10 pm to 4.30 pm	**Open House (Q&A)** Interaction with key stakeholders and addressing queries	Moderator – UN-Habitat/Lead Expert
4.30 pm to 4.35 pm	**Vote of Thanks**	BMC

Additional Commissioner
Municipal Corporation

Note:

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