ICLEI
Local Governments for Sustainability
SOUTH ASIA

Investing in
Climate Resilient Cities

State Level Project Pipelines
Andhra Pradesh & Telangana



Acknowledgement and Disclaimer

In Appreciation:

ICLEI South Asia gratefully acknowledges the Governments of Andhra Pradesh and Telangana; the Greater Visakhapatnam, Kakinada, Vijayawada and Greater Hyderabad Municipal Corporations; elected representatives; government officers; technical experts; academia; community representatives; and the ICLEI South Asia team for their contributions to the city climate action plans and these climate project pipelines. We thank C40 Cities for supporting the preparation of the Kakinada and Vijayawada city climate action plans.

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About this Project

This report presents state-level climate project pipelines for Andhra Pradesh and Telangana, intended to support the state governments, cities and financing partners in moving local climate priorities into implementation. They are aggregated from the Net-Zero Climate Resilient City Action Plans of four cities: Visakhapatnam, Kakinada and Vijayawada in Andhra Pradesh, and Hyderabad in Telangana.

The Kakinada and Vijayawada Net-Zero Climate Resilient City Action Plans were prepared under the "Mainstreaming Climate Action in Three Cities in Andhra Pradesh" project, supported by C40 Cities. Hyderabad's plan was prepared under the "Development of Climate Resilient City Action Plan for Greater Hyderabad Municipal Corporation" project, supported by the Greater Hyderabad Municipal Corporation (GHMC). The Visakhapatnam plan was prepared by ICLEI South Asia for the Greater Visakhapatnam Municipal Corporation.

This state climate project pipeline report builds on the leadership and commitment of the Governments of Andhra Pradesh and Telangana and the Greater Visakhapatnam, Kakinada, Vijayawada and Greater Hyderabad Municipal Corporations, and on the contributions of the government departments, technical experts, academia and community representatives who helped shape the Net-Zero Climate Resilient City Action Plans.





Message from ICLEI South Asia

The Climate Investment Imperative



Emani Kumar
Deputy Secretary General, ICLEI &
Executive Director, ICLEI South Asia

The Climate Investment Imperative

India's climate goals will largely be delivered in its cities, where most new infrastructure will be built over the coming decades and where heat, flooding and water stress are already hitting hardest. Andhra Pradesh and Telangana are well placed to lead the way. Andhra Pradesh's Swarna Andhra 2047 vision aims for net-zero emissions by 2047. It is backed by an Integrated Clean Energy Policy that targets more than 160 GW of renewable energy. Telangana's Rising 2047 vision puts net-zero development at the centre of its growth, with Hyderabad as its focus. Both states are urbanising fast, so their cities will play a decisive role in realising these ambitions.

Hyderabad, Kakinada, Vijayawada and Visakhapatnam have taken an important step by preparing Net-Zero Climate Resilient City Action Plans, using ICLEI's Net-Zero ClimateResilientCITIES methodology. This report brings their projects together into state-level pipelines for Andhra Pradesh and Telangana. By the horizon year of each city's plan, these projects could cut greenhouse gas (GHG) emissions by about 123 million tCO_2e a year in Andhra Pradesh and 57 million tCO_2e a year in Telangana. They will deliver improved resilience to extreme heat, flooding, cyclones and water stress to more than 1.4 crore residents across these four cities in the two states.

Total climate project pipeline investment: *₹5.24 lakh crore for Andhra Pradesh by 2070 and ₹1.84 lakh crore for Telangana by 2047*
Four cities: *Kakinada, Vijayawada, Visakhapatnam, and Hyderabad*

The pipelines give each state a view of what its cities need, in which sectors and by when. With them, departments can prioritise projects against respective state targets, undertake the necessary feasibility studies, develop projects and match them to budgets, central missions and the Urban Challenge Fund. They can also bundle common projects across cities into state-wide programmes and offer financing partners a credible portfolio of investment-ready opportunities. I urge both states and their cities to use these pipelines to move together from plans to projects, and from projects to results.

ICLEI South Asia extends its sincere gratitude to the State Governments of Andhra Pradesh and Telangana, the Municipal Corporations of Greater Visakhapatnam, Kakinada, Vijayawada and Greater Hyderabad, partners, and all stakeholders who supported and shaped these plans. We are committed to working with both state governments and their cities, alongside our partners, to take these pipelines forward into prepared, financed and implemented projects for a Swarna Andhra, a Rising Telangana and a Viksit Bharat.

With appreciation and a shared commitment towards advancing climate resilient cities!



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Abbreviations

3R	Reduce, Reuse and Recycle
AC	Air conditioner
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
AP ECBC	Andhra Pradesh Energy Conservation Building Code
BGI	Blue-Green Infrastructure
BLDC	Brushless Direct Current
CAP	Climate Action Plan
CCTV	Closed-Circuit Television
CCUS	Carbon Capture, Utilisation and Storage
CNG	Compressed Natural Gas
CRC	ClimateResilientCities
CRCAP	Climate Resilient City Action Plan
DeWATS	Decentralised Wastewater Treatment Systems
DISCOM	Electricity Distribution Company
DMA	District Metered Area
E-Bus	Electric Bus
ECBC	Energy Conservation Building Code
ECSBC	Energy Conservation and Sustainable Building Code
ECSBC-R	Energy Conservation and Sustainable Building Code – Residential
EE	Energy Efficiency / Energy-Efficient
EPR	Extended Producer Responsibility
EV	Electric Vehicles
EWS	Early Warning System
FSI	Floor Space Index
FSTP	Faecal Sludge Treatment Plant
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIS	Geographic Information System
GOBARdhan	Galvanizing Organic Bio-Agro Resources Dhan
GPS	Global Positioning System
GW / GWh	Gigawatt / Gigawatt-hour
HITEC City	Hyderabad Information Technology and Engineering Consultancy City
HMWSSB	Hyderabad Metropolitan Water Supply and Sewerage Board
HVAC	Heating, Ventilation and Air-conditioning
HYDRAA	Hyderabad Disaster Response and Asset Protection Agency
ICE Policy	Integrated Clean Energy Policy
IDF	Intensity–Duration–Frequency
INR / ₹	Indian Rupee
IoT	Internet of Things
IT	Information Technology
kLD	Kilolitres per Day
km / sq. km	Kilometre / square kilometre
kWh	Kilowatt-hour
kWp	Kilowatt-peak
LBSAP	Local Biodiversity Strategy and Action Plan
LED	Light-Emitting Diode
LEZ	Low Emission Zone
LPCD	Litres per Capita per Day
MISHTI	Mangrove Initiative for Shoreline Habitats & Tangible Incomes
MLD	Million Litres per Day
MMTS	Multi-Modal Transport System
MRF	Material Recovery Facility
MRV	Monitoring, Reporting and Verification
MW / MWp	Megawatt / Megawatt-peak
NDC	Nationally Determined Contribution
NGO	Non-Governmental Organisation
NMT	Non-motorised transport
NRW	Non-Revenue Water
PAT	Perform, Achieve and Trade
PM E-DRIVE	Prime Minister Electric Drive Revolution in Innovative Vehicle Enhancement
PSP	Pumped Storage Power
PV	Photovoltaic
RDF	Refuse-derived fuel
RE	Renewable energy
RFID	Radio-Frequency Identification
RWA	Resident Welfare Association
RWH	Rainwater Harvesting
SATAT	Sustainable Alternative Towards Affordable Transportation



SBM-U	Swachh Bharat Mission – Urban
SCADA	Supervisory control and data acquisition
SDG	Sustainable Development Goal
SOP	Standard operating procedure
SRTW	Safe Reuse of Treated Wastewater
STP	Sewage treatment plant
tCO2e	Tonnes of carbon dioxide equivalent
TGSRTC	Telangana State Road Transport Corporation
TPD	Tonnes per day
TSAPCC	Telangana State Action Plan on Climate Change
TS ECBC	Telangana State Energy Conservation Building Code
UPHC	Urban Primary Health Centre
USD	United States Dollar
WASH	Water, Sanitation and Hygiene



01 Setting the Context

Indian cities are the engines of the Viksit Bharat 2047 vision and are on the front line of rising heat, floods and water stress. Building resilience and low-carbon infrastructure into today's urban investments is the way to get it right the first time.

Why Cities Matter

600 MILLION	75%	44%	USD2.4 TRILLION+
people likely to live in Indian cities by 2036	of GDP expected to come from cities by 2036	of India's GHG emissions come from urban areas	urban climate investment needed by 2050

1.1 Climate Resilient Cities for a Viksit Bharat

India has set forth an ambitious **Viksit Bharat vision** of becoming a developed economy by **2047**. At the same time, India has committed to achieving **net-zero greenhouse gas (GHG) emissions by 2070**, thereby anchoring its development in a climate-conscious and sustainable pathway.

Cities serve as the country's economic and innovation powerhouses and will play a critical role in realising the vision of Viksit Bharat 2047. With 600 million people likely to live in urban areas by 2036, their contribution to the country's GDP is expected to rise from 63% currently to 75% by 2036[1]. This rapid urbanisation will generate significant demand for housing, infrastructure and basic services, while increasing exposure to climate and disaster risks

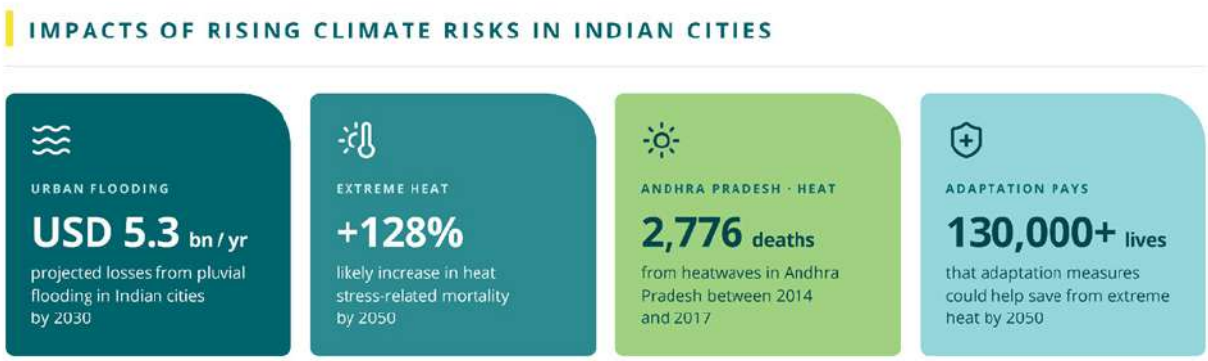
Rising climate risks in cities

Climate change is already straining urban systems, impairing service delivery and risking the health of populations. Indian cities are experiencing more frequent and intense heat, flooding, water stress and other climate-related hazards, with impacts spanning across health, livelihoods, infrastructure and economic productivity. For example, losses due to pluvial flooding in Indian cities were estimated to reach USD 5.3 billion per year by 2030, while heat stress-related mortality is likely to increase by 128% by 2050[2]. These impacts are particularly significant for vulnerable populations, including low-income households, informal and outdoor workers, elderly, children and women. For example, a study identified that outdoor workers in Ahmedabad lost an average of 11 workdays due to extreme heat, with at least 10% of surveyed workers requiring hospitalisation[3].

Investing in climate resilience can significantly reduce these risks and losses. The World Bank estimates that climate adaptation measures could mitigate annual urban flood-related losses of approximately USD 5 billion by 2030 and help prevent more than 130,000 deaths from extreme heat by 2050[2]. These findings demonstrate that climate resilience is not only an environmental priority, but should become an essential component of urban development, public health and infrastructure planning.

[1] *World Bank: A roadmap to shaping India's urban future, 2025*
[2] *World Bank: Towards Resilient and Prosperous cities in India, 2025*
[3] *"Rising temperatures, deadly threat: recommendations for Ahmedabad's government officials." NRDC Briefings Series, 2013*





India's climate ambition and role of cities

India has matched this challenge with an ambitious climate vision and action. The 2070 net-zero commitment is backed by firm near-term targets. India achieved the target of 50% non-fossil-based installed power capacity by 2030 five years early. India's **Nationally Determined Contribution (NDC) for 2031-2035** has ramped up its targets to a 47% reduction in emissions intensity of GDP from 2005 levels and 60% of power capacity from non-fossil sources by 2035[4]. These goals dovetail with the Viksit Bharat 2047 vision and are being delivered through national policies and programmes on renewable energy, high-efficiency buildings, electric mobility, water security, waste management, clean air, urban greening, and disaster resilience, as shown in Figure 1. **Atmanirbhar Bharat** complements this vision by building the domestic manufacturing base for solar modules, batteries, electric vehicles and green hydrogen.

Cities are central to delivering this ambition. Urban areas account for about 44% of India's GHG emissions[5] and will house much of the infrastructure that will shape the country's emissions and risk profiles for the decades to come. Climate action in cities also leads to wider benefits such as cleaner air, reliable water, efficient transport, cooler homes, better health, new green jobs and improved quality of life, especially for low-income groups. It supports progress towards the Sustainable Development Goals (SDGs) on good health (SDG 3), clean water (SDG 6), clean energy (SDG 7), decent work (SDG 8), sustainable cities (SDG 11) and climate action (SDG 13).



Figure 1: India's climate commitments and key sectoral policies

[4] *Government of India: India's NDC 2031-2035, April 2026*
[5] *WWF India: Background paper on Cities and Climate Change: Indian context*

1.2 The Urban Climate Investment Opportunity

The scale of investment required to address these challenges is substantial. India will require more than USD 2.4 trillion in investment by 2050 to provide climate-resilient and low-carbon urban infrastructure and services under a conservative urbanisation scenario, with estimates reaching USD 2.8 trillion in a moderate urbanisation scenario[2]. These investment requirements far exceed municipal financing capacities.



With over 50% of the urban infrastructure required for 2050 yet to be built[2], India has a strategic opportunity to get it right the first time. Embedding climate resilience, clean energy, and resource efficiency into new infrastructure and services from the outset can set cities on a safer, future-ready and climate-sensitive development pathway. At the same time, retrofitting and upgrading existing assets is essential to manage the climate risks cities already face and to meet growing service demand.

1.3 Moving from Climate Action Plans to Project Pipelines

Realising this opportunity would require states and cities to translate climate priorities into implementable investments. City-scale climate action plans provide a strong foundation by identifying climate risks, high-risk wards and vulnerable communities, as well as sectoral interventions and targets. They enable Urban Local Bodies to integrate climate-resilient interventions into city planning, budgeting and management.

State and city governments need support to translate these climate interventions into capital investment projects, including the preparation of a pipeline of viable projects, supported by climate benefits and financing strategies. With over 75% of urban infrastructure financing coming from central and state governments and only 15% funded by urban local bodies through own surplus revenues[7], city project pipelines need to be linked to state level climate and urban development priorities and financing mechanisms to drive at-scale implementation.



[6] *Compiled by authors based on Government of India, NDC 2031–2035 (2026); NITI Aayog, Scenarios Towards Viksit Bharat and Net Zero (2026); and MoHUA, MNRE, MoEFCC and PIB sources*
[7] *World Bank (2022), Financing India's Urban Infrastructure Needs: Constraints to Commercial Financing and Prospects for Policy Action; see press release, 14 November 2022.*

A pipeline of evidence-based climate projects can support state and city departments to move beyond broad strategic priorities, towards well-defined projects with clear delineation of scale, costs, timelines, benefits and funding sources. It will support cities in identifying early-stage project requirements, planning project preparation and identifying financing sources and partners. Multi-level climate governance, through coordination mechanisms and interlinked institutional structures provides a framework to connect local climate-resilient projects with state policies, departmental schemes and budgetary programmes. This helps cities identify potential funding sources and integrate climate priorities into ongoing and planned urban investments.



02 Andhra Pradesh, Telangana and the Climate Project Pipelines

A cyclone-exposed coastal state and India's youngest, fast-urbanising state, each with net-zero ambitions in its 2047 vision. These pipelines bring together projects from the Net-Zero Climate Resilient City Action Plans of Visakhapatnam, Kakinada, Vijayawada and Hyderabad, prepared with ICLEI South Asia's Net-Zero ClimateResilientCities methodology – projects that could make 40.2 lakh residents in Andhra Pradesh and 1.06 crore residents in Hyderabad more resilient to climate hazards such as heat stress, urban flooding, landslides, sea-level rise and storm surge.

THE STATES AT A GLANCE

5.32 crore
people in Andhra Pradesh, 36.5% of them in urban areas

58%
of Telangana's people expected to live in urban areas by 2036 (about 50% today)

₹5.24 lakh cr
estimated pipeline investment in Andhra Pradesh across nine sectors

₹1.84 lakh cr
estimated pipeline investment in Telangana across eight sectors

123 $MtCO_2e$
Cumulative annual GHG emission reduction potential from 3 cities in Andhra Pradesh, by each city plan's horizon year

57 $MtCO_2e$
Annual GHG emission reduction potential from Hyderabad in Telangana, by the 2047 horizon year

5
key climate hazards across the three cities in Andhra Pradesh: heat stress, urban flooding, landslides, sea-level rise and storm surge

2
key climate hazards in Hyderabad: heat stress and urban flooding

2.1 Andhra Pradesh State Context

Andhra Pradesh is home to about 53.2 million people and it contributes around 4.7% to the national GDP[8]. With a coastline of about 974 km, fast-growing cities, and diverse ecosystems, it is ranked as the second most vulnerable state in the country[9]. Rising temperatures, erratic rainfall, sea-level rise and more frequent cyclones already affect agriculture, water availability and coastal livelihoods, and heatwaves have taken a growing toll on public health[10]. These risks are amplified by rapid urbanisation: 36.5% of the population lives in urban areas[11], and growth is concentrated in coastal cities such as Visakhapatnam and Kakinada, which face cyclones, storm surges and sea-level rise.

Andhra Pradesh is steering its transition to a green economy through the Integrated Clean Energy (ICE) Policy 2024. Over the policy period to 2029, it targets more than 160 GW of renewable energy, 22 GW of pumped storage, 25 GWh of battery storage and 1.5 million tonnes of green hydrogen a year[12]. The ICE policy is a key instrument for the Swarna Andhra@2047 vision, which aims for a USD 2.4 trillion economy, water security, universal access to water, sanitation and hygiene, clean living environments, and net-zero emissions by 2047[13] . The state also plans to set up a Central Climate Knowledge Centre and partner with universities and research institutions on carbon capture and storage, energy storage and green ethanol, while advancing local energy self-sufficiency through smart grids and rooftop solar. storage, energy storage and green ethanol, while advancing local energy self-sufficiency through smart grids and rooftop solar.



ANDHRA PRADESH AND TELANGANA STATE CONTEXT



Map for illustration only; boundaries are indicative.

1.46 crore
people in the four cities

9.6%
of India's GDP (Andhra Pradesh 4.7%, Telangana 4.9%)

974 km
Andhra Pradesh coastline exposed to cyclones, storm surge and sea-level rise

+4.2°C
projected rise by end of century

2.2 Telangana State State Context

Telangana, India's youngest state (formed in 2014), has one of the country's fastest-growing economies and contributes about 4.9% of national GDP[14]. Telangana is particularly vulnerable to climate change impacts due to its dependence on agriculture and increasing urbanisation. Nearly 50% of its people live in urban areas, well above the national average of 36%, and this share is projected to reach 58% by 2036, driven largely by Hyderabad[15]. This growth is taking place in a climate-stressed landscape. About 2.2% of the state's area is flood-prone, and Hyderabad faces recurrent urban flooding, partly due to inadequate stormwater drainage. Heat is a major concern: 246 of the state's 589 mandals, home to 13.32 million people, have severe, critical or semi-critical heatwave vulnerability[16].

Telangana began formal climate planning with its State Action Plan on Climate Change (TSAPCC) in 2015, which is now being revised. It made the Energy Conservation Building Code mandatory for large commercial buildings in 2014, and its Cool Roof Policy 2023–2028 targets 300 sq. km of cool roofs by 2028. Its Electric Vehicle and Energy Storage Policy promotes EV adoption. Building rules now require dual piping and EV charging in buildings and group housing. The Telangana Clean and Green Energy Policy 2025 targets an additional 20 GW of renewable energy and storage capacity by 2030[17].

The Telangana Rising 2047 vision targets a USD 3 trillion economy by 2047, with net-zero development as a central priority[8]. Its urban targets, centred on Hyderabad, include over 623 km of metro, light rail and bus rapid transit, fully electric public transport by 2030, and 6,000 public EV charging stations. It also aims for 100% sewage treatment and reuse in every town and city, the revival of over 100 lakes, and the designation of 45% of the metropolitan region as ecological sanctuaries[18].

[8] *Relative Economic Performance of Indian States: 1960-61 to 2023-24. Economic Advisory Council to the Prime Minister, 2024. Available at: https://eacpm.gov.in/wp-content/uploads/2024/09/State-GDP-Working-Paper_Final_240916_190207.pdf*
[9] *Mapping India's Climate Vulnerability A District Level Assessment. New Delhi: Council on Energy, Environment and Water (CEEW). Available at: https://www.ceew.in/sites/default/files/ceew-study-on-climate-change-vulnerability-index-and-district-level-risk-assessment.pdf*
[10] *Andhra Pradesh Heat Wave Action Plan 2020. Andhra Pradesh State Disaster Management Authority. Available at: https://apsdma.ap.gov.in/latestupdate_pdfs/heatwave/Heat_Wave_Action_Plan_2020.pdf*
[11] *Macro and Fiscal Landscape of the State of Andhra Pradesh 2025. NITI Aayog. Available at: https://www.niti.gov.in/sites/default/files/2025-03/Macro-and-Fiscal-Landscape-of-the-State-of-Andhra-Pradesh-1.pdf*
[12] *Andhra Pradesh Integrated Clean Energy Policy, 2024. Government of Andhra Pradesh. Available at: https://www.apindustries.gov.in/apindus/Data/policies/Integrated%20Clean%20Energy%20Policy.pdf*
[13] *Swarna Andhra @2047. Available at: https://swarnandhra.dev.nidhi.apcfss.in/SwarnandhraLogin#home*

Building on these state-level efforts, Kakinada, Vijayawada and Visakhapatnam in Andhra Pradesh and Hyderabad in Telangana have prepared Net-zero Climate Resilient City Action Plans. The following sections present the climate project pipeline at a glance for each state, followed by city snapshots and the consolidated pipelines by sector.

2.3 About this State-level Climate Project Pipeline for Andhra Pradesh and Telangana

This report consolidates state-level climate project pipelines based on climate projects of four cities: Kakinada, Vijayawada and Visakhapatnam in Andhra Pradesh, and Hyderabad in Telangana. The climate projects have been collated from Net-Zero Climate Resilient City Action Plans of these cities, prepared using ICLEI South Asia's Net-Zero ClimateResilientCities Methodology and aligned with local priorities.

Net-Zero ClimateResilientCities (CRC) methodology: Guiding cities from planning to implementation

ICLEI's Net-Zero CRC methodology is a nine-step process designed to support cities in preparing, implementing and monitoring city-scale Climate Action Plans. It includes tools to guide baseline development (climate risk assessment, GHG inventories), conduct an urban systems gap analysis, identify and prioritise climate resilience strategies, targets and interventions, develop bankable project proposals, identify and implement pilot projects, institutionalise climate governance and financing mechanisms and develop and implement a monitoring, reporting, and verification (MRV) system to track progress.

Moreover, the Net-Zero CRC methodology provides cities with a structured implementation pathway to translate climate action plans into on-ground projects and results. It guides cities in identifying pilot projects to test new technologies and approaches, and in building a pipeline of bankable, investment-ready projects backed by techno-economic assessments. It supports embedding of climate action into



[14]*Relative Economic Performance of Indian States: 1960-61 to 2023-24. Economic Advisory Council to the Prime Minister, 2024. Available at: https://eacpm.gov.in/wp-content/uploads/2024/09/State-GDP-Working-Paper_Final_240916_190207.pdf*

[15]*Telangana Socio Economic Outlook 2026. Planning Department, Government of Telangana. Available at: https://legislation-legislature.telangana.gov.in//PreviewPage.*

[16]*Draft Telangana State Heatwave Action Plan, 2020. Revenue (Disaster Management) Department, Government of Telangana.*

[17]*Telangana Clean and Green Energy Policy, 2025. Available at: https://tgredco.telangana.gov.in/Updates_2025/Telangana_Clean_and_Green_Energy_Policy_2025.pdf*

[18]*Telangana Rising - Vision 2047. Available at: https://www.hmdagov.in/wp-content/uploads/2020/07/TelanganaRising-2047.*



routine municipal governance through guidance on establishment of enabling governance structures, break-down of climate action plans into annual action plans, and integration of climate action into annual budgetary process through municipal climate budgeting.

Implementation is anchored in permanent Net-Zero or Climate Action Cells, with defined roles and responsibilities to steer and oversee coordination, annual planning, implementation of climate solutions and development of projects for scale-up. The CRC methodology's implementation guidance has already been put into practice by Indian cities. Permanent Net-Zero and Climate Action Cells have been set up in six cities (Ahmedabad, Rajkot, and Vadodara in Gujarat, and Coimbatore, Tiruchirappalli and Tirunelveli in Tamil Nadu) to drive implementation and monitoring, with climate budgets prepared in five of these cities.

What the climate project pipeline covers

This report draws on four city-scale Climate Action Plans that each include a pipeline of climate projects supported by quantified mitigation and resilience benefits, cost estimates and financing strategies, and monitoring indicators. These city climate action plans cover different time horizons: Visakhapatnam has a target year of 2070, while the plans of Kakinada, Vijayawada and Hyderabad run up to 2047. The consolidated pipelines therefore reflect each city's investments only up to its own plan horizon: the Andhra Pradesh totals to 2070 include investments for Visakhapatnam up to 2070 and for Kakinada and Vijayawada up to 2047, and the Telangana totals cover Hyderabad up to 2047.

The state-level pipelines aggregate city projects across sectors including Built Environment and Energy, Transportation, Water Supply, Stormwater and Wastewater Management, Solid Waste Management, Urban Greening and Biodiversity, Air Quality, and Public Health System, covering both climate adaptation and mitigation priorities. Similar projects across cities are grouped together, with projects further categorised as capital investment projects and enabling measures. For each project, the report consolidates information on scale, expected climate impacts, and indicative investment requirements, and rolls these up by sector to support prioritisation and project preparation.

The investment figures in this report reflect initial estimates drawn from the city climate action plans to be refined through further detailed assessments and studies. Costs have not been estimated for certain projects and actions where limited information is available on the scale, size or design. These remain a part of the pipeline and will require costing during project preparation.

CITY CLIMATE ACTION PLANS IN ANDHRA PRADESH AND TELANGANA

Horizon years and sectors addressed





2.4 How the States can use this Climate Project Pipeline

This report brings city climate projects together into a state-level pipeline to give the state governments a consolidated view of the scale, sectoral mix and timing of the climate investments their cities need, and of how these contribute to state targets on clean energy, mobility, water and resilience. It highlights investment needs shared across cities, where technical and financial support can be coordinated, and helps state departments and cities identify short-term and medium-term opportunities to build climate resilience into urban infrastructure and services. The pipeline is also intended to help mobilise support for project preparation and delivery from public finance, the private sector, multilateral development banks, development partners and philanthropies

.

State and city departments can use the pipeline to move from planned interventions to implementation. Projects can be matched to the national and state schemes best placed to fund them, while those that go beyond budgetary allocations can be steered towards other sources of finance. The pipeline also helps departments prioritise and sequence projects, link them to the State Action Plan on Climate Change and annual budgets, and assign responsibilities for project preparation, so that climate projects become part of city and state plans and policies.

Project proposals can be strategically steered and designed to leverage funding from the **Urban Challenge Fund,** which has a corpus of INR 1 lakh crore for cities until 2030-31 and can support 25% of project costs on the condition that at least half of the cost is raised from municipal bonds, public-private partnerships, and bank loans[19]. The pipeline includes common climate projects across cities such as renewable energy in municipal utilities, energy efficient pumping, green buildings, electric buses, water body rejuvenation, faecal sludge and septage management, stormwater network upgradation and nature-based drainage, material recovery facilities, and urban forest development, which can be bundled into state-wide programmes for pooled investment that delivers transformational climate benefits and outcomes.

[19]Ministry of Housing and Urban Affairs, 2026: Urban Challenge Fund – Operational



2.5 Climate Project Pipeline at a Glance: Andhra Pradesh

TOTAL INVESTMENT

₹5.24 lakh crore

estimated investment across nine sectors

CLIMATE PROJECTS ACROSS

3 cities

Kakinada, Vijayawada and Visakhapatnam

GHG REDUCTION POTENTIAL

123 million tCO_2e

per year by each city plan's horizon year

Built Environment and Energy
INR 4,82,091 crore

- Renewable energy (solar)
- High energy-efficiency appliances & green buildings
- Climate-resilient buildings & urban cooling programme
- Shift towards cleaner cooking fuel
- Early warning systems for landslides

Transportation
INR 13,437 crore

- Public transport (e-buses)
- Electric vehicles & charging
- Non-motorised transport (walking & cycling)
- Traffic management & road infrastructure
- Climate resilient infrastructure

Water Supply
INR11,112 crore

- 24x7 water supply
- NRW reduction & SCADA
- Rainwater harvesting, lakes & groundwater recharge
- EE & RE in water supply facilities

Wastewater Management
INR 8,749 crore

- Sewerage network & treatment expansion
- Faecal sludge & septage management
- Anaerobic STPs with biogas recovery & Aerobic STP optimisation
- Decentralised Wastewater treatment (DeWATS)
- EE & RE wastewater facilities

Urban Greening and Biodiversity
INR 4,568 crore

- Green cover, parks & avenues
- Biodiversity governance & green planning
- Ecosystem restoration (mangroves & wetlands)

Solid Waste Management
INR 2,608 crore

- Segregation at source & collection
- Composting & bio-CNG / biomethanation
- Sanitary landfill & legacy waste (biomining), Methane capture
- MRF, recycling & dry waste recovery

Stormwater Management
INR 1,640 crore

- Rehabilitation of natural streams and lakes
- Stormwater drainage network improvement
- Nature-based stormwater management & recharge
- Flood early warning & flood-risk planning

Air quality

- Road dust management
- Vehicular & industrial emission control
- Air quality monitoring

Public Health System

- Climate-resilient healthcare facilities
- Climate-health preparedness & heat action

Notes: Cost is not estimated for Air Quality and Public Health projects due to limited available information on project scale, size or design and these require further detailed technical assessments.

Phasing of Pipeline Investment (₹ crore) by 2070, three cities

₹61,090 CRORE	₹2,39,045 CRORE	₹2,24,070 CRORE
UPTO 2030	2030-2050	2050-2070

Notes: Investments up to 2050 cover all three cities. Vijayawada's and Kakinada's climate action plan has a target year of 2047. Therefore, investments after 2050 exclude Vijayawada and Kakinada and cover Visakhapatnam only.

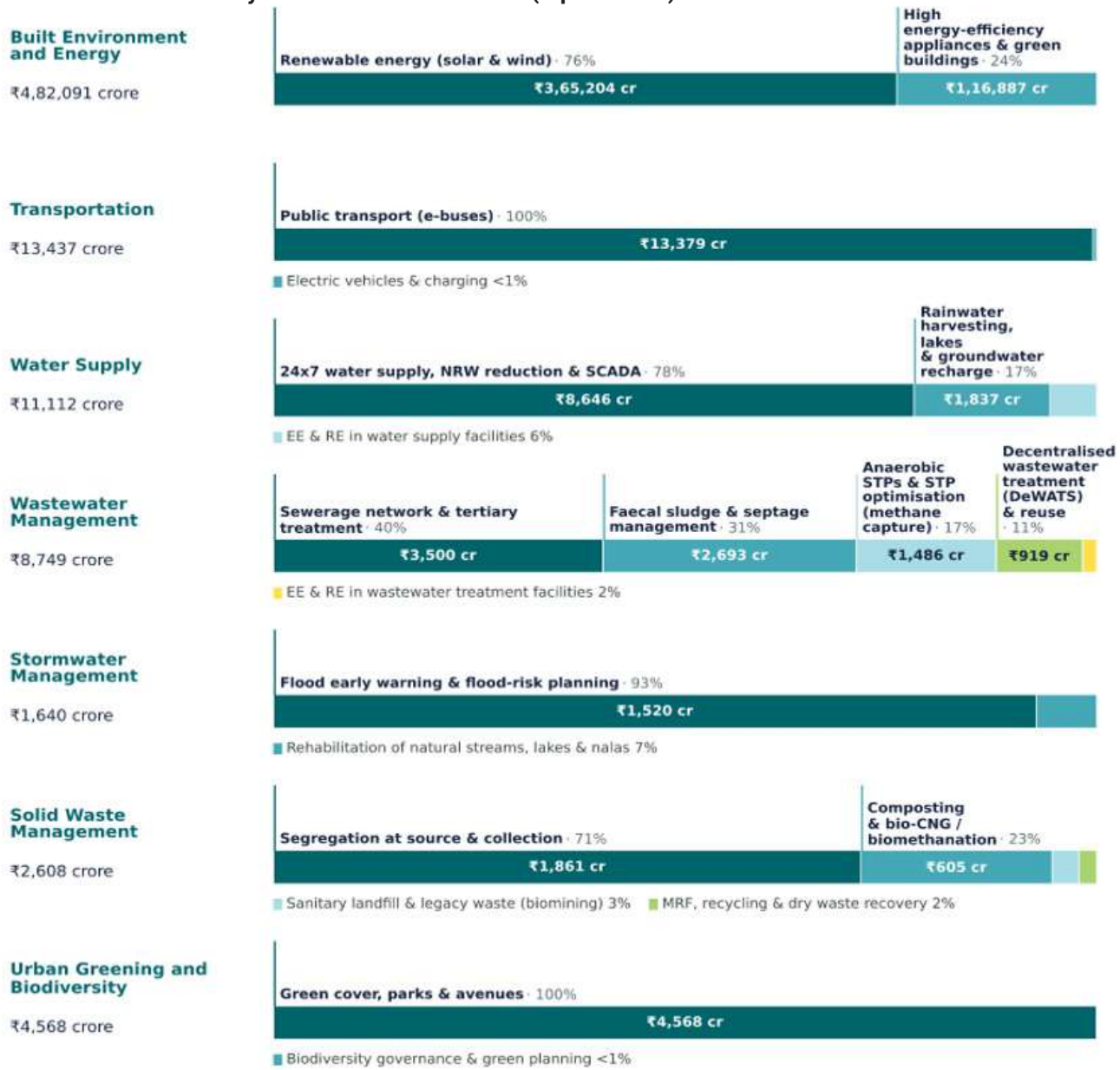


The pipeline consolidates the climate projects in the Climate Resilient City Action Plans of Kakinada, Vijayawada and Visakhapatnam, grouping similar actions across the cities. Together, the climate projects across nine sectors sum up to an estimated investment of INR 5.24 lakh crore. By each city plan's horizon, cumulatively these projects are expected to reduce GHG emissions by 123 million tCO2e every year.

Renewable energy accounts for 70% of the estimated investment, followed by energy-efficient buildings and appliances at 22%. Public transport, including its electrification, non-motorised mobility, and improvement of road infrastructure and traffic management, contributes 3% of the investment.

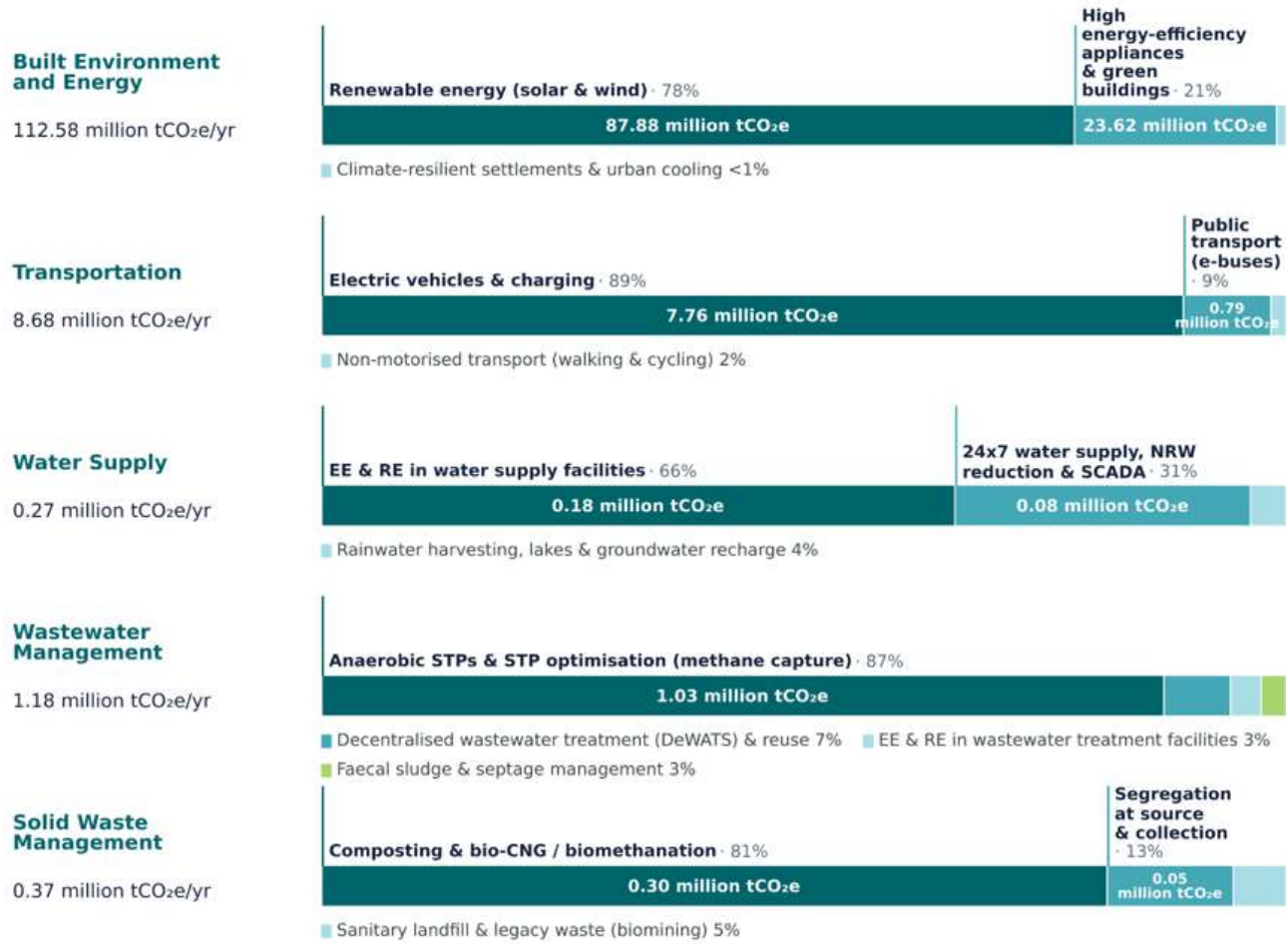
The remaining investment is distributed across water supply, wastewater and stormwater management, solid waste management, urban greening and biodiversity.

Estimated investment by action within each sector (rupees crore)



Note: Costs are not estimated for some projects and actions due to limited available information on project scale, size or design, and these require further detailed technical assessments. Therefore, certain action types show limited cost contribution.
**Bio-CNG – bio-Compressed Natural Gas; DeWATS – Decentralised Wastewater Treatment Systems; EE – Energy Efficiency; MRF – Material Recovery Facility; NRW – Non-Revenue Water; RE – Renewable Energy; SCADA – Supervisory Control and Data Acquisition; STP – Sewage Treatment Plant.*

Estimated GHG emission reduction by action within each sector (million tCO_2e per year)



2.6 Climate Project Pipeline at a Glance: Telangana

TOTAL INVESTMENT

₹1.84 lakh crore

estimated investment across eight sectors by 2047

CLIMATE PROJECTS ACROSS

1 city

Hyderabad

GHG REDUCTION POTENTIAL

57 million tCO_2e

per year by 2047

Built Environment and Energy
INR 1,66,300 crore

- Renewable energy (solar & wind)
- High energy-efficiency appliances & green buildings
- Climate-resilient buildings & urban cooling programme

Transportation
INR 7,959 crore

- Public transport (e-buses)
- Electric vehicles & charging
- Non-motorised transport (walking & cycling)
- Traffic management & road infrastructure

Water Supply
INR 1,028 crore

- Rainwater harvesting, lakes & groundwater recharge
- EE & RE in water supply facilities
- 24x7 water supply, NRW reduction & SCADA

Wastewater Management
INR **7,920 crore**

- Decentralised wastewater treatment (DeWATS) & reuse
- Faecal sludge & septage management
- EE & RE in wastewater treatment facilities
- Anaerobic STPs with biogas recovery & Aerobic STP optimisation

Urban Greening and Biodiversity

- Biodiversity governance
- Community led biodiversity conservation

Solid Waste Management
INR 873 crore

- Segregation at source & collection
- Composting & bio-CNG / biomethanation
- MRF, recycling & dry waste recovery
- E-waste collection and processing

Stormwater Management

- Flood early warning & flood-risk planning
- Rehabilitation of natural streams and lakes
- Nature-based stormwater management & recharge

Air quality

- Road dust management
- Vehicular & industrial emission control
- Air quality monitoring

Public Health System

- Climate-resilient healthcare facilities
- Climate-health readiness

Notes: Cost is not estimated for Air Quality and Public Health projects due to limited available information on project scale, size or design and these require further detailed technical assessments.

Phasing of Pipeline Investment (₹ crore) by 2047, Hyderabad

₹34,359 CRORE	₹60,379 CRORE	₹89,342 CRORE
UPTO 2030	2030-2040	2040-2047

Notes: Investments up to 2050 cover all three cities. Vijayawada's and Kakinada's climate action plan has a target year of 2047. Therefore, investments after 2050 exclude Vijayawada and Kakinada and cover Visakhapatnam only.



The pipeline consolidates the climate projects in the Climate Resilient City Action Plans of Kakinada, Vijayawada and Visakhapatnam, grouping similar actions across the cities. Together, the climate projects across nine seactors sum up to an estimated investment of INR 5.24 lakh crore. By each city plan's horizon, cumulatively these projects are expected to reduce GHG emissions by 123 million tCO2e every year. Together, the climate projects across eight sectors sum up to an estimated investment of INR 1.84 lakh crore. By 2047, these projects are expected to reduce GHG emissions by 57 million tCO2e every year.

Renewable energy accounts for 46% of the estimated investment, followed by energy-efficient buildings and appliances at 45%. Public transport, including its electrification, non-motorised mobility, and improvement of road infrastructure and traffic management, contributes 4% of the investment. The remaining investment is distributed across water supply, wastewater and stormwater management, solid waste management, urban greening and biodiversity.

Estimated investment by action within each sector (rupees crore)



Note: Costs are not estimated for some projects and actions due to limited available information on project scale, size or design, and these require further detailed technical assessments. Therefore, certain action types show limited cost contribution.

**Bio-CNG – bio-Compressed Natural Gas; DeWATS – Decentralised Wastewater Treatment Systems; EE – Energy Efficiency; MRF – Material Recovery Facility; NRW – Non-Revenue Water; RE – Renewable Energy; SCADA – Supervisory Control and Data Acquisition; STP – Sewage Treatment Plant.*

Estimated GHG emission reduction by action within each sector (million tCO_2e per year)



03 City Snapshots: Profile and Climate Targets

Profiles of the four cities – their size, climate hazards, risk and vulnerability, emissions and the mitigation and adaptation targets set in their climate action plans.

CITIES IN NUMBERS

4 cities
Visakhapatnam, Vijayawada and Kakinada in Andhra Pradesh and Hyderabad in Telangana – home to 1.46 crore people now make for this

125 of 212
wards assessed as at climate risk or vulnerable across 3 cities in Andhra Pradesh

73 of 150
wards assessed as at climate risk in Hyderabad

9.7 $MtCO_2e$
combined city-scale GHG emissions of the 3 cities in Andhra Pradesh (2021)

26.3 $MtCO_2e$
city-scale GHG emissions of Hyderabad (2021)

2070 · 2047
2070 for Visakhapatnam; 2047 for Hyderabad, Kakinada and Vijayawada

FOUR ANDHRA PRADESH AND TELANGANA CITIES COMPARED Profile, emissions, risk and targets

	Hyderabad TELANGANA	Visakhapatnam ANDHRA PRADESH	Vijayawada ANDHRA PRADESH	Kakinada ANDHRA PRADESH
Population lakh	106	26.7	10.34	3.12
City area sq km	610	618	62	32
Density persons / sq km	17,388	4,322	16,715	9,782
GHG emissions $MtCO_2e$	26.31	6.83	2.21	0.62
Per capita emissions tCO_2e / person	2.48	2.56	1.85	1.33
Population at climate risk % of city	50.6%	90%	32%	20%
Mitigation target GHG reduction below BAU	**85.7%** below BAU by **2047** **Net-zero target**	**80.2%** below BAU by **2070** **Net-zero target**	**89%** below BAU by **2047** **Net-zero target**	**83.8%** below BAU by **2047** **Net-zero target**



Visakhapatnam

City area: 618 sq. km (98 wards, 10 zones)

Total population (2021): 26.7 lakh

Population density (2021): 4,322 persons per sq. km

Total households (2021): 6.8 lakh

Climatic condition: Tropical – hot & humid; Average annual rainfall: 1,191 mm

Key climate hazards:

- **Extreme heat:** max. temperature to increase by 0.2–1.3°C by 2050
- **Urban floods:** annual rainfall to increase by 10–21% by 2050; very high-intensity rainfall events to rise from 13 to up to 24.
- **Cyclones:** 5–13 cyclonic disturbances a year.
- **Sea Level rise:** sea level to rise by 31.5–37.7 cm by 2060 and 68.6–91.3 cm by 2100, increased coastal flooding and storm surge

Climate risk and vulnerability index: 88 of 98 wards at risk; 17.1 lakh persons (90.0%)

- **Extreme:** 2 wards, 0.42 lakh (2.2%)
- **High: 21** wards, 4.1 lakh (21.8%)
- **Moderate:** 65 wards, 12.5 lakh (66.0%)

Fragile urban systems: Water supply, Wastewater, Stormwater, Solid waste, Transport and Health

Economic activities: Industries, Ports & Trade, Services, Tourism, Fisheries, and IT

City-scale GHG emissions (2021): 6.83 million tCO_2e; 2.56 tCO_2e per capita.
Key emitting sectors: Industries (40.5%) & Transport (17.1%)

Climate Target:
Mitigation:

- 50.9% reduction from BAU levels by 2032
- 62.7% reduction from BAU levels by 2047
- 80.2% reduction from BAU levels by 2070

Adaptation goal: Enhance capacity to anticipate, withstand, respond to and recover from climate hazards by integrating climate resilience into urban planning, infrastructure development, ecosystem conservation and municipal service delivery, while prioritising vulnerable communities and critical infrastructure.

Vijayawada

City area: 61.88 sq. km (64 wards as of 2021, 3 circles)

Total population (2021): 11.95 lakh

Population density (2021): 19,276 persons per sq. km

Total households (2021): 3.1 lakh

Climatic condition: Tropical – hot & humid; Average annual rainfall: 1,078 mm

Key climate hazards:

- **Extreme heat:** average temperature to rise by 0.9–2.2°C by 2079
- **Urban floods:** at least one more high/very high-intensity (51-100 mm/day) rainfall event a year by 2050
- **Cyclones:** severe cyclonic storms (>89 kmph)

Climate risk and vulnerability index: 16 of 64 wards at risk; 3.6 lakh persons (32%)

- **Extreme**: 4 wards, 1.0 lakh (9%)
- **High:** 10 wards, 2.2 lakh (19%)
- **Moderate:** 2 wards, 0.4 lakh (4%)

Fragile urban systems: Water supply, Wastewater, Stormwater, Solid Waste, Transport, Housing & Health

Economic activities: Agriculture, Tourism, Commerce & Industries

City-scale GHG emissions (2021): 2.21 million tCO_2e; 1.85 tCO_2e per capita
Key emitting sectors: Industries (32%) & Residential buildings (27%)

Climate Target:
Mitigation:

- 29% reduction from BAU levels by 2030
- 55% reduction from BAU levels by 2040
- 89% reduction from BAU levels by 2047

Adaptation goal: Build resilience to climate extremes of high temperature and intense rainfall events through strategic climate adaptation actions, safeguarding vulnerable urban systems, and enhancing the livability of all citizens.



Kakinada

City area: 31.95 sq. km (50 wards)

Total population (2021): 4.7 lakh

Population density (2021): 14,758 persons per sq. km

Total households (2021): 1.24 lakh

Climatic condition: Tropical - hot & humid; Average annual rainfall: 1,157 mm

Key climate hazards:

- **Extreme heat:** max. temperature to increase by 1.7–2.1°C; annual average temperature to reach 31.5–32°C by the 2080s
- **Urban floods:** rainfall to increase by 21–31%; 62 days of high-intensity rainfall
- **Cyclones:** 5–13 cyclonic disturbances a year

Climate risk and vulnerability index: 21 of 50 wards vulnerable; 1 lakh persons (20%)

Fragile urban systems: Water supply, Wastewater, Stormwater, Solid Waste, Transport & Health

Economic activities: Port & Shipping

City-scale GHG emissions (2021): 0.62 million tCO_2e; 1.33 tCO_2e per capita
Key emitting sectors: IResidential Buildings (45%) and Transportation (24%)

Climate Target:
Mitigation:

- 31.8% reduction from BAU levels by 2030
- 56% reduction from BAU levels by 2040
- 83.8% reduction from BAU levels by 2047

Adaptation goal: Strengthen resilience to climate impacts by implementing adaptation strategies that reduce heat and flooding risks, safeguard urban systems, and prioritise vulnerable communities for a sustainable, equitable future.

Hyderabad

City area: 609.8 sq. km (150 wards, 6 zones)

Total population (2021): 106 lakh

Population density (2021): 17,387.5 persons per sq. km

Total households (2021): 24.1 lakh

Climatic condition: Semi-arid; Average annual rainfall: 877.5 mm

Key climate hazards:

- **Extreme heat:** temperatures to rise by 1–1.5°C
- **Urban floods:** annual rainfall to increase by 7–22%; 30–95 more high-intensity rainfall days and 7–85 more very high-intensity rainfall days

Climate risk and vulnerability index: 73 of 150 wards at risk; 53.7 lakh persons (50.6%)

- **Extreme:** 17 wards, 12.0 lakh (11.3%)
- **High:** 17 wards, 11.9 lakh (11.2%
- **Moderate:** 39 wards, 29.8 lakh (28.1%)

Fragile urban systems: Water supply, Wastewater, Stormwater, Solid Waste, Transport, Housing & Health

Economic activities: IT, Technology, Life Sciences, Commerce & Industries

City-scale GHG emissions (2021): 26.31 million tCO_2e; 2.48 tCO_2e per capita
Key emitting sectors: Residential (27.4%), Transport (20.7%), Industries (18.9%) & Commercial (17.3%)

Climate Target:
Mitigation:

- 43.7% reduction from BAU levels by 2030
- 62.9% reduction from BAU levels by 2040
- 85.7% reduction from BAU levels by 2047

Adaptation goal: Enhance the climate resilience of urban systems, infrastructure, and community to rising temperatures and urban flooding, through structured and strategic planning and management of grey and blue-green infrastructure along with policy measures that are climate responsive, water sensitive, circular and resource efficient.



04 Climate Projects by Sector

Sector-wise pipeline of climate projects for each state presented as tables listing the capital investment projects and enabling measures, with scale up to 2070 in Andhra Pradesh and up to 2047 in Telangana, expected climate impacts and benefits, and indicative investment requirements.

SECTORS IN FOCUS

9
sectors in Andhra Pradesh: Built Environment and Energy, Transportation, Water, Wastewater, Stormwater, Solid Waste, Urban Biodiversity, Public Health and Air Quality; 8 in Telangana, all except Air Quality

40.2 lakh
residents benefiting from climate projects in Andhra Pradesh

1.06 cr
residents benefiting from climate projects in Hyderabad, Telangana

4.1 Andhra Pradesh

Built Environment and Energy

₹4,82,091
crore investment by 2070

112.58 Mt
CO_2e/yr reduction potential

Project and scale by 2070	Climate impact and benefits	Estimated cost by 2070*
Capital Investment Projects		
Green-certified buildings: new and existing buildings certified to green building standards (ECBC/Eco-Niwas or green rating) • Residential: 9.9 lakh • Commercial and institutional: 1.5 lakh	**GHG emissions reduction:** 2.93 million tCO_2e/yr	Not estimated
Energy-efficient lighting and appliance retrofit in buildings (LEDs, BLDC fans, refrigerators, ACs/HVAC) across residential, commercial, institutional and industrial buildings • 1,028 lakh LED fixtures • 678 lakh BLDC/energy-efficient fans • 118.7 lakh energy-efficient refrigerators • 105.1 lakh energy-efficient ACs/HVACs	**GHG emissions reduction:** 16.27 million tCO_2e/yr	INR 1,16,007 crore
Renewable energy for buildings: rooftop, captive and off-site solar and wind for residential, commercial, institutional and industrial consumers • Visakhapatnam: 52.3GW (rooftop/captive solar and wind, and captive solar PV) • Kakinada: 0.26GW • Vijayawada: 0.95GW • Total: 53.57 GW	**GHG emissions reduction:** 65.00 million tCO_2e/yr	INR 3,63,578 crore
Solar water heater installation in buildings • Residential: 9.84 lakh units (Visakhapatnam, Vijayawada, Kakinada) • Commercial and institutional: 3,659 buildings (Kakinada, Vijayawada)	**GHG emissions reduction:** 1.06 million tCO_2e/yr	INR 1,626 crore
Window glazing in existing and new buildings: 21.95 lakh units (Visakhapatnam, Vijayawada and Kakinada)	**GHG emissions reduction:** 4.31 million tCO_2e/yr	Not estimated
Energy-efficient water pumps in buildings: 0.59 lakh pumps in residential buildings (Visakhapatnam, Vijayawada and Kakinada)	**GHG emissions reduction:** 0.02 million tCO_2e/yr **Beneficiaries:** City-wide	INR 873 crore



Project and scale by 2070	Climate impact and benefits	Estimated cost by 2070*
Capital Investment Projects		
Cool roofs in existing and new buildings • Kakinada: 1.2 lakh residential and 0.12 lakh commercial and institutional buildings • Vijayawada: 3.99 lakh residential and 0.49 lakh commercial units	**GHG emissions reduction:** 0.09 million tCO_2e/yr **Beneficiaries:** 13.46 lakh	Not estimated
Solar and energy-efficiency retrofit of municipal and public buildings and streetlights • Visakhapatnam: rooftop solar on public buildings and citywide LED streetlighting • Kakinada: 100% of existing public buildings by 2040 and all new public buildings from 2030 • Visakhapatnam: 100% of existing and new public buildings equipped with energy-efficient appliances and 75% of energy demand to be met from renewable sources by 2070	**Beneficiaries:** 43.35 lakh	INR 6 crore
Climate-resilient housing and in-situ development of informal settlements • Kakinada: 100% of informal settlements by 2047 • Vijayawada: slums exposed to heat, flooding, cyclones and landslides (Kakinada, Vijayawada)	**Beneficiaries:** 2.6–3.3 lakh persons	Not estimated
Green power purchase for buildings: 30,520.8 million kWh (residential 2,570; commercial and institutional 5,128.4; industrial 22,822.3) (Visakhapatnam)	**GHG emissions reduction:** 21.82 million tCO_2e/yr **Beneficiaries:** 26.7 lakh	Not estimated
Renewable electricity-powered cooking: 10% of residential and 10% of commercial and institutional establishments by 2047 (Kakinada)	**Beneficiaries:** 0.5 lakh	Not estimated
Enabling measures (policy, regulatory and programme support)		
Urban cooling programme in heat-vulnerable wards: cool roofs, green roofs, vertical gardens, and shaded shelters and drinking water at markets, vending zones and bus stations • Visakhapatnam: Priority in 20 heat-vulnerable wards, then citywide expansion • Kakinada: 14 priority wards; 100% of low-income households • Vijayawada: 22 heat-impacted wards	**GHG emissions reduction:** 1.08 million tCO_2e/yr **Beneficiaries:** 36 lakh persons	Not estimated
Capacity building and energy-efficiency support programmes: training of officials and professionals, energy audits, awareness, bulk procurement and financing (Visakhapatnam, Kakinada)	**Beneficiaries:** 31.4 lakh	Not estimated
Early warning system with real-time monitoring of landslides (Visakhapatnam)	**Beneficiaries:** 26.7 lakh	Not estimated
Carbon Capture, Utilisation and Storage (CCUS) policy framework for industries: Industrial estates (Visakhapatnam)	–	Not estimated
Renewable energy facilitation and aggregated procurement programme (rooftop mapping, group captive and community projects, incentives and finance) (Kakinada)	**Beneficiaries:** 4.7 lakh	Not estimated
Green and low-carbon public building policy: AP ECBC and green certification mandatory for new public buildings; All new public buildings from 2030 (Kakinada)	–	Not estimated
Technical study on sustainably cooled and heat-resilient buildings: Schools, health centres, public housing and institutional buildings (Vijayawada)	–	Not estimated
Regulations restricting construction in ecologically sensitive areas and flood-plain zoning: Flood plains and fragile hill slopes (Vijayawada)	**Beneficiaries:** 12 lakh (1 lakh slum dwellers in priority areas)	Not estimated

*All sectoral and action totals combine city climate action plans with different end years - Kakinada and Vijayawada until 2047 and Visakhapatnam until 2070

**Across all sectors, costs are not estimated for certain actions due to limited available information on project scale, size or design and these require further detailed technical assessments



Transportation

₹13,437 crore investment by 2070

8.67 Mt CO_2e/yr reduction potential

Project and scale by 2070	Climate impact and benefits	Estimated cost by 2070*
Capital Investment Projects		
Shift from private vehicle utilisation to public transport adoption: electric bus fleet with RE-powered charging • E-buses: 8,919 • Visakhapatnam: 22.2 lakh daily trips shifted to public transport; Kakinada: 55% public transport mode share by 2047	**GHG emissions reduction:** 0.79 million tCO_2e/yr **Beneficiaries:** 31.4 lakh	INR 13,379 crore
Citywide expansion of non-motorised transport infrastructure (footpaths, cycle tracks, safe crossings, bicycle sharing) • Visakhapatnam: 0.89 lakh trips shifted to walking and cycling • Kakinada: 34% NMT mode share by 2047 • Vijayawada: pedestrian infrastructure on all roads	**GHG emissions reduction:** 0.13 million tCO2e/yr **Beneficiaries:** 43.35 lakh	Not estimated
Electrification of private, commercial and freight vehicles • Visakhapatnam: 10.84 lakh cars, 74.5 lakh two-wheelers, 1.83 lakh three-wheelers, 1 lakh commercial passenger vehicles and 3.53 lakh goods vehicles • Kakinada and Vijayawada: 80% cars, 80-85% commercial vehicles, 90% two- and three-wheelers, 100% light and 70-90% medium and heavy freight vehicles by 2047	**GHG emissions reduction:** 7.55 million tCO_2e/yr **Beneficiaries:** 29.82 lakh	Not estimated
RE-powered EV charging infrastructure for passenger and freight vehicles • Kakinada: city-wide network with 50% of EVs RE-powered by 2047 • Vijayawada: 180 kWp solar at charging stations	**GHG emissions reduction:** 0.20 million tCO_2e/yr **Beneficiaries:** 16.65 lakh	INR 1 crore
Climate-resilient road and NMT infrastructure design addressing heat, floods, cyclones and coastal hazards: flexible pavements, permeable paving, roadside green infrastructure and flood protection on vulnerable corridors • Kakinada: citywide, with flood protection in 13 wards • Vijayawada: citywide • Visakhapatnam: citywide	**Beneficiaries:** 43.35 lakh persons	Not estimated
Electrification of municipal and government vehicle fleet: 100% electric municipal cars by 2040 (Kakinada)	**GHG emissions reduction:** <0.01 million tCO_2e/yr	INR 56 crore
Sustainable freight infrastructure: freight corridors, truck terminals, logistics hubs and electric freight zones (Kakinada)	–	Not estimated
Enabling measures (policy, regulatory and programme support)		
Intelligent transport systems and traffic management (GPS tracking, passenger information, junction improvements, parking management) (Visakhapatnam, Kakinada)	**Beneficiaries:** 31.4 lakh	Not estimated
Model E-Mobility City with dedicated institutional mechanisms, financing and monitoring (Visakhapatnam)	**Beneficiaries:** 26.7 lakh	Not estimated
Inclusive and accessible public transport for women, children, elderly persons and persons with disabilities (Kakinada)	**Beneficiaries:** 4.7 lakh	Not estimated



Water Supply

₹11,112 crore investment by 2070

0.27 Mt CO_2e/yr reduction potential

Project and scale by 2070	Climate impact and benefits	Estimated cost by 2070*
Capital Investment Projects		
24x7 metered supply by water source augmentation, NRW reduction and SCADA • Visakhapatnam: 150 LPCD, universal metering, NRW <10%, citywide SCADA • Kakinada: 88 MLD supply, 100% household metering, NRW <10% by 2040 • Vijayawada: 157 LPCD with DMAs and smart meters, NRW from 33% to <10% by 2047	**GHG emissions reduction:** 0.08 million tCO_2e/yr **Beneficiaries:** 43.35 lakh persons	INR 8,646 crore
Renewable energy installation for water supply facilities: 105.9 MW solar PV	**GHG emissions reduction:** 0.11 million tCO_2e/yr	INR 599 crore
Energy-efficient pump retrofit in water supply facilities: 1,194 pumps (Visakhapatnam, Vijayawada and Kakinada) and in Kakinada, retrofitting with 68,441 smart meters and water-efficient fixtures	**GHG emissions reduction:** 0.07 million tCO_2e/yr	INR 30 crore
Rainwater harvesting and groundwater recharge integrated with dual plumbing and greywater reuse • Visakhapatnam: runoff from 142 lakh sq. m residential and 197 lakh sq. m commercial and institutional roofs • Kakinada: runoff from 11.5 lakh sq. m of residential and 9.5 lakh sq. m of commercial and institutional roof area; dual plumbing in all eligible new buildings • Vijayawada: enforce mandatory RWH	**GHG emissions reduction:** 0.01 million tCO_2e/yr **Beneficiaries:** 43.35 lakh persons	INR 1,837 crore
Water quality monitoring infrastructure at treatment plants, reservoirs and supply points (Kakinada)	**Beneficiaries:** 4.7 lakh persons	Not estimated
Enabling measures (policy, regulatory and programme support)		
Ecological restoration of water sources • Visakhapatnam: water sources citywide • Vijayawada: Krishna river within the city	**Beneficiaries:** 38.65 lakh persons	Not estimated
Integrated water resource management and groundwater regulation: citywide water resource plans, groundwater monitoring and extraction regulation (Kakinada, Vijayawada)	**Beneficiaries:** 16.65 lakh persons	Not estimated
City-wide household water conservation programme (Kakinada)	**Beneficiaries:** 4.7 lakh persons	Not estimated

Wastewater Management

₹8,749 crore investment by 2070

1.18 Mt CO_2e/yr reduction potential

Project and scale by 2070	Climate impact and benefits	Estimated cost by 2070*
Capital Investment Projects		
Sewer network expansion, rehabilitation and SCADA monitoring, with STP upgrade and tertiary treatment for reuse • Visakhapatnam: rehabilitate ageing sewers, STP upgrade and tertiary treatment • Kakinada: 95% network coverage by 2050 • Vijayawada: house connections in unserved areas and rehabilitation	**Beneficiaries:** 43.35 lakh persons	INR 3,500 crore
Performance improvement and optimisation of aerobic STPs: 371–388 MLD (Vijayawada plants phased out by 2047)	**GHG emissions reduction:** 0.10 million tCO_2e/yr	INR 416 crore
Low-carbon anaerobic STPs with biogas recovery: 1,220 MLD anaerobic STP capacity	**GHG emissions reduction:** 0.93 million tCO_2e/yr	INR 1,071 crore
Decentralised wastewater treatment (DeWATS and large establishments) • Visakhapatnam: large establishments (10,000 sq. m and above) • Kakinada: 3.5 MLD; Vijayawada: 15 MLD	**GHG emissions reduction:** 0.01 million tCO_2e/yr	INR 919 crore
Renewable energy installation for wastewater facilities: 28.8 MW solar PV	**GHG emissions reduction:** 0.03 million tCO_2e/yr	INR 144 crore



Project and scale by 2070	Climate impact and benefits	Estimated cost by 2070*
Energy-efficient pump retrofit in wastewater facilities: 214 pumps (Visakhapatnam, Vijayawada and Kakinada)	**GHG emissions reduction:** 0.01 million tCO_2e/yr	INR 7 crore
Septage and sludge management with faecal sludge treatment and co-treatment at STPs • Visakhapatnam: septage services until all properties are sewered • FSTP capacity: 290 kLD	**GHG emissions reduction:** 0.03 million tCO_2e/yr **Beneficiaries:** 35.2 lakh persons	INR 2,693 crore
Treated wastewater reuse infrastructure for non-potable uses • Kakinada: pipelines, storage and tanker supply • Vijayawada: 6,025 MLD per year for gardening and green spaces	**GHG emissions reduction:** 0.07 million tCO_2e/yr **Beneficiaries:** 16.65 lakh	Not estimated
Enabling measures (policy, regulatory and programme support)		
Build resilience of wastewater infrastructure to floods and landslides: citywide network (Visakhapatnam)	**Beneficiaries:** 26.7 lakh	Not estimated
Comprehensive wastewater management master plan (Kakinada)	**Beneficiaries:** 4.7 lakh persons	INR 0 crore
Safe reuse of treated wastewater (SRTW) framework (Vijayawada)	**Beneficiaries:** 11.95 lakh persons	Not estimated

Urban Greening and Biodiversity

₹4,568 crore investment by 2070

Adaptation resilience-focused projects

Project and scale by 2070	Climate impact and benefits	Estimated cost by 2070*
Capital Investment Projects		
Green cover increase through green corridors, avenues, traffic islands, urban parks, plazas and rooftop and vertical gardens: Kakinada: 5.85 sq. km and Vijayawada: 20 sq. km of green cover by 2047 (25.85 sq. km); Visakhapatnam: citywide	**Beneficiaries:** 43.35 lakh persons	INR 4,568 crore
Ecosystem restoration: mangroves, wetlands, river and canal banks and hill slopes • Visakhapatnam: coastal mangroves • Kakinada: Coringa wetlands and mangroves • Vijayawada: hill slopes, flood plains and river banks	**Beneficiaries:** 16.8 lakh persons	Not estimated
Biodiversity-rich micro-habitats with pollinator gardens and native grasslands: within existing green-blue networks (Visakhapatnam)	**Beneficiaries:** 26.7 lakh	Not estimated
Enabling measures (policy, regulatory and programme support)		
Designate land for parks, urban forests and blue-green infrastructure in town planning schemes and zonal development plans	**Beneficiaries:** 43.35 lakh	Not estimated
Biodiversity governance: City Biodiversity Index, LBSAP and Biodiversity Management Committee (Kakinada, Vijayawada)	**Beneficiaries:** 16.65 lakh	INR <1 crore



Solid Waste Management

₹2,608 crore investment by 2070

0.37 Mt CO_2e/yr reduction potential

Project and scale by 2070	Climate impact and benefits	Estimated cost by 2070*
Capital Investment Projects		
Door-to-door collection and source segregation system with electric collection fleet: 100% segregated collection; 41006 electric waste collection vehicles (Kakinada, Vijayawada and Visakhapatnam)	**GHG emissions reduction:** 0.05 million tCO_2e/yr **Beneficiaries:** 43.35 lakh	INR 2,499 crore
Development of wet waste processing facilities (composting, biomethanation and bio-CNG) • Composting: 394 TPD • Biomethanation: 85 TPD (Kakinada) • Bio-CNG: 2,621 TPD	**GHG emissions reduction:** 0.30 million tCO_2e/yr **Beneficiaries:** 43.35 lakh	INR 605 crore
Waste recycling through material recovery facilities with automated segregation: 1,643 TPD	**Beneficiaries:** 43.35 lakh	INR 54 crore
Sanitary landfill with gas capture and bioremediation of legacy dumpsites • Visakhapatnam: landfill with gas capture for 25 years • Kakinada and Vijayawada: biomining of legacy waste and reuse of reclaimed land	**GHG emissions reduction:** 0.02 million tCO_2e/yr **Beneficiaries:** 43.35 lakh	INR 87 crore
Enabling measures (policy, regulatory and programme support)		
Transition towards zero-waste cities and wards through 3R, EPR and circular value chains: 70% of wards reducing or recycling waste at source by 2047 (Kakinada, Vijayawada)	**Beneficiaries:** 16.65 lakh	Not estimated
Optimisation of waste collection and transportation (route rationalisation, GPS and RFID tracking, worker training) (Kakinada, Vijayawada)	**Beneficiaries:** 16.65 lakh	Not estimated

Stormwater Management

₹1,640 crore investment by 2070

Adaptation resilience-focused projects

Project and scale by 2070	Climate impact and benefits	Estimated cost by 2070*
Capital Investment Projects		
Real-time monitoring and early warning system (EWS) for urban flooding and storm surge • Visakhapatnam: flooding and storm surge EWS • Kakinada: canal and drain sensors, IoT pumping at 13 locations • Vijayawada: Budameru canal	**Beneficiaries:** 11.42 lakh persons	INR 1,520 crore
Rehabilitate natural streams, canals and drainage channels: remove encroachments and sewage inflows and restore capacity • Visakhapatnam: encroachment-free natural streams, geddas and canal network • Kakinada: 100% of nalas and canals free from encroachments by 2040 • Vijayawada: 100% of canal and buffer encroachment-free	**Beneficiaries:** 43.35 lakh	INR 120 crore
Climate-proof stormwater drainage network: roadside and trunk drains, capacity enhancement, pumping and retention • Visakhapatnam: low-coverage and flood-prone zones • Kakinada: retention ponds and detention basins • Vijayawada: expand 1,198 km network to cover 100% of roads	**Beneficiaries:** 37.5 lakh	Not estimated
Reducing runoff generation through blue-green infrastructure and decentralised infiltration: rain gardens, recharge pits and percolation wells, bioswales, permeable pavements, terraced landscapes and coastal wetlands	**Beneficiaries:** 13.2 lakh persons	Not estimated
Enabling measures (policy, regulatory and programme support)		



Project and scale by 2070	Climate impact and benefits	Estimated cost by 2070*
Enabling measures (policy, regulatory and programme support)		
Stormwater and flood-risk master planning: watershed assessment, flood hazard mapping and blue-green infrastructure plans integrated into land-use plans • Visakhapatnam: includes sea-level rise, storm surge and upstream catchments • Kakinada: GIS-based watershed plan • Vijayawada: micro-watershed BGI plan	**Beneficiaries:** 35.5 lakh	Not estimated
Community-based stormwater management and flood preparedness, with regular desilting of drains (Kakinada)	**Beneficiaries:** 4.7 lakh persons	Not estimated

Air Quality

To be costed
during project preparation

Co-benefits
health and liveability benefits

Project and scale by 2070	Climate impact and benefits	Estimated cost by 2070*
Enabling measures (policy, regulatory and programme support)		
Integrated road dust management programme across major transport corridors (Visakhapatnam)	**Beneficiaries:** 26.7 lakh	Not estimated
Vehicular emission management through inspection, enforcement and traffic management (Visakhapatnam)	**Beneficiaries:** 26.7 lakh	Not estimated
Dust management at construction sites (Visakhapatnam)	**Beneficiaries:** 26.7 lakh	Not estimated
Industrial emission control and cleaner production, with fugitive dust management at industrial estates and port operations: industrial estates and port (Visakhapatnam)	**Beneficiaries:** 3.5 lakh persons	Not estimated
Air quality monitoring, emission inventories, source apportionment and decision support systems (Visakhapatnam)	**Beneficiaries:** 26.7 lakh	Not estimated

Public Health System

To be costed
during project preparation

Adaptation
resilience-focused projects

Project and scale by 2070	Climate impact and benefits	Estimated cost by 2070*
Capital Investment Projects		
Climate-resilient healthcare facilities with flood-resilient access and RE backup power: all residents within 1.5 km of a healthcare centre (Kakinada)	**Beneficiaries:** 4.7 lakh	Not estimated
Enabling measures (policy, regulatory and programme support)		
Climate-health preparedness: capacity building, awareness and early warning for health departments (Kakinada, Vijayawada)	**Beneficiaries:** 16.65 lakh	Not estimated
Heat stress and vector-borne disease prevention: Heat Action Plan, cooling centres, shelters and vector control; heat-vulnerable and disease-prone wards (Kakinada, Vijayawada)	**Beneficiaries:** 16.65 lakh	Not estimated



4.2 Telangana

Built Environment and Energy

₹1,66,300 crore investment by 2047

43.53 Mt CO_2e/yr reduction potential

Project and scale by 2047	Climate impact and benefits	Estimated cost by 2047*
Capital Investment Projects		
Green-certified buildings: Eco-Niwas Samhita compliance in 100% of new and 50% of existing residential buildings, and TS ECBC compliance or green certification in 70% of new commercial and institutional buildings by 2047 (3.79 lakh new residential and 39,608 commercial and institutional buildings)	**GHG emissions reduction:** 0.93 million tCO_2e/yr	Not estimated
Energy-efficient lighting and appliance retrofit in buildings • 640.0 lakh LED fixtures (residential 449.6 lakh; commercial and institutional 94.5 lakh; industrial 95.9 lakh) • 283.3 lakh BLDC/energy-efficient fans (residential 138.3 lakh; commercial and institutional 71.3 lakh; industrial 73.7 lakh) • 122.9 lakh energy-efficient refrigerators (residential 30.5 lakh; commercial and institutional 92.4 lakh) • 67.7 lakh energy-efficient ACs/cooling systems (residential 6.7 lakh; commercial and institutional 55.7 lakh; industrial 5.2 lakh)	**GHG emissions reduction:** 8.40 million tCO_2e/yr	INR 81,452 crore
Energy-efficient water pumps in buildings: 58,420 energy-efficient pumps in residential buildings	**GHG emissions reduction:** 0.02 million tCO_2e/yr	INR 876 crore
Renewable energy for buildings (rooftop solar): 112.4 lakh kWp (residential 19.2 lakh kWp; commercial and institutional 48.0 lakh kWp; industrial 45.1 lakh kWp)	**GHG emissions reduction:** 11.94 million tCO_2e/yr	INR 50,562 crore
Captive solar PV for buildings: 82.3 lakh kWp (residential 12.8 lakh kWp; commercial and institutional 43.7 lakh kWp; industrial 25.8 lakh kWp)	**GHG emissions reduction:** 8.77 million tCO_2e/yr	INR 32,167 crore
Green power purchase for buildings from DISCOM: 10,409.5 million kWh (residential 2,665.4; commercial and institutional 3,902.1; industrial 3,842.0)	**GHG emissions reduction:** 7.45 million tCO_2e/yr	Not estimated
Solar water heater installation in buildings: 7.27 lakh residential and 3,667 commercial units (20% and 45% of buildings by 2047)	**GHG emissions reduction:** 0.78 million tCO_2e/yr	INR 1,243 crore
Window glazing in buildings: 16.4 lakh residential and 3.3 lakh commercial and institutional units (45% and 60% of buildings by 2047)	**GHG emissions reduction:** 4.02 million tCO2e/yr	Not estimated
Cool roofs and green roofs in new and existing buildings: 21.8 lakh residential and 3.8 lakh commercial and institutional units (60% of residential; 100% of new and 70% of existing commercial and institutional buildings by 2047)	**GHG emissions reduction:** 1.22 million tCO_2e/yr	Not estimated
Solar and energy-efficiency retrofit of municipal, state and central government buildings, with public procurement of efficient appliances (100% LED, 90% efficient fans and cooling by 2047)	**Beneficiaries:** 106 lakh	Not estimated
Solar PV in affordable housing projects and the Indiramma Indlu scheme, and large-scale solar PV for commercial buildings, IT and business hubs, universities and group housing	**Beneficiaries:** 106 lakh	Not estimated
Climate-resilient measures in vulnerable settlements and affordable housing: raised plinths, flood protection, better ventilation and lighting, improved roofing and rainwater harvesting	**Beneficiaries:** 106 lakh	Not estimated
Enabling measures (policy, regulatory and programme support)		
Cool and green roof incentives (property tax rebates, FSI and development charge discounts, subsidies) and training for developers and contractors	**Beneficiaries:** 106 lakh	Not estimated
Feasibility study for floating solar plants on surface water bodies	**Beneficiaries:** 106 lakh	Not estimated

*All sectoral and action totals are for the Hyderabad climate action plan, which runs until 2047

**Across all sectors, costs are not estimated for certain actions due to limited available information on project scale, size or design and these require further detailed technical assessments



Transportation

₹7,959 crore investment by 2047

9.23 Mt CO_2e/yr reduction potential

Project and scale by 2047	Climate impact and benefits	Estimated cost by 2047*
Capital Investment Projects		
Shift from private vehicle utilisation to public transport adoption: route rationalisation of the city bus fleet, accessible and safe bus shelters, and multimodal integration of bus, MMTS and metro; 45% public transport mode share; procurement of 5,290 e-buses (100% electrification of public buses)	**GHG emissions reduction:** 0.95 million tCO_2e/yr **Beneficiaries:** 106 lakh	INR 7,935 crore
Citywide expansion of inclusive and safe non-motorised transport infrastructure: new and wider footpaths, safe crossings and foot-over-bridges, vendor zones and pedestrianisation pilots; 32% NMT mode share by 2047	**GHG emissions reduction:** 0.52 million tCO_2e/yr **Beneficiaries:** 106 lakh	Not estimated
Electrification of private, commercial and freight vehicles through incentives: 85% electric cars, 95% two- and three-wheelers, 100% light and 90% medium and heavy freight vehicles by 2047	**GHG emissions reduction:** 7.70 million tCO_2e/yr **Beneficiaries:** 106 lakh	Not estimated
Electrification of municipal vehicle fleet: 157 electric vehicles by 2047 (100% of municipal car fleet); RE (solar PV) for charging	**GHG emissions reduction:** 0.06 million tC_02e/yr	INR 24 crore
City-wide EV charging stations, with solar PV at TGSRTC bus depots, bus shelters and municipal buildings (100% of depot and charging electricity from RE)	**Beneficiaries:** 106 lakh	Not estimated
Climate-resilient NMT infrastructure and green bus shelters: tree shading, pervious pavements, rain gardens, bioswales and tree trenches, upgraded drainage near flood-prone bus stops, and green bus stops in heat and congestion hotspots	**Beneficiaries:** 72.4 lakh	Not estimated
Parking lots at all major public transport stations	**Beneficiaries:** 106 lakh	Not estimated
Enabling measures (policy, regulatory and programme support)		
Adoption of intelligent transport systems, including expansion of the Adaptive Traffic Control System	**Beneficiaries:** 106 lakh	Not estimated
Piloting Low Emission Zones (LEZ) within the city	**Beneficiaries:** 106 lakh	Not estimated

Water Supply

₹1,028 crore investment by 2047

2.40 Mt CO_2e/yr reduction potential

Project and scale by 2047	Climate impact and benefits	Estimated cost by 2047*
Capital Investment Projects		
24x7 metered supply by water source augmentation, NRW reduction and SCADA: 100% piped coverage with GIS-based prioritisation of unserved areas, source and treatment augmentation, District Metered Areas, NRW reduced to 10% or below, smart meters in 50% of households and SCADA across the network	**GHG emissions reduction:** 0.87 million tCO_2e/yr **Beneficiaries:** 106 lakh	Not estimated
Renewable energy installation for water supply facilities: 60% of electricity from solar PV by 2047 (1,430 million kWh/yr)	**GHG emissions reduction:** 1.02 million tCO_2e/yr	Not estimated
Energy-efficient pump retrofit in water supply facilities: 9,157 energy-efficient pumps (100% by 2047)	**GHG emissions reduction:** 0.46 million tCO_2e/yr	Not estimated
Rainwater harvesting and reuse integrated with dual plumbing: RWH in 100% of new and existing residential and commercial buildings by 2047, mapping of existing structures and dual plumbing in all new construction	**GHG emissions reduction:** 0.05 million tCO_2e/yr **Beneficiaries:** 106 lakh	INR 1,028 crore
Enabling measures (policy, regulatory and programme support)		
Sustainable management of lake water resources: map all lakes, restoration plans for critical lakes, 100% elimination of wastewater discharge into water bodies and an integrated lake management strategy	**Beneficiaries:** 106 lakh	Not estimated
Groundwater conservation and management: phased piezometer network, aquifer mapping, geotagged recharge structures and incentives for recharge maintenance	**Beneficiaries:** 106 lakh	Not estimated



Wastewater Management

₹7,920 crore investment by 2047

1.38 Mt CO_2e/yr reduction potential

Project and scale by 2047	Climate impact and benefits	Estimated cost by 2047*
Capital Investment Projects		
Sewer rehabilitation and expansion, STP upgrade and tertiary treatment for reuse: sewer coverage for all properties including peripheral areas and slums, STP capacity for 2047 loads, real-time quality monitoring, sludge hygienisation and tertiary treatment modules	**Beneficiaries:** 106 lakh	Not estimated
Performance improvement and optimisation of aerobic STPs: 100% of aerobic STPs (230 MLD) by 2047	**GHG emissions reduction:** 0.01 million tCO_2e/yr	Not estimated
Low-carbon anaerobic STPs with biogas recovery: 1,305 MLD anaerobic capacity (85% of treatment) with 100% methane capture by 2047	**GHG emissions reduction:** 1.14 million tCO_2e/yr	Not estimated
Decentralised wastewater treatment (DeWATS): 20% of wastewater treated through DeWATS; on-site STPs in all new buildings above 10,000 sq. m	**GHG emissions reduction:** 0.04 million tCO_2e/yr	INR 4,224 crore
Renewable energy installation for wastewater facilities: 95.9 MWp solar PV (100% of electricity by 2047)	**GHG emissions reduction:** 0.10 million tCO_2e/yr	INR 432 crore
Energy-efficient pump retrofit in wastewater facilities: 100% energy-efficient pumps by 2047	**GHG emissions reduction:** 0.02 million tCO_2e/yr	INR 441 crore
Septage and sludge management: scheduled desludging, standalone FSTPs and co-treatment at STPs with biogas recovery; 70% of faecal sludge treated at FSTPs	**GHG emissions reduction:** 0.04 million tCO_2e/yr	INR 2,823 crore
Treated wastewater reuse: 20% safe reuse of treated wastewater by 2047 (22,693 MLD as reported)	**GHG emissions reduction:** 0.03 million tCO_2e/yr	Not estimated
Prevent stormwater discharge into sewers during floods: sensors on manholes near waterlogging points and penalties for unauthorised opening	**Beneficiaries:** 106 lakh	Not estimated
Enabling measures (policy, regulatory and programme support)		
Safe reuse of treated wastewater (SRTW) policy and Circular Economy Cell at HMWSSB: reuse mandates for IT hubs, residential complexes and industries, rationalised tariffs and long-term supply contracts	**Beneficiaries:** 106 lakh	Not estimated

Stormwater Management

To be costed during project preparation

Adaptation resilience-focused projects

Project and scale by 2047	Climate impact and benefits	Estimated cost by 2047*
Capital Investment Projects		
Real-time monitoring and early warning system (EWS) for urban flooding: catchment-based Automated Weather Stations and an EWS linked to HYDRAA, line departments and the public	**Beneficiaries:** 106 lakh	Not estimated
Revitalise lakes and nalas: demarcation and encroachment clearance, dredging, interlinking lakes, interception and diversion of untreated wastewater, screens on nalas and restoration of lake buffers	**Beneficiaries:** 106 lakh	Not estimated
Reducing runoff generation through groundwater recharge pits: mandatory pits in all new public and large private developments, with a geotagged registry and maintenance	**Beneficiaries:** 106 lakh	Not estimated
Enabling measures (policy, regulatory and programme support)		
River-sensitive city planning with micro-catchment blue-green infrastructure and an ecological restoration master plan for the Musi river	**Beneficiaries:** 106 lakh	Not estimated
Climate-responsive stormwater design: climate impact studies, updated IDF curves and design standards for cloudbursts and extreme events	**Beneficiaries:** 106 lakh	Not estimated
Policy and regulatory framework for permeable surfaces: GIS inventory, minimum permeability in zoning and building codes, infiltration mandates for large developments and retrofit incentives	**Beneficiaries:** Flood-prone areas	Not estimated



Solid Waste Management

₹873 crore investment by 2047

24.27 Mt CO_2e/yr reduction potential

Project and scale by 2047	Climate impact and benefits	Estimated cost by 2047*
Capital Investment Projects		
Door-to-door collection and source segregation system with EV fleet: 5,819 electric collection vehicles (80% of fleet by 2047), with GPS/RFID tracking and CCTV monitoring	**GHG emissions reduction:** 0.05 million tCO_2e/yr	INR 873 crore
Development of wet waste processing facilities: 5,890 TPD bio-CNG/ biomethanation capacity; 862 TPD composting	**GHG emissions reduction:** 24.15 million tCO_2e/yr	Not estimated
Modernised transfer stations and Dry Resource Collection Centres with pre-sorting: 2,155 TPD capacity; recycling facility, 1,867 TPD RDF and 1,436 TPD waste-to-energy capacity	**GHG emissions reduction:** 0.07 million tCO_2e/yr	Not estimated
Dedicated e-waste collection and processing centres at IT hubs and in every ward, with manufacturer buy-back programmes	**Beneficiaries:** IT hubs (HITEC City, Gachibowli, Madhapur)	Not estimated
Enabling measures (policy, regulatory and programme support)		
Source segregation and 3R at source: phased segregation, collection drives with RWAs and NGOs, anti-littering awareness, and on-site treatment by bulk waste generators with incentives and geotagging	**Beneficiaries:** 106 lakh	Not estimated

Urban Greening and Biodiversity

To be costed during project preparation

Adaptation resilience-focused projects

Project and scale by 2047	Climate impact and benefits	Estimated cost by 2047*
Enabling measures (policy, regulatory and programme support)		
Biodiversity governance: City Biodiversity Management Committee, mapping of natural assets, LBSAP and City Biodiversity Index	**Beneficiaries:** 106 lakh	Not estimated
Community-led biodiversity conservation: ward-level green committees, park infrastructure assessment and awareness programmes	**Beneficiaries:** 106 lakh	Not estimated

Public Health System

To be costed during project preparation

Adaptation resilience-focused projects

Public Health System

Project and scale by 2047	Climate impact and benefits	Estimated cost by 2047*
Capital Investment Projects		
Strengthen the climate-resilient healthcare network: extend facilities to vulnerable areas, retrofit UPHCs with cool roofs, glazing, ventilation and air purifiers, and flood-proof hospital equipment and records	**Beneficiaries:** 106 lakh	Not estimated
Enabling measures (policy, regulatory and programme support)		
Climate-health readiness: capacity building, real-time disease surveillance and community awareness on safety and first aid	**Beneficiaries:** 106 lakh	Not estimated

Note: Cost is not estimated for Public Health projects due to limited available information on project scale, size or design and these require further detailed technical assessments.



Investing in Climate Resilient Cities State level Project Pipelines: Andhra Pradesh & Telangana

2026

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