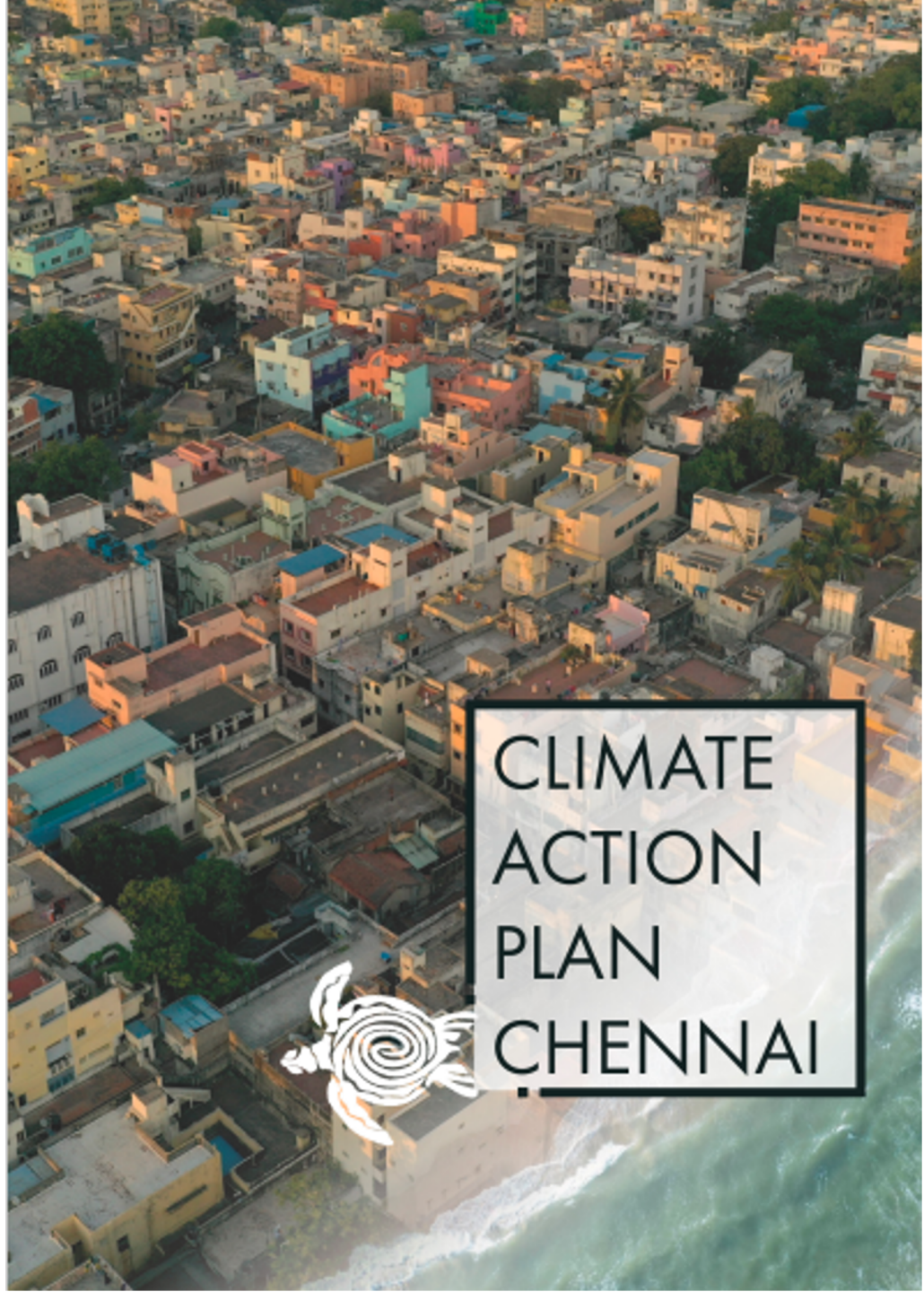


September 2022

This is a draft document for public comments and suggestions

Purpose of the document

Human-induced climate change is already affecting many weather and climate extremes in every region across the globe. The most recent Intergovernmental Panel on Climate Change (IPCC) report identifies a code red for humanity as we face the imminent risk of hitting 1.5 degrees in the near term.

Chennai is the fifth most populous metropolis (Census of India, 2011) and one of the fastest growing cities in India. Rapid urbanisation over the last 2 decades has impacted natural resources and ecology of the city resulting in increased flooding events, sea level rise, heat island effect etc. To tackle these challenges, and reiterate its commitment to India's climate agenda, Chennai joined the C40 cities network in 2016.

Greater Chennai Corporation (GCC) is preparing the Chennai Climate Action Plan (CCAP) facilitated through the support of C40 and Urban Management Centre aligned to C40's Climate Action Planning framework. The study area for the CCAP includes the city corporation area of 426 sqkm under GCC jurisdiction. The CCAP envisions a climate-resilient Chennai by 2050 with a focus on mitigation and adaptation strategies under six key action areas. The CCAP has been carried out through a rigorous consultation process by engaging various state and city level government departments along with NGOs, CSOs, Technical Experts and Academia.

The purpose of this document is to both inform as well as elicit suggestions from the citizens of Chennai on the CCAP. The document is open to the public at large to provide comments/ feedback/ suggestions for a period of 6 weeks.

Please share your suggestions on the email id: chennaiclimateactionplan@gmail.com

C40 is a network of nearly 100 world-leading cities collaborating to deliver the urgent action needed to confront the climate crisis.

7	20%	97
regions	of the global economy	cities

Created by **CITIES**

For **CITIES**

Led by **CITIES**

Directly representing 582 million **residents**

Influencing 896 million **people living and working in the wider city**

AFRICA: ABIDJAN – ACCRA – ADDIS ABABA – CAPE TOWN – DAKAR – DAR ES SALAAM – DURBAN (ETHEKWINI) – EKURHULENI – FREETOWN – JOHANNESBURG – LAGOS – NAIROBI – TSHWANE | **CENTRAL EAST ASIA:** BEIJING
CHENGDU – DALIAN – FUZHOU – GUANGZHOU – HANGZHOU – HONG KONG – NANJING – SHANGHAI – SHENZEN – QINGDAO – WUHAN – ZHENJIANG | **EAST, SOUTHEAST ASIA & OCEANIA:** AUCKLAND – BANGKOK – HANOI
HO CHI MINH CITY – JAKARTA – KUALA LUMPUR – MELBOURNE – QUEZON CITY – SEOUL – SINGAPORE – SYDNEY – TOKYO – YOKOHAMA | **EUROPE:** AMSTERDAM – ATHENS – BARCELONA – BERLIN – COPENHAGEN – HEIDELBERG
ISTANBUL – LISBON – LONDON – MADRID – MILAN – OSLO – PARIS – ROME – ROTTERDAM – STOCKHOLM – TEL AVIV – WARSAW | **LATIN AMERICA:** BOGOTÁ – BUENOS AIRES – CURITIBA – GUADALAJARA – LIMA MEDELLÍN
MEXICO CITY – RIO DE JANEIRO – SALVADOR – SÃO PAULO – SANTIAGO – QUITO | **NORTH AMERICA:** AUSTIN – BOSTON – CHICAGO – HOUSTON – LOS ANGELES – MIAMI – MONTRÉAL – NEW ORLEANS – NEW YORK – PHILADELPHIA
PHOENIX – PORTLAND – SAN FRANCISCO – SEATTLE – TORONTO – VANCOUVER – WASHINGTON DC | **SOUTH & WEST ASIA:** AHMEDABAD – AMMAN – BENGALURU – CHENNAI – DELHI – DHAKA – DUBAI – KARACHI – KOLKATA – MUMBAI

3

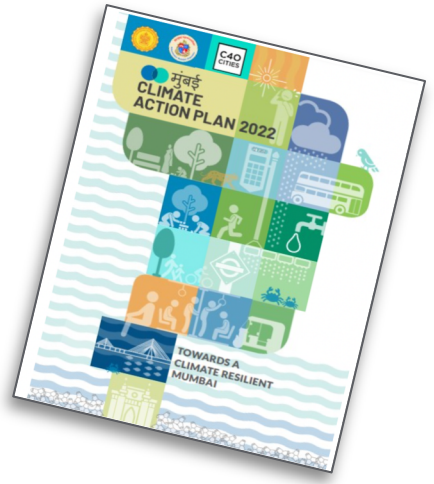
What are City Climate Action Plans (CAPs)?

City **Climate Action Plans (CAPS)** are a tool to bring together a **holistic approach to urban development,** bringing the entire range of urban development challenges under one umbrella.

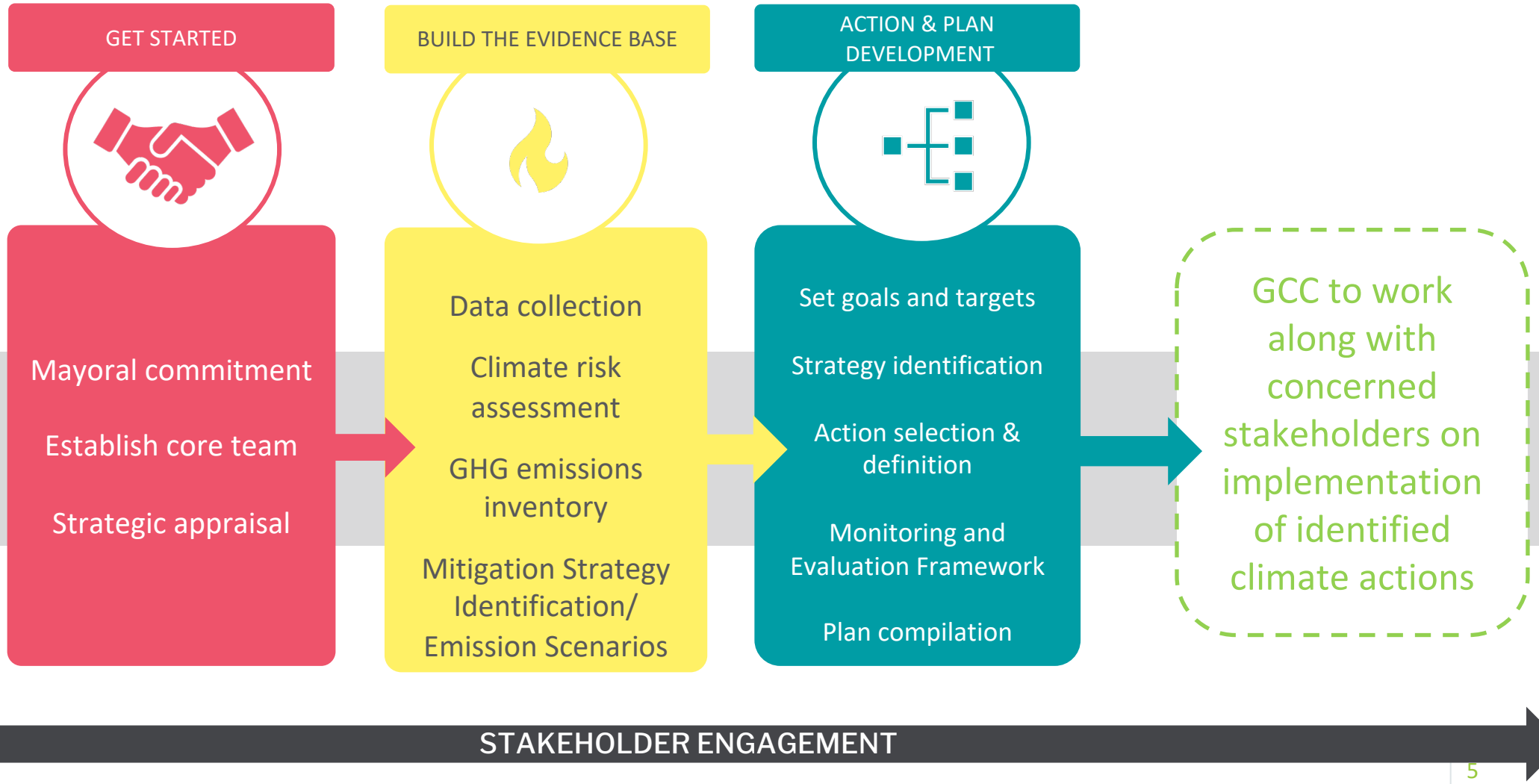
Evidence based, data driven, and **inclusive, it** lays out a strategy, including specific measures, **to reduce GHG emissions** and **adapt to the impacts of climate change**

Goal of CAPs:

Effective climate action is **integrated and embedded city-wide** to enable **widespread implementation and adoption**



Climate action planning process



Key pillars of CAP

Calculating Green House Gas Emissions

Mitigation
Identify actions to mitigate and reduce the emissions

For eg, increasing heat is a concern, adapting to it by using cool roofing in housing, increasing green cover, terrace gardens

Assessing Climate Change Risk and its impact

Adaptation
Identify actions to adapt and to become resilient to climate change and reduce its impact

For eg, majority of emissions comes from residential consumption of electricity this can be mitigated through increasing solar roofs

Assessing Climate Change Risks on Vulnerable Communities

Inclusive Climate Action
Integrating inclusivity into the actions with a focus on improving health and protecting vulnerable communities from the risks of climate change

For eg, majority of slum housing is prone to heating up during summers this can be mitigated by retrofitting them for improved thermal comfort.

Stakeholder consultations & interactions - 204

TRANSPORT
- CMRL
- SUBURBAN RAIL
- MTC

ENERGY AND FUEL
- TANGEDCO
- IOCL
- TEDA

WASTE
- SWM, GCC
- CMWSSB

GCC DEPTS.
- DC (Works)
- CSCL
- PARKS
- HEALTH
- REVENUE
- DM CELL
- GIS CELL
- SWD
- ELECTRICAL

STATE GOVT.
- DoECCF

PLANNING & DEVPT.
- TNUHDB
- CMDA
- BUILDINGS & TP

ENVT. AND DISASTER
- DoE
- TNPCB
- TNFRS

ACADEMIA
- IITM
- ANNA UNIVERSITY

TECHNICAL EXPERTS, NGOs, CSOs

Stakeholder consultations & interactions

ACS, DoECCF

Commissioner, GCC


DC(Works), GCC & CEO, CSCL

Department Heads, GCC


IOCL


CMWSSB


CMRL


CMDA

Building the Evidence

GHG Inventory & Climate Change Risk Assessment

What is Green House Gas (GHG) emission inventory?

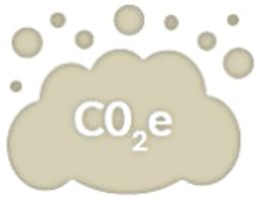
A city-wide GHG inventory enables cities to measure their overall emissions, as well as understand the contribution of different activities within the city. The Global Protocol for Community-scale Greenhouse Gas Emission Inventories (also referred to as GPC) is a GHG Protocol standard developed by C40, World Resources Institute and ICLEI - Local Governments for Sustainability. The GPC provides a robust framework for accounting and reporting city-wide GHG emissions. Chennai's GHG inventories are prepared under the GPC protocol.

The GPC protocol for preparation of GHG inventories seeks to:

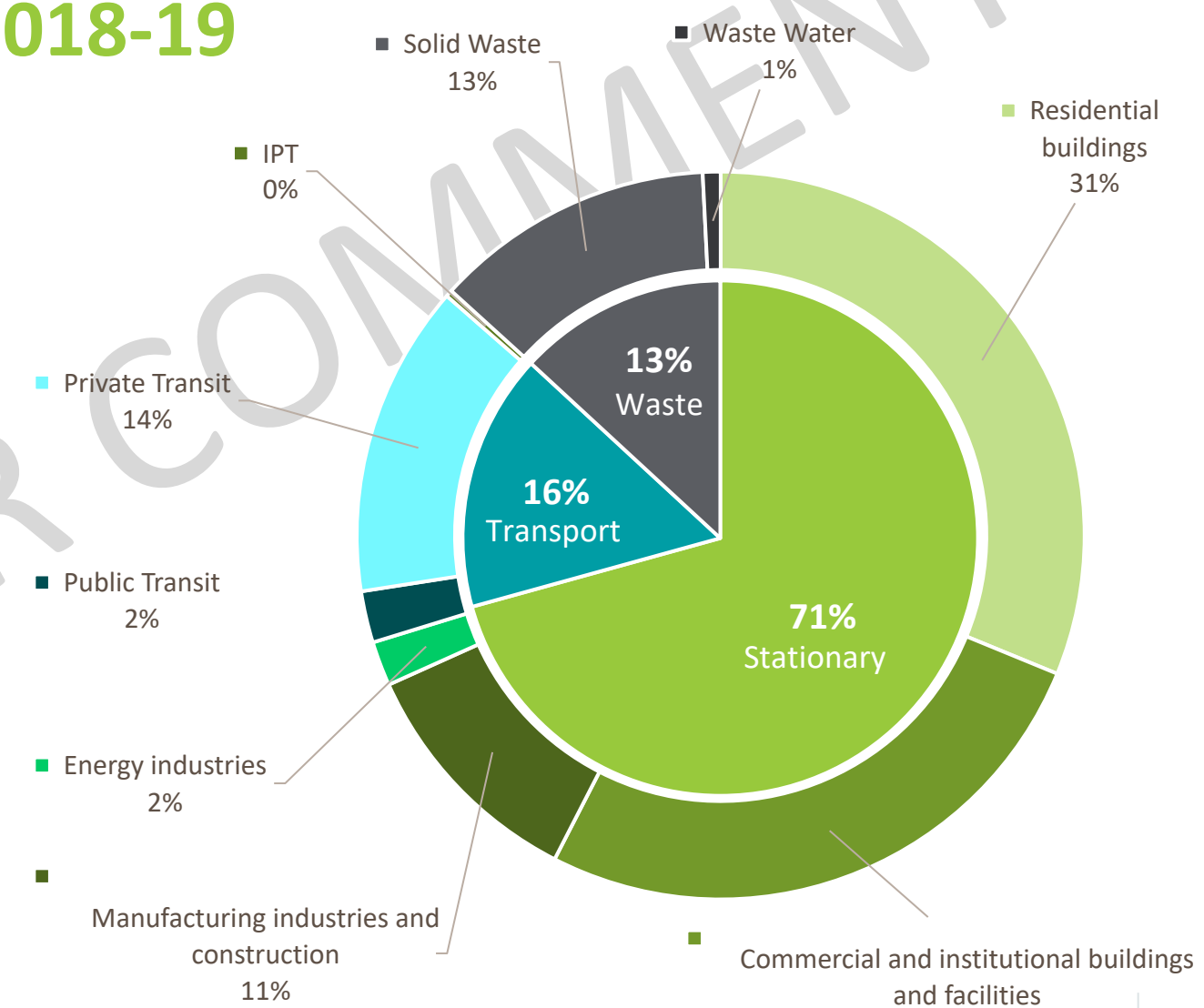
- Develop a comprehensive and robust greenhouse gas inventory
- Establish a base year emissions inventory, set reduction targets, and track their performance
- Ensure consistent and transparent measurement and reporting of GHG emissions between cities, following internationally recognised greenhouse gas accounting and reporting principles
- Enable cities' inventories to be aggregated at subnational and national levels
- Demonstrate the important role that cities play in tackling climate change, and facilitate insight through benchmarking – and aggregation – of comparable data

Source: https://resourcecentre.c40.org/resources/measuring-ghg-emissions#:~:text=The%20Global%20Protocol%20for%20Community,reporting%20city%2Dwide%20GHG%20emissions

Chennai's GHG inventory 2018-19

Total GHG emissions for base year 2018		
		
Chennai	**14.38** million tons CO_2e	**1.9** tons CO_2e per capita*

Further details of the inventory is published online here .



Source: Calculated using CIRIS tool, using data collected from GCC and other stakeholders, Mumbai Climate Action Plan
**The population considered for Chennai is 7,523,337 for the year 2018-19 based on Oxford Economic data*

What is Climate Change Risk Assessment?

A climate risk assessment seeks to understand the likelihood of future climate hazards and the potential impacts of these hazards on cities spatially, and their inhabitants. This is fundamental information for prioritizing action and investment into climate adaptation and resilience. As a part of city's Climate Change Risk Assessment, both GCOM and C40 require cities to report on:

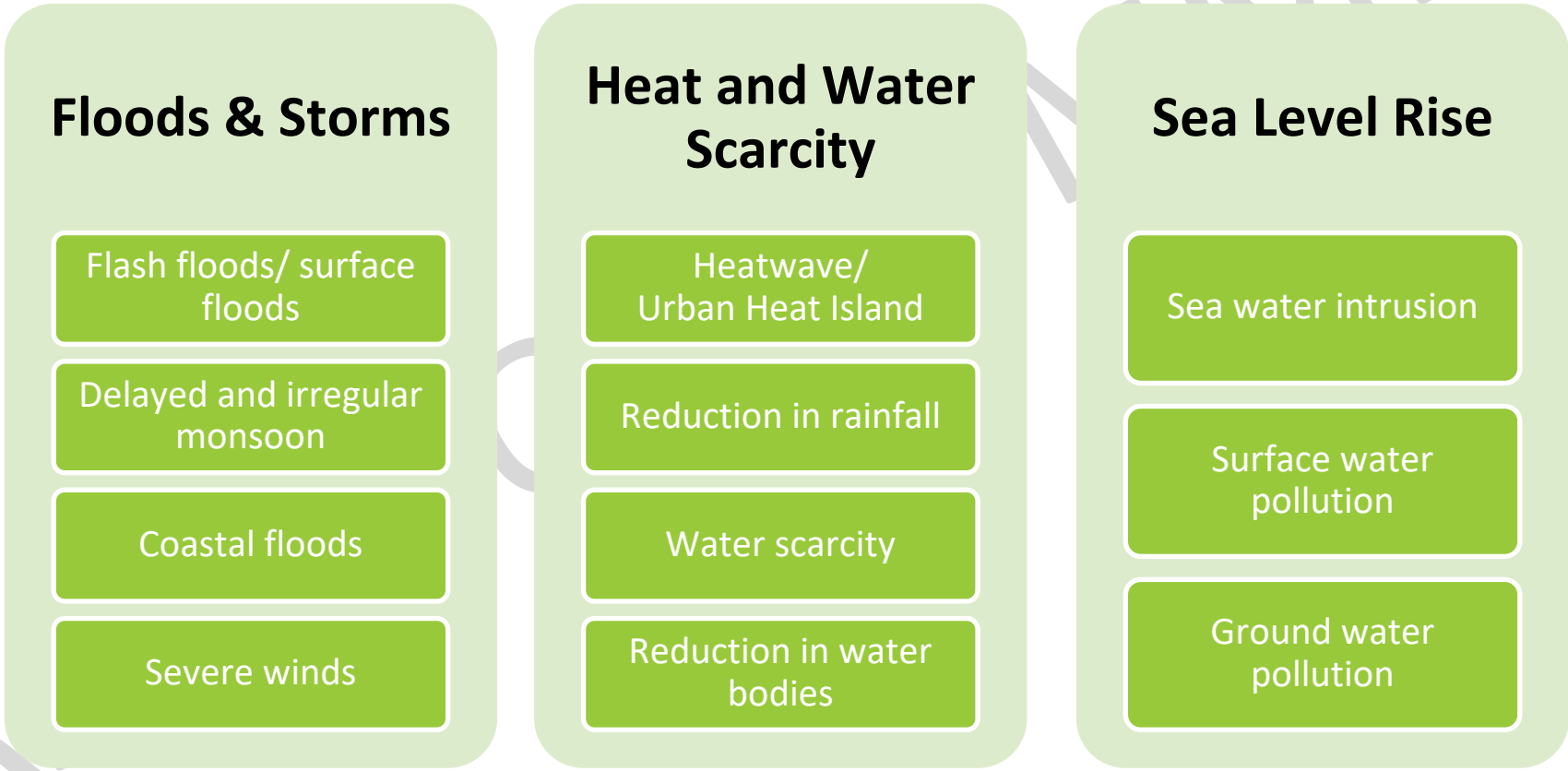
- **Climate related hazards:**
  - The hazard assessment identifies the most frequent, severe and widespread hazards and those likely to cause the greatest impact. It considers the city's historic trends and current situation, as well as future scenarios based on available scientific evidence through to 2050 at least.

- **Impact assessment of hazards:**
  - The assessment would consider the vulnerability of people, systems or sectors; their capacity to adapt in the face of hazards, and also the potential impact in terms of number of people affected, cost of damage, days' service lost, etc. The impact assessment would consider hazards experienced today and projections through to 2050.

- **Action identification:**
  - The action identification stage would include setting goals, targets and broad objectives thereby arriving at feasible climate actions. Further the actions are prioritised (short, medium and long term) through a consultative process and further attaching the actions to implementable climate governance structures.

Source: Climate Change Risk Assessment Guidance, C40 cities

Chennai's Climate Risk and Vulnerabilities

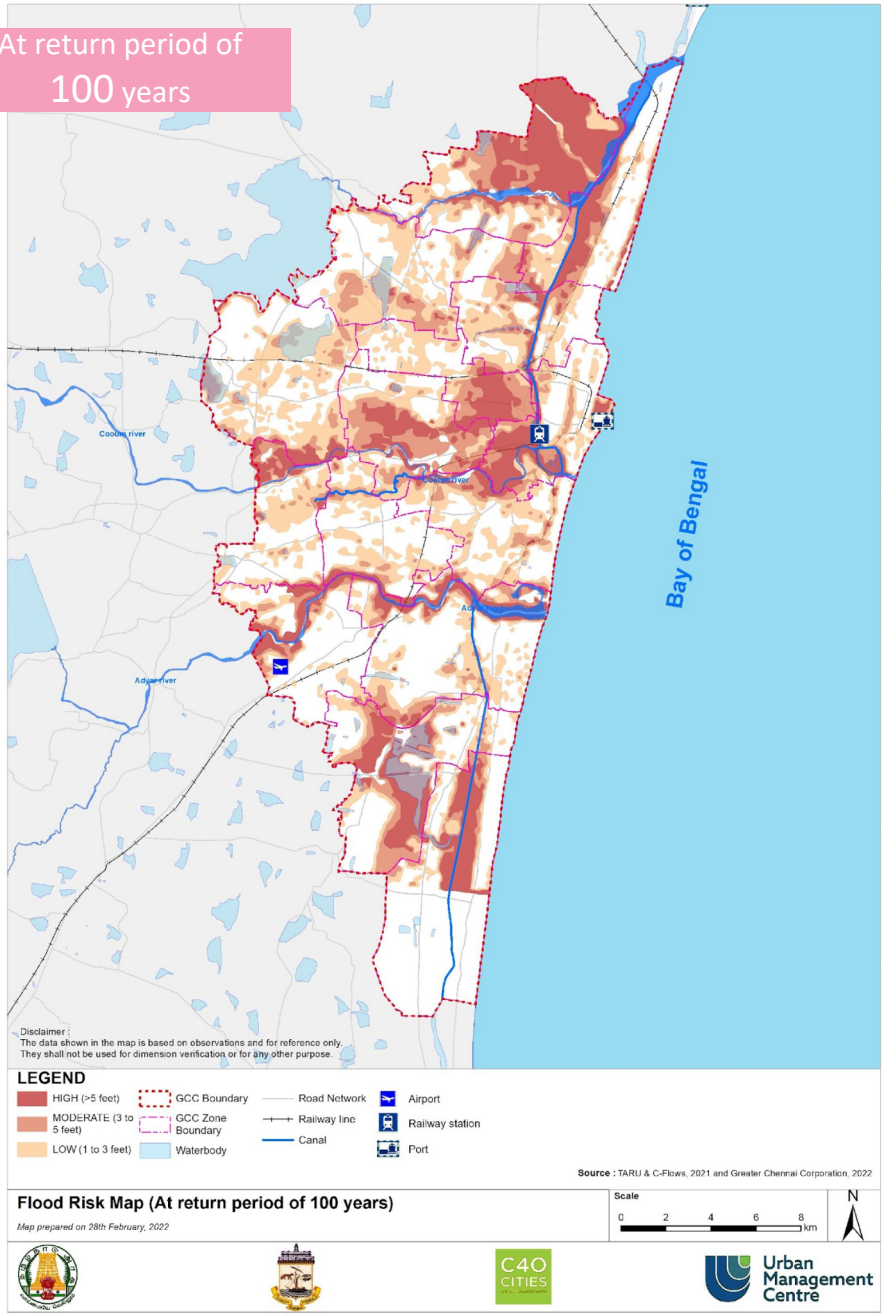


Identified climatic hazards for Chennai based on prioritisation of past and future trends

(pages 14-21 includes spatial analysis of climate risks and pages 40-43 includes the adaptation actions)

Projected flood risks due to extreme precipitation

At return period of 5 years (20cm of rainfall)	At return period of 25 years (38cm of rainfall)	At return period of 100 years (47cm of rainfall)
29.1% of GCC area is at risk of flood inundation	**46%** of GCC area is at risk of flood inundation	**56.5%** of GCC area is at risk of flood inundation



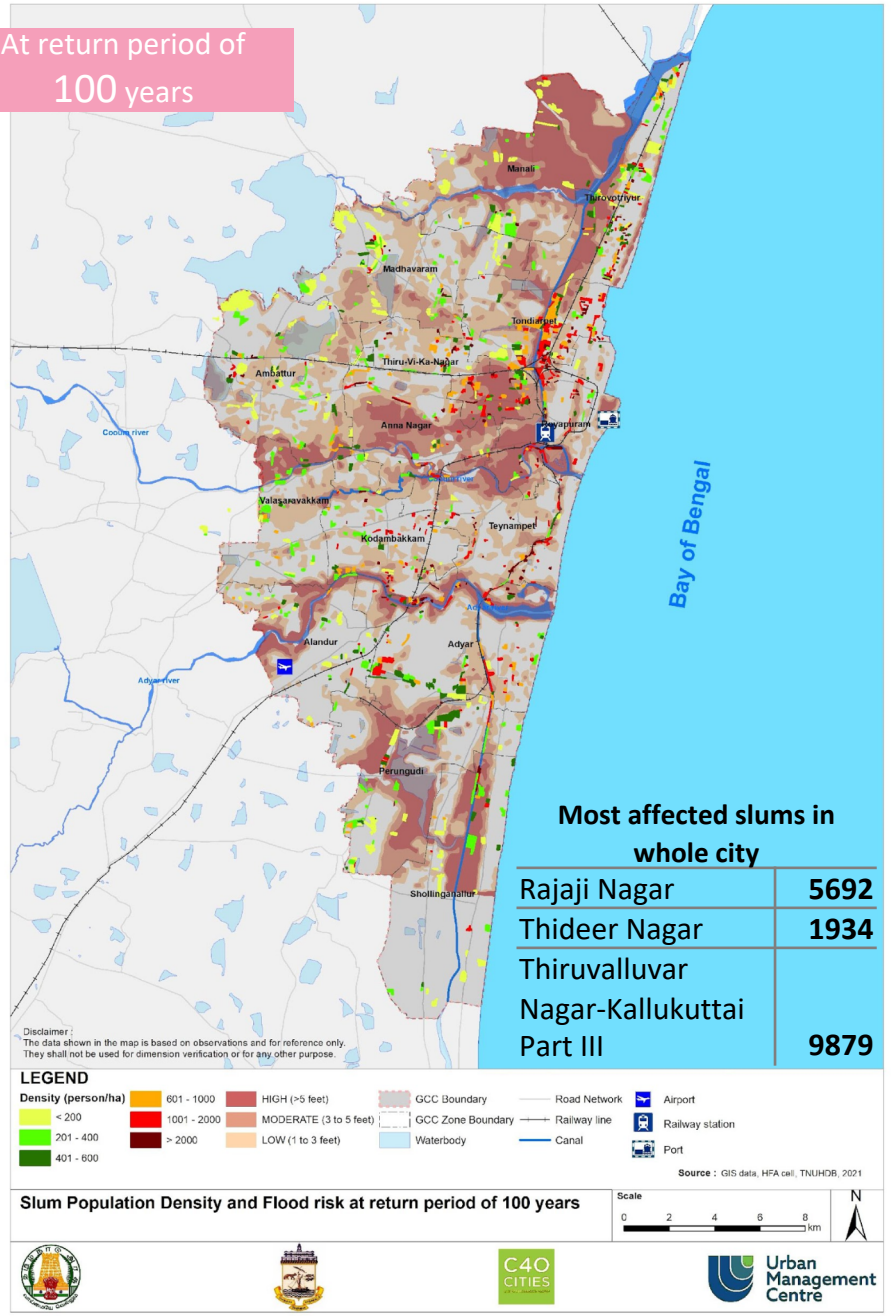
Source: Survey Data Analysis & GIS Dataset, Chennai City Partnership, Resilient Urban Mobility And Services In Chennai, TARU, UMTCL, GoAscendal, 2021

Slums & projected flood risk

Level of Flood risk	Slums prone to Flooding		Total Slum Population Affected
RETURN PERIOD OF 5 YEARS (20cm of rainfall) – **41.1%** **of slums inundated**			
High (> 5 ft)	80	7%	107611
Moderate (3 to 5 ft)	82	7%	116942
Low (1 to 3 feet)	332	28%	385320
RETURN PERIOD OF 25 YEARS (38cm of rainfall) – **60%** **of slums inundated**			
High (> 5 ft)	172	14%	232963
Moderate (3 to 5 ft)	159	13%	159419
Low (1 to 3 feet)	390	32%	438956
RETURN PERIOD OF 100 YEARS (47cm of rainfall) – **68.1%** **of slums inundated**			
High (> 5 ft)	257	21%	330028
Moderate (3 to 5 ft)	177	15%	196427
Low (1 to 3 feet)	384	32%	416319

**Each category of risk zones is exclusive and not overlapping with each other*

"Increased vulnerability due to higher density" –
2 times higher population density than rest of the city

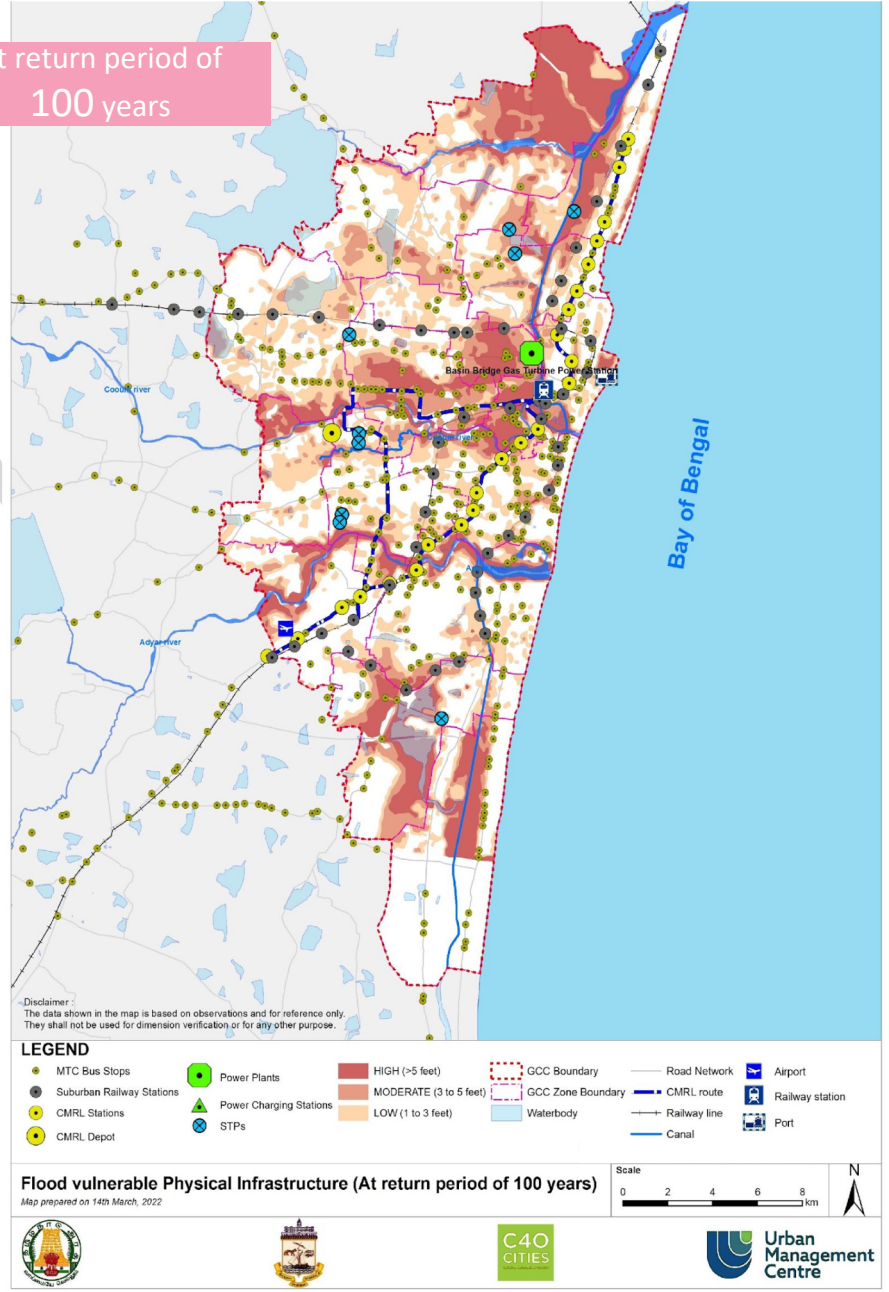


Source: HFA Cell, TNUHDB, 2021 & Survey Data Analysis & GIS Dataset, Chennai City Partnership, Resilient Urban Mobility And Services In Chennai, TARU, UMTCL, GoAscendal, 2021

Physical Infrastructure & projected flood risk

Level of Flood risk	PHYSICAL INFRASTRUCTURE PRONE TO FLOODING											
	MTC Bus Stops		Existing CMRL Stations		Suburban railway station		Smart bike Stations		STP		Power Charging Infrastructure	
RETURN PERIOD OF 5 YEARS (20cm of rainfall): **20%** of total physical infrastructure												
High (> 5 ft)	7	2.0%	0	0.0%	0	0.0%	6	5.6%	0	0.0%	0	0.0%
Moderate (3 to 5 ft)	9	2.5%	1	3.8%	1	2.9%	5	4.7%	0	0.0%	0	0.0%
Low (1 to 3 feet)	49	13.8%	5	19.2%	12	35.3%	21	19.6%	2	22.2%	8	21.6%
RETURN PERIOD OF 25 YEARS (38cm of rainfall): **38%** of total physical infrastructure												
High (> 5 ft)	15	4.2%	0	0.0%	1	2.9%	13	12.1%	1	11.1%	1	2.7%
Moderate (3 to 5 ft)	35	9.9%	3	11.5%	13	38.2%	15	14.0%	0	0.0%	3	8.1%
Low (1 to 3 feet)	77	21.8%	6	23.1%	9	26.5%	32	29.9%	4	44.4%	8	21.6%
RETURN PERIOD OF 100 YEARS (47cm of rainfall) : **45%** of total physical infrastructure												
High (> 5 ft)	38	10.7%	2	7.7%	6	17.6%	20	18.7%	1	11.1%	3	8.1%
Moderate (3 to 5 ft)	44	12.4%	3	11.5%	10	29.4%	18	16.8%	2	22.2%	4	10.8%
Low (1 to 3 feet)	87	24.6%	10	38.5%	14	41.2%	31	28.9%	4	44.4%	9	24.3%

**Each category of risk zones is exclusive and not overlapping with each other*

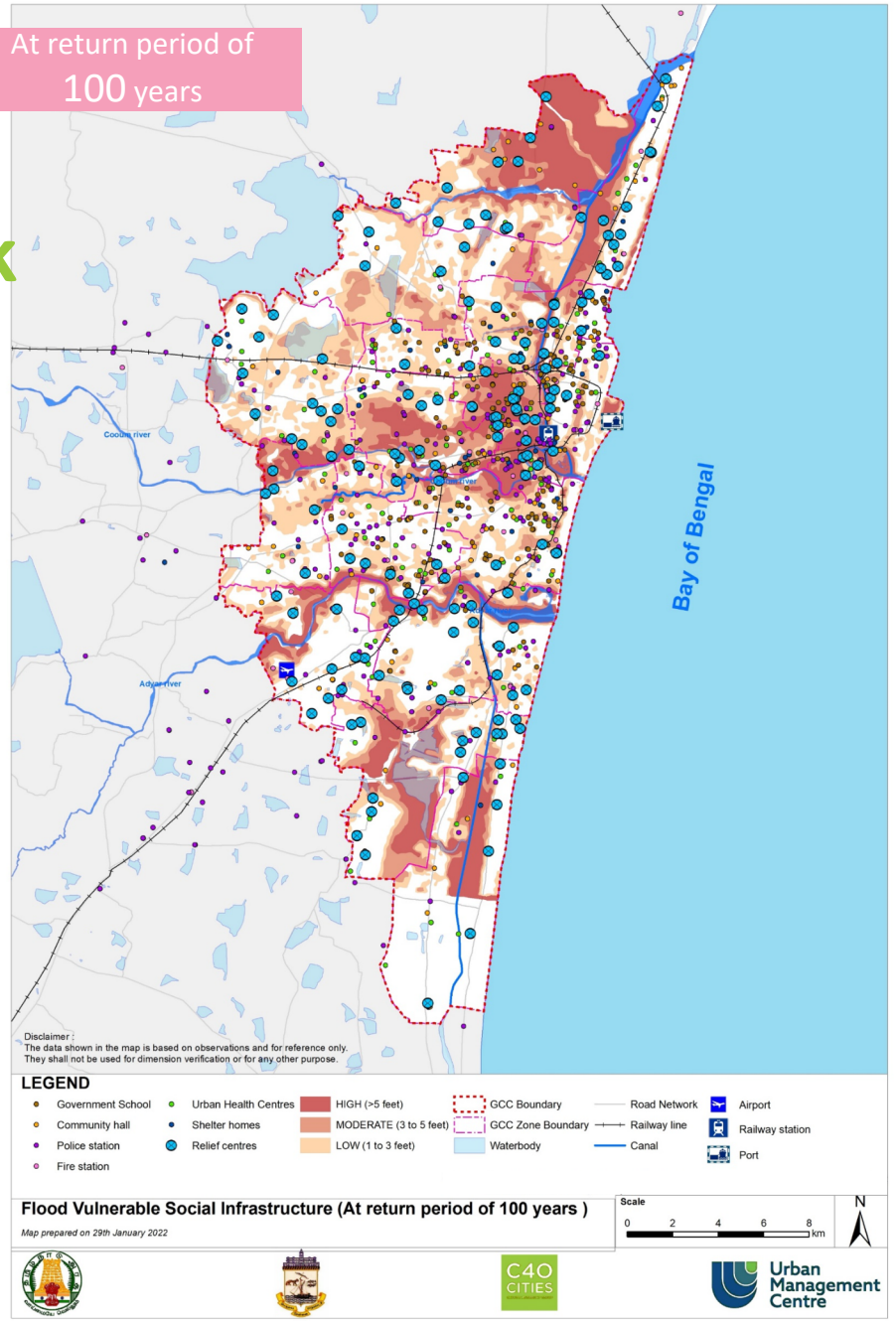


For flood return period of 100 years, 45% of total physical infrastructure affected

Source: GIS Cell, 2021 & Survey Data Analysis & GIS Dataset, Chennai City Partnership, Resilient Urban Mobility And Services In Chennai, TARU, UMTCL, GoAscendal, 2021

Social infrastructure & projected flood risk

Level of Flood risk	SOCIAL INFRASTRUCTURE PRONE TO FLOODING													
	UHC		RC		SH		G.SL.		CH		FS		PS	
RETURN PERIOD OF 5 YEARS (20cm of rainfall): **22.7%** **of total social infrastructure inundated**														
High (> 5 ft)	1	0.5%	4	2.4%	1	2.1%	6	2.1%	0	0.0%	0	0.0%	2	1.6%
Moderate (3 to 5 ft)	5	2.6%	10	5.9%	4	8.3%	12	4.3%	6	5.4%	3	6.0%	4	3.1%
Low (1 to 3 feet)	33	16.8%	25	14.8%	3	6.3%	57	20.3%	21	18.8%	6	12.0%	20	15.6%
RETURN PERIOD OF 25 YEARS (38cm of rainfall): **41.4%** **of total social infrastructure inundated**														
High (> 5 ft)	5	2.6%	12	7.1%	6	12.5%	19	6.8%	9	8.0%	3	6.0%	6	4.7%
Moderate (3 to 5 ft)	21	10.7%	22	13.0%	2	4.2%	41	14.6%	12	10.7%	3	6.0%	13	10.2%
Low (1 to 3 feet)	52	26.5%	25	14.8%	9	18.8%	75	26.7%	26	23.2%	15	30.0%	31	24.2%
RETURN PERIOD OF 100 YEARS (47cm of rainfall): **55.4%** **of total social infrastructure inundated**														
High (> 5 ft)	22	11.2%	26	15.4%	7	14.6%	49	17.4%	17	15.2%	5	10.0%	15	11.7%
Moderate (3 to 5 ft)	22	11.2%	20	11.8%	5	10.4%	42	14.9%	20	17.9%	7	14.0%	14	10.9%
Low (1 to 3 feet)	65	33.2%	38	22.5%	11	22.9%	83	29.5%	25	22.3%	16	32.0%	36	28.1%



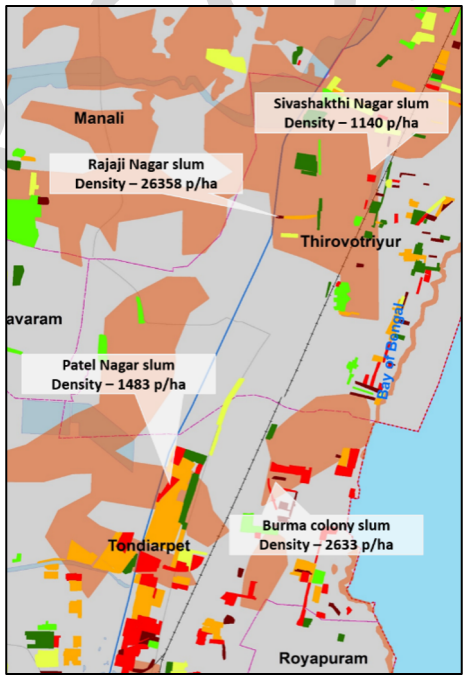
*UHC- Urban Health Centers, DRC – Disaster Relief Centers, SH – Shelter Homes, G.SL – Government Schools, CH – Community Halls, FS - Fire Stations, PS – Police Stations

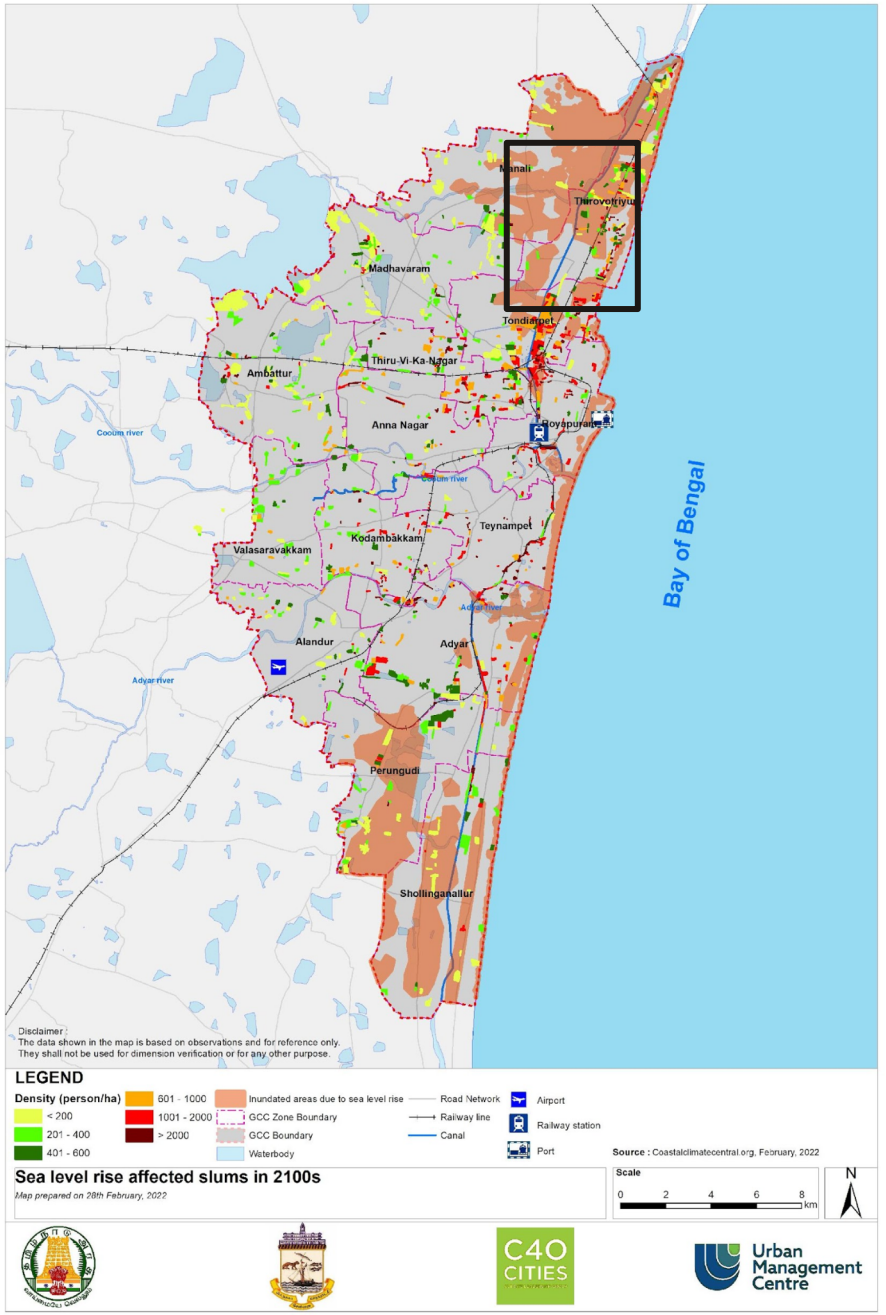
Source: GIS Cell, GCC, 2021 & Survey Data Analysis & GIS Dataset, Chennai City Partnership, Resilient Urban Mobility And Services In Chennai, TARU, UMTCL, GoAscendal, 2021

Slums under risk due to Sea Level Rise

- 16% of GCC area (67 sq.km.) to permanently inundate in 2100s
- ~10,00,000 population of the city will be affected
- **17%** of total slums (215 slums) residing ~2.6 lakhs population is expected to get affected
- Higher risks in high density slums located around creeks and rivers
- 7500 TNSCB tenements built for resettlement of slums also to be affected by SLR.

"Major risk as permanent loss of shelter"



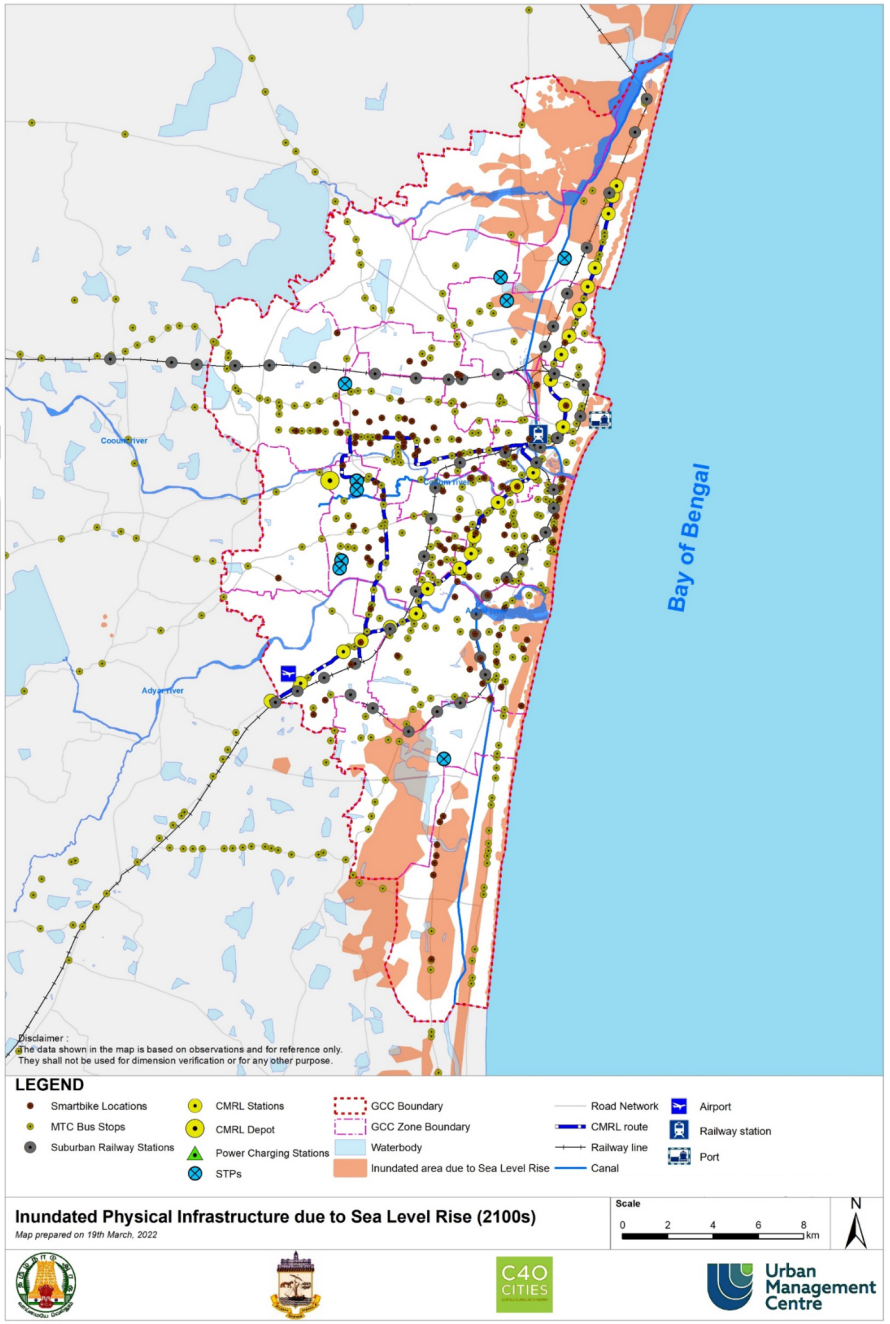


Source: Future Sea Level Rise, Assessment of Loss and Damage in Chennai, GCC, TNSLURB 2017 and Climatecentral.org

Sea level rise impact on physical infrastructure

- 100m of the coast are at a risk of submersion as a result of 7 cm of sea level rise in the next 5 years.
- North Chennai Thermal Power Plants is going to impacted as well, which will require replacement by 2050.

Sea Level Rise affected	Probability of being Inundated by 2100	
MTC Bus Stops	28	8%
Suburban Railway	4	12%
CMRL Stations	18	69%
Smart bike stations	3	2.8%
STP	3	33%
Power Plants	2	67%
PCI*	3	8%
Total	**61**	**13.1%**

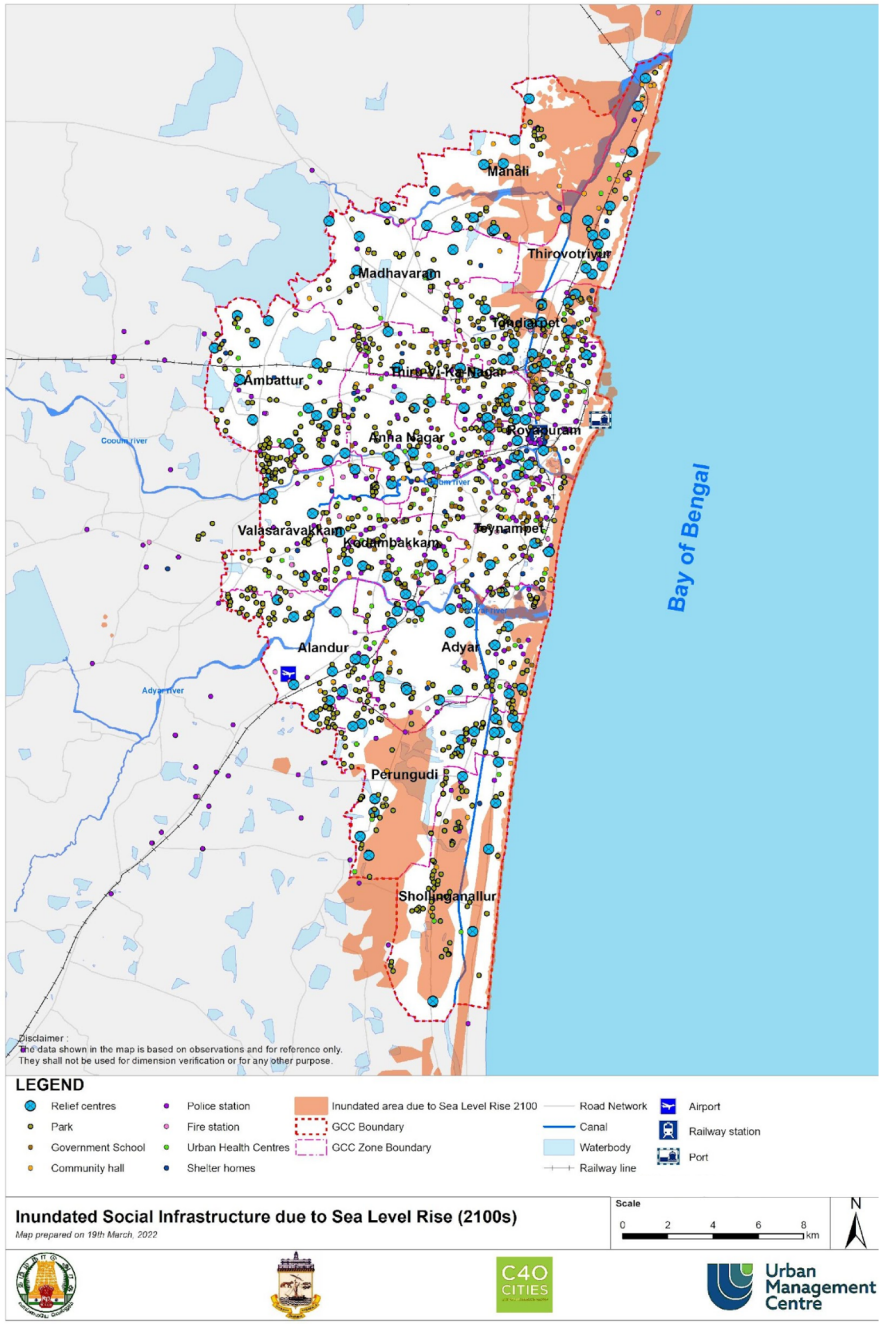


Source:National Centre for Coastal research, 2020 and Future Sea Level Rise, Assessment of Loss and Damage in Chennai, GCC, TNSLURB 2017 and Climatecentral.org

Sea level rise impact on social infrastructure

- Disaster relief centres are most prone to get inundated, followed by community halls, and government schools.
- Most important infrastructure to provide shelter in hazards are found most prone.

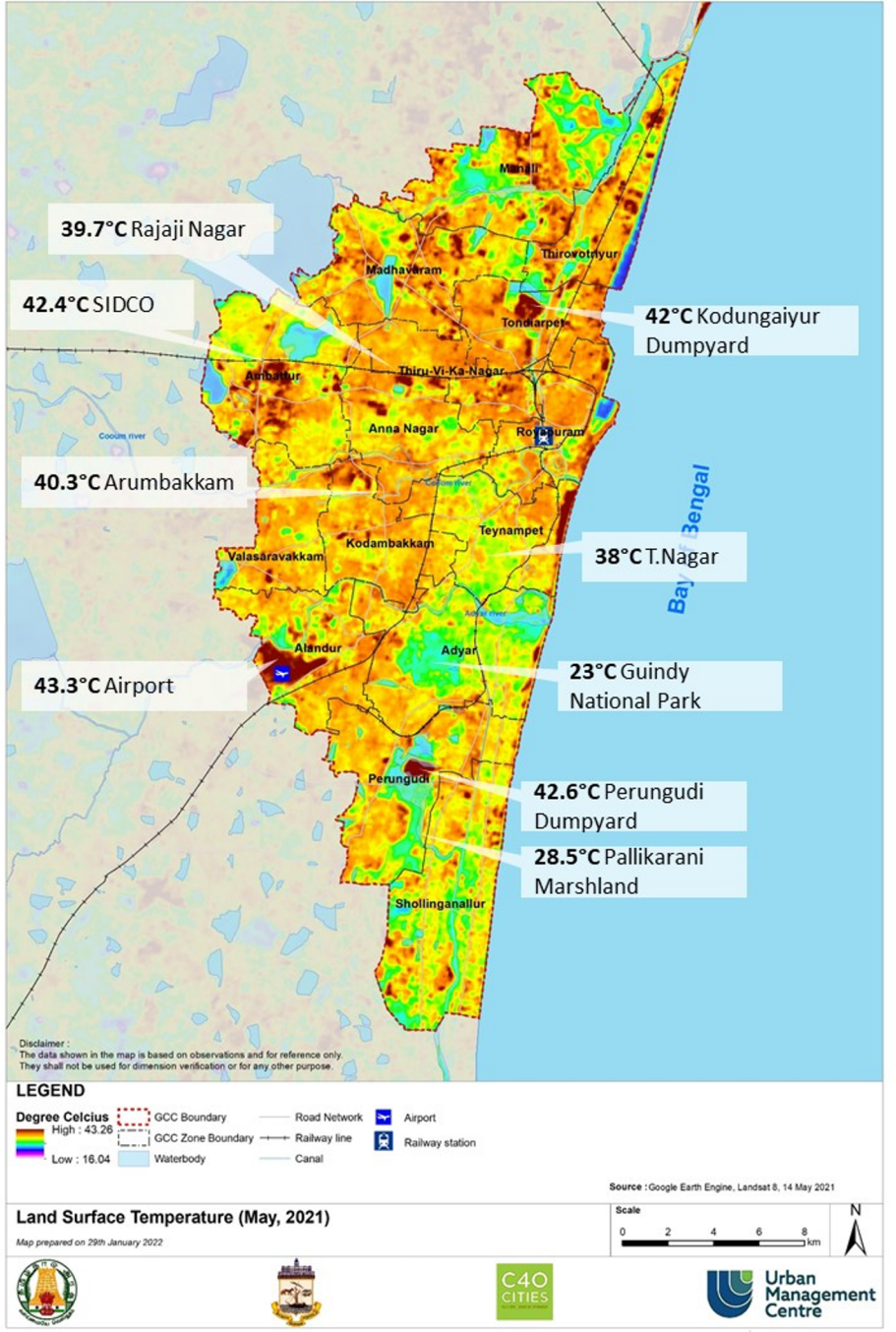
Sea Level Rise affected	Probability of being Inundated by 2100	
UHC	12	6%
Relief Centers	18	11%
Shelter homes	3	6%
Schools (Govt.)	14	5%
Community halls (Govt.)	15	13%
Fire Stations	5	10%
Police Stations	3	1.2%
Total	**70**	**6.36%**



Source:National Centre for Coastal research, 2020 and Future Sea Level Rise, Assessment of Loss and Damage in Chennai, GCC, TNSLURB 2017 and Climatecentral.org

Impact of increasing heat

- 53% houses dependent on external sources for drinking water – **Water shortage**
- 27% of total slum houses* use asbestos sheet as roofing material, currently, as against 8.9% of all houses** in Chennai - More vulnerable to heat stress
- Takes longer to cool-off at night-time due to Urban Heat Island effect
- Limited or no access to cooling equipment
- May lead to heat related fires, heat stress impacts on health



*Source: SFCPoA, 2014; Based on the sampling of 1131 out of 2173 total slums in the expanded city boundaries (200 wards)
**LANDSAT-8, Google Earth Engine, May 2021

Action and Plan Development

Pathways, Vision and Identified Actions

What is Pathways?

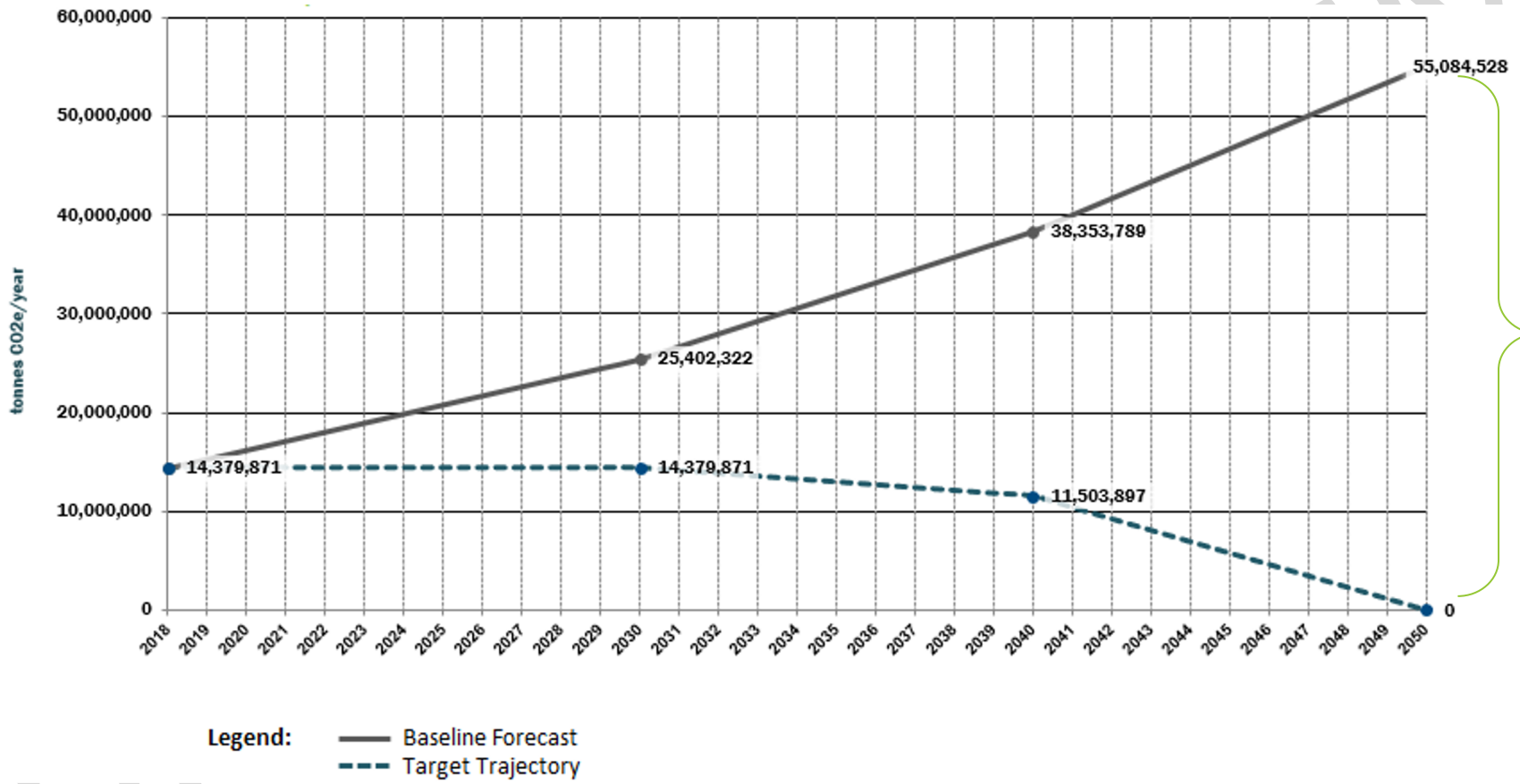
“Pathways” helps in understanding how cities can contribute to the deliverables mandated to national governments by the Paris Agreement and achieve **‘Carbon Neutrality’** by year 2050.

It supports in building better understanding of the impact of strategies or actions on emissions of the city.

Business as Usual Scenario	Existing & Planned Scenario	Ambitious Scenario
The BAU scenario aka. zero-action scenario aims to represent future emissions if no mitigation efforts are implemented and serves as a reference point from which other scenarios can be measured. This scenario is built using the city’s base-year GHG inventory, combined with additional information about the city that enables modelling of future emissions.	This scenario will help to determine anticipated emission reductions from the plans and policies already in place and assess the gap between what they are expected to deliver and the ambition required in the city’s draft targets. This is the starting point for identifying where further action is needed, which is then explored further with an ambitious scenario(s).	Usually, the level of ambition in the city’s existing and planned scenario is not sufficient to achieve a carbon-neutral trajectory by 2050. An ambitious scenario incorporates strategies and actions that are ambitious yet achievable and is the most important scenario used in developing a CAP. Again, it is critical to involve internal and external stakeholders to determine realistic, credible strategies and actions that align with city conditions and wider objectives.

Source: https://www.c40knowledgehub.org/s/guide-navigation?language=en_US&guideArticleRecordId=a3s1Q000001iaiGQAQ&guideRecordId=a3t1Q0000007lEWQAY

Emission trajectory from 2018 to 2050



'Business as Usual' Scenario – Considers population growth, along with economic growth

Gap towards achieving "Carbon Neutrality" by 2050

Target

Source: Calculated using Pathways tool, using CIRIS data and growth projections from Oxford Economics

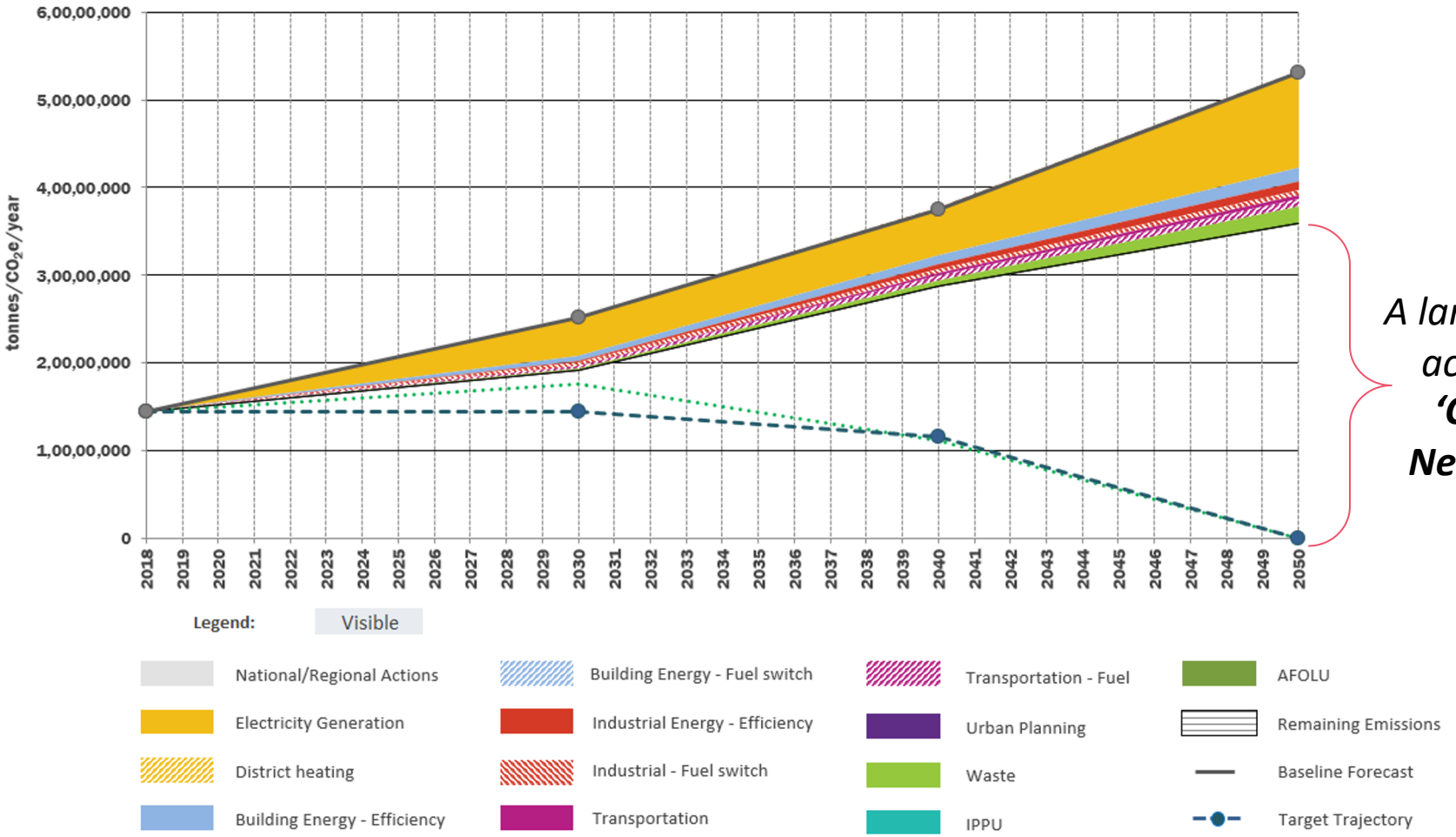
Sectoral existing plans & actions (Mitigation)

Electric GRID & Renewable Energy	Building Energy	Transport	Waste
Grid Energy • Increase of 5700MW in capacity of thermal plant and 520MW capacity of hydro-electric plant by 2030 • TN to generate 20,000 MW of solar power in next 10 years **Decentralized Renewable Power** • TN aims for incremental generation of 5000MW of wind energy and 5000MW of solar energy by 2023 • 3 MW solar power produced from GCC owned buildings & 19 MW generated from streetlights diverted to GRID	**Solar Policy 2022** • Incentivize and enforce requirements for solar rooftops for large projects • GCC owned buildings to be solar power • Solar power generation on canals and rivers **Building Energy Demand Reduction** • Incentivize green building design for large projects **Building Appliance Efficiency** • Incentivize higher efficiency appliances for cooling and lighting in buildings	**Ethanol blending in India 2020-25 - Ministry of Petroleum & Natural Gas** • Target of 20% blending of ethanol in petrol by 2030 **Mode shift as per Mobility plan – Chennai Metropolitan Development Authority (CMDA)** • Increased dependency on Bus-standard from private vehicles **Feasibility report – Chennai Metro Rail Ltd (CMRL)** • Increased dependency on CMRL due to shift from Bus to CMRL	**City Action Plan, SWM department, GCC 2021** • Augmentation in waste processing capacity through Material Recovery Facility (MRF), Micro Composting Centre (MCC), Incineration, waste to energy, Bio-CNG • Bio-mining of Kodungaiyur dumping site and scientific closure

Source: Based on Stakeholder Consultations with respective departments in Chennai from 8th-11th June

Pathways – Existing & Planned Scenario

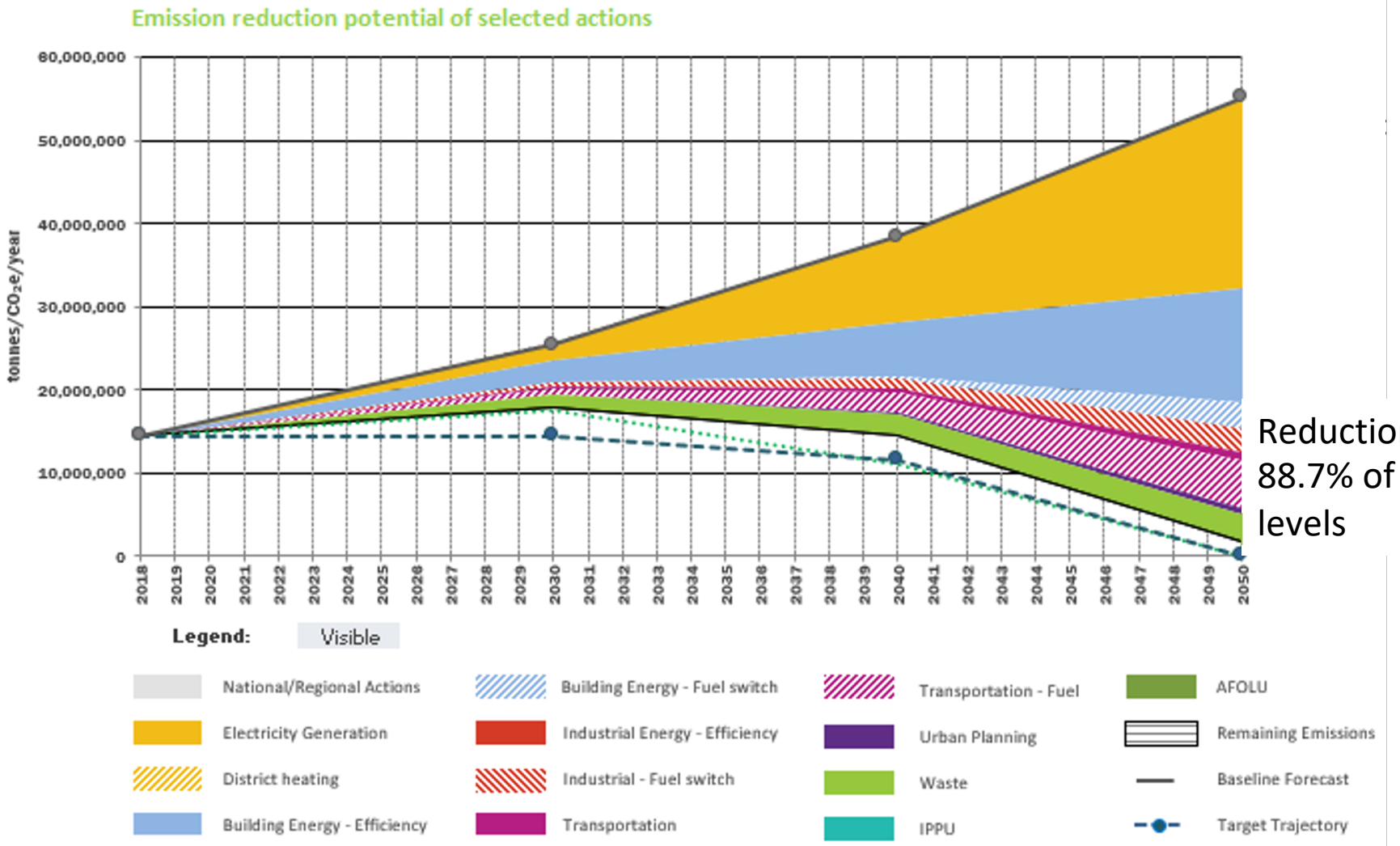
Existing and Planned Actions will reduce future emissions, but still result in emissions growth above base year in all target years.



*A large gap in achieving **'Carbon Neutrality'***

Pathways – Ambitious Scenario

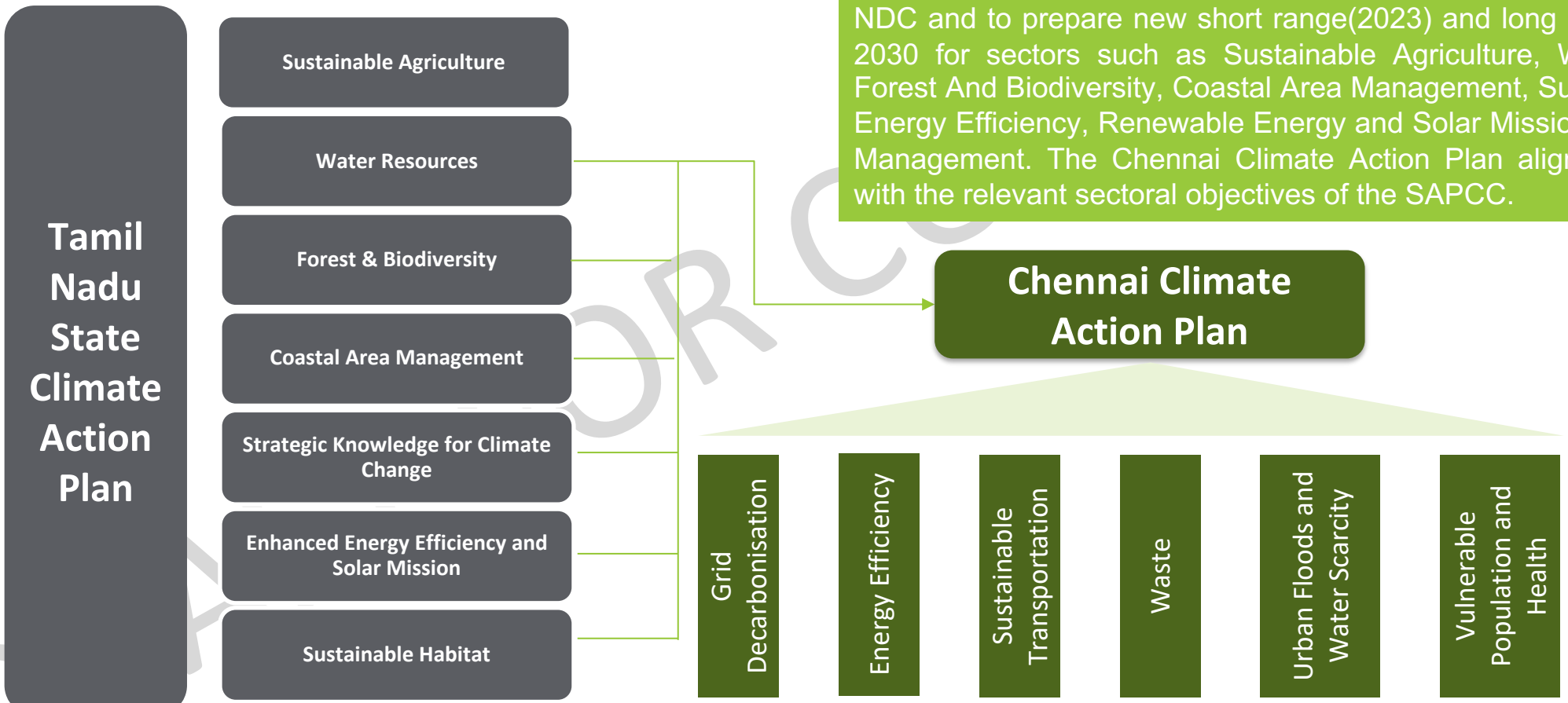
Ambitious actions will help to reduce emissions from 55 million tCo2e in BAU scenario 2050 to 0.16 cr tCo2e in ambitious scenario 2050



Reduction to 88.7% of BAU levels

Alignment with State Climate Action Plan

The objective of Tamil Nadu State Climate Action Plan (SAPCC) is to to examine the State specific, impact, risk and vulnerability, to take stock of the implementation of the SAPCC, to re-examine various actions (adaptations and mitigation) in the light of climate goals set in India's NDC and to prepare new short range(2023) and long range plans up to 2030 for sectors such as Sustainable Agriculture, Water Resources, Forest And Biodiversity, Coastal Area Management, Sustainable Habitat, Energy Efficiency, Renewable Energy and Solar Mission and Knowledge Management. The Chennai Climate Action Plan aligns and integrates with the relevant sectoral objectives of the SAPCC.



"Nehil Thiranudan and Unthuthaludan Chennai"

"Resilient and Pro-active Chennai"

Vision for Chennai Climate Action Plan

“Nehil Thiranudan and Unthuthaludan Chennai”

“Resilient and Pro-active Chennai”

Goals

1. **Carbon Neutrality** by 2050

2. **Water Balance** by 2050

Principles

Inclusivity and Equity	Focused Acceleration	Align with State and National priorities
Reducing the impact of climate change on the urban poor and most vulnerable residents of Chennai	Prioritizing select high impact opportunities across sectors	Align with the National and State Climate Plans

Pillars

Enable	Engage	Empower	Enforce
• Through robust data systems and information; • Strengthened institutional and individual capacity across departments and levels; • Use of appropriate technologies	• With all sections of citizen groups from all walks of life • Focus on reaching out and engaging with urban poor & vulnerable communities • Create platforms for two-way communication and engagement	Realistic, Risk-compliant building regulations and development planning principles through stringent monitoring and capacities of institutions, allocation of human resources and through community platforms	The institutions closest to the ground to take actions and participate in decision making, and ensure that communities have voice and agency

Priority Sectors

1.
Decarbonizing Electric GRID & Increasing Usage of Renewable Energy

100% Renewable Power

Energy Storage Capacity

Decentralized Generation

2.
Energy Efficient Buildings

100% use of energy efficient appliances

Energy Efficient Building Design

100% heating demand from renewables

3.
Transport

100% Fossil Fuel Free public transport services

80% of all trips by Walking, Cycling or Public Transit

4.
Sustainable Waste Management
"Remediation of existing dumpsite while ensuring no waste is being dumped in open"

100% segregation of waste at source and 100% collection coverage

100% decentralized waste processing

5.
Managing Urban Floods and Water Scarcity
"From a Water-Reactive to a Water Proactive Chennai"

An efficient storm water management system to prevent pluvial flooding

Conservation of natural water ecosystem and water resource management

Improved disaster risk reduction

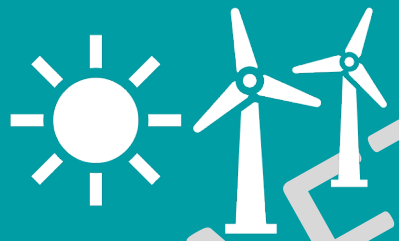
6.
Vulnerable Population & Health
"No Fatalities due to Climate Induced Events"

Relocating & Retrofitting households for vulnerable population

Ensure 100% Coverage of Primary Health Care & Risk Reduction

1.

Decarbonizing Electric GRID & Increasing Usage of Renewable Energy



100%
Renewable Power

Energy Storage
Capacity

Decentralized
Generation

Actions identified

Objective 1 100% Renewable Power for Grid	Objective 2 Decentralized Energy storage and generation
Revise tariffs for consumer solar net-metering installations Short term (2025-2030)	**Pilot city level energy storage systems** Short term (2022-2025)
Explore large scale power storage systems - pumped water storage Medium term (2030-2040)	**Guidelines for integrating solar installations in buildings with shared rooftops** Short term (2022-2030)
Replace coal fired plants with more gas/biomass/renewable power capacity Long term (2040-2050)	**Integrate energy storage systems and urban energy generation into land use planning** Medium term (2030-2040)
	Accelerate rooftop solar through roof lease framework, empanelled service providers Medium term (2030 -2040)
	Expand DCR provisions to require solar in all new multi-family projects and all commercial buildings Medium term (2030-2040)

8
Actions

Note: These are the actions towards adaptation and mitigation

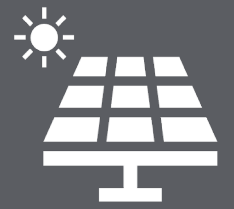
2.

Energy Efficient Buildings

"Achieving energy efficiency in all building by 2050"

100% use of energy efficient appliances

Energy Efficient Building Design



100% heating demand from renewables

Actions identified

Objective 1 100% use of energy efficient appliances	Objective 2 Energy Efficient Building Design
Information Education and Communication (IEC) program on building and appliance energy efficiency Short term (2022-2030)	**Technical support for Energy Efficiency Building Design – through certification and guidebooks** Short term (2025-2030)
Credit programs for upgrading essentials in Economically Weaker Section (EWS) housing Medium term (2030-2040)	**Authorized service providers for construction and retrofitting** Short term (2022-2030)
Property value-based Energy Conservation requirements Long term (2040-2050)	**Floor Space Index (FSI) compensation for buildings with insulation** Medium term (2030-2040)
	Public database of 'certified' energy usage for renters and buyers Medium term (2030-2040)
	Multiplier on Property tax rates based on energy/water consumption Long term (2040-2050)

8
Actions

Note: These are the actions towards adaptation and mitigation

3.

Transport

"Moving towards sustainable mobility"

100% Fossil Fuel Free public transport services

80% of all trips by Walking, Cycling or Public Transit

Actions identified

Objective 1 Fuel shift	Objective 2 80% of all trips by Walking, Cycling or Public Transit
Shift 15% bus fleet to electric by 2030 and 100% by 2050 Short term (2022-2030)	**Enable real-time public data for transit services so users can track arrival times and occupancy** Short term (2022-2030)
Enable intermediate charging points for electric bus Short term (2022-2030)	**Develop and implement a Street Design and Maintenance Standard for all urban roads** Short term (2022-2030)
Require installation of Level-3 Electric chargers for x parking units Medium term (2022-2030)	**Decrease urban block size to increase walkability** Medium term (2030-2040)
Increasing Ethanol blending in Petrol and Diesel to 30% and 20% Medium term (2030-2040)	**Identify and develop Bicycle "Highways" exclusive to NMT users** Medium term (2030-2040)
Incentivize adoption of electric 2Wheelers in households Long term (2040-2050)	**Improve pedestrian access and road design around bus stops** Long term (2040-2050)

10 Actions

Note: These are the actions towards adaptation and mitigation

4.

Sustainable Waste Management

"Remediation of existing dumpsite while ensuring no waste is being dumped in open"

100% segregation of waste at source and 100% collection coverage

100% decentralized waste processing

Actions identified

Objective 1 100% segregation of waste at source and 100% collection coverage	Objective 2 100% Decentralized Waste Processing	
Identification of gaps in door-to-door Collection Short term (2022-2025)	**Assessment study to identify the challenge in utilizing existing processing capacity** Short term (2022-2025)	**Encouraging Community level engagement Programs** Short term (2025-2030)
Changing user behavior & supporting home composting by incentivizing waste reduction and source segregation at home Short term (2022-2025)	**Ensuring the processing units are not in flood risk zones** Short term (2022-2030)	**Ensuring dedicated space for secondary storage for solid waste generated in buildings, through GDCR** Short term (2022-2030)
Establishing demonstration ward to promote the implementation of garbage free, plastic free habitats Short term (2025-2030)	**Augmenting processing capacity to meet 100% capacity of waste processing by setting up various decentralized waste processing Units** Short term (2025-2030)	**Monitoring of remediation of legacy waste & setting up of scientific landfill for inert waste** Long term (2040-2050)
Monitoring for Implementation of SWM bye laws Short term (2022-2030)	**Building a system to monitor the collection of segregated waste from Bulk Waste Generators, Also all BWG should be encouraged to set up on site waste processing units** Mid Term(2030-2040)	

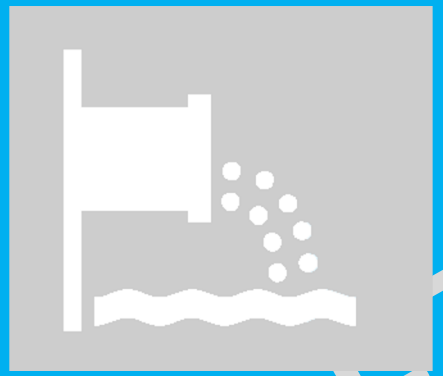
11
Actions

Note: These are the actions towards adaptation and mitigation

5.

Managing Urban Floods and Water Scarcity

"From a Water-Reactive to a Water Proactive Chennai"



An efficient storm water management system to prevent pluvial flooding

Conservation of natural water ecosystem and water resource management

Improved disaster risk reduction

Actions identified

Objective 1 Built an efficient storm water management system to prevent pluvial flooding	Objective 2 Conservation of natural water ecosystem and water resource management	Objective 3 Improved disaster risk reduction
Improve the capacity of storm water drainage network based on current and predicted future rainfall intensities and coefficient of surface run-off Short term (2022-2030)	**Demarcate boundaries and initiate actions for eviction and prevention of encroachment on waterbodies under Tamil Nadu Protection of Tanks and Eviction of Encroachment Act, 2007** Short term (2022-2028)	**Strengthen data monitoring and ensure consistency to minimize the gaps in local weather forecasting model and tidal changes for sea-level rise, while collaborating with private and non-governmental organizations** Short term (2022-2028)
Regularize the maintenance of Storm water drains to prevent waterlogging Short term (2022-2030)	**Reserve land for green belt development in 12-15m buffer all along the Adyar and Cooum river with strict enforcement of 'No Development Zone' on both sides for native vegetation plantation** Short term (2022-2030)	**Generate awareness on disaster preparedness and leveraging the support provided for disaster risk reduction in communities** Short term (2022-2025)
Create a prioritized list of areas for construction of new storm water drains Short term (2022-2025)	**Formalize systems for groundwater connections for monitoring of ground water withdrawal** Short term (2022-2025)	**Ensure strict monitoring of all roads to be resurfaced to maintain contour levels of the roads as per the construction plans** Short term (2022-2025)
Augment permeable surfaces in open spaces (at all levels -in buildings, societies, parks, OSRs, streets) to reduce run-off and enhance water recharge through introducing mandate in building byelaws Short term (2022-2030)	**Implement a city level system for water meter and volumetric water charge through policy level interventions** Short term (2022 – 2025)	**Institutionalization and capacity building of 'First responders' for climate emergencies** Short term (2022-2025)
Strengthen implementation of byelaws for rainwater harvesting (RWH) in all new construction as per the rule 55 of Tamil Nadu Combined Development and Building Rules, 2019 Short term (2022-2026)	**Develop OSRs as sponge parks, rain gardens, bio-diversity parks, urban forest and other Blue-Green Infrastructure** Mid term (2030-2040)	**Assess disaster response readiness of the disaster relief centers** Short term (2022-2026)
Initiate IEC campaigns on constructing RWH systems Short term (2022-2028)	**Ensure preservation of natural drain to maintain natural flow of water covering entire catchment area** Mid term (2030-2040)	

17
Actions

Note: These are the actions towards adaptation and mitigation

6.

Vulnerable Population & Health

"Climate proofing for all"

Provision of climate-proof housing for vulnerable population

Building climate resilient health systems for all

Actions identified

Objective 1 Provision of climate-proof housing for vulnerable population	Objective 2 Building climate resilient health systems for all
Rehabilitating population located in floodplains, periphery of waterbodies, low-lying areas, and nearby coastal creeks Short term (2022-2025)	**Prepare an operational framework for implementation of Tamil Nadu State Action Plan for Climate Change and Human Health (TNSAPCCHH)** Short Term (2022-2025)
Retrofit existing slum housing to be heat resilient Short term (2022-2025)	**Create awareness among citizens, especially among the vulnerable population regarding impacts of climate change on human health** Short term (2025-2030)
Inclusion of heat resilient, water efficient and energy efficient guidelines in the Tamil Nadu Combined Development and Building Rules (TNCDBR), 2019 Mid term (2030-2040)	**Strengthen healthcare services based on research on climate variables and impact on human health** Mid term (2022-2026)
Prepare a framework to ensure accessibility & functionality of disaster relief centres falling in climate risk zones Mid term (2030-2040)	**Regularize the monitoring of health care facilities in context of Climate Change** Short Term (2022-2026)
Implementation of ECO-Niwas Samhita guidelines for all upcoming affordable housing projects Short term (2022 – 2030)	**Develop health infrastructure (Basti Clinic) at community level to improve access to health** Short Term (2022-2030)
	Implement management approaches to reduce heat related health impacts on workers/labours Short Term (2022-2030)
	Prepare a framework to ensure accessibility & functionality of health facilities lying under climate risk zones Mid-term (2030-2040)

12 Actions

Note: These are the actions towards adaptation and mitigation

Climate Governance

Proposed Governance & Climate Budgeting

Action areas and the linked department in GCC - Existing

Electricity	Building Energy	Transport	Waste	Flooding and Disaster Management	Vulnerable population & Health
• Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) • Tamil Nadu Energy Development Agency (TEDA)	• Town Planning Department, GCC • Electrical Department, GCC • Buildings Department, GCC	• Metropolitan Transport Corporation Ltd (MTC), State • MRTS- Suburban rail, Southern Railways • Chennai Metro Rail Ltd (CMRL), SPV of GoTN	• Chennai Metropolitan Water Supply & Sewerage Board (CMWSSB) for wastewater • Solid Waste Management (SWM) Department, GCC for Solid waste	• Storm Water Drain Department, GCC • CMWSSB for catchment area plans • State Disaster Management Authority at State Level • District Disaster Management Authority (DDMA) at district level • Relief Committee at city level	• Tamil Nadu Housing Board (TNUHDB) • Public Health Department, GCC

Predicaments to guide institutional strengthening for climate action

Climate change is not a sectoral subject to be dealt on a standalone basis by any one department. It deals with a **multitude of aspects that affect the survival of the city**

Climate change as an issue needs to be pervasive across **various governance and administration levels of institutional structures**

To ensure comprehensiveness as well as granularity, climate change thinking needs to be made an institutional culture, and climate change addressing is reflected as an institutional spirit –
“Think development – Think carbon neutrality”

Proposed Institutional Strengthening for Comprehensive Implementation of Climate Actions

State Level

Leadership

Tamil Nadu Council on Climate Change (TNCCC): An inter-departmental coordination structure)

Chair: Hon'ble Chief Minister, Tamil Nadu

- Revenue Administration & Disaster Management
- Environment, Climate Change & Forests
- Finance
- Municipal Administration & Water Supply (MAWS)
- Housing & Urban Development (HU&D)
- Water Resources
- Public Works
- Energy
- Transport
- Industries, Investment Promotion & Commerce
- Health & Family Welfare
- Agriculture
- Rural Development

Executive

Expansion of: Steering Committee for Implementation of TNSAP

Chair: Chief Secretary, GoTN

Present Members: Secretaries of Depts. of:
Environment, Climate Change & Forests; Finance; Public Works; Energy; Industries; Health & Family Welfare; Agriculture; Rural Development & PR; PDSI; Forests; and representatives from TEDA; Anna University (2); MSE; NABARD

To be expanded incorporating Depts of:

- Revenue Administration & Disaster Management
- MAWS
- HU&D
- Water resources
- Transport

Expansion of : TNGCC Management Board

Addl. Chief Secretary, Dept of Environment, Climate Change & Forests

Present Members: representing Depts of:

- Finance; Public Works and Water Resources; Energy; MAWS; Agriculture & Farmers Welfare; Forests

To be expanded incorporating Depts of:

- Revenue Administration & Disaster Management
- HU&D
- Transport
- Industries

District/ GCC Level

Area Sabhas and Ward Committees to act as grass root level instrument for climate change initiatives

Incorporation of an agenda on climate change issues in council meeting

Modify & Expand: District Climate Change Mission

- To be chaired by GCC-Commissioner (instead of District Collector)
- To act as a Coordination Committee for climate change with all internal Depts and external concerned agencies invited

New: Establish a Dept of Climate Change Initiatives

R&D, Implementation Facilitation and Monitoring & Evaluation Wings

Proposed 'Department of Climate Change Initiatives' at GCC level

Roles & Responsibilities:

1. Review and updation of the GHG inventory
2. Assess the progress of actions and realign sectoral priorities
3. Ensure proper guidance and advice so that the ward sabhas, Ward Committees evolve as grass root instruments for implementation of climate change initiatives through facilitation by the climate officers at ward and zonal levels
4. Advice external institutions on sectoral priorities through the District Climate Change Mission
5. Periodically empower the internal depts of GCC as well as external stakeholders
6. Analyze the implications of proposed major actions/projects by external institutions and take up through TNGCC and State Coordination Committee as well as the proposed TN Climate Change Council
7. Facilities parallel taking up of projects by multiple depts for common adaptation/mitigation action
8. Identify and advocate for local/ national / international funding opportunities for climate actions/ projects including carbon credit mechanisms
9. Guide and facilitate climate budgeting within and outside GCC to ensure priority is accorded
10. Ensure periodical Reporting and Evaluation at local, national and international requirements to enable timely policy and action orientation to climate change initiatives
11. Evolve as a storehouse and knowledgebase on local, national and international climate initiatives and best practices to guide other cities

Proposed ‘Department of Climate Change Initiatives’ at GCC level

Composition:

1. The department may be headed by Deputy Commissioner (Works)
2. It may have research & development, implementation facilitation and monitoring & reporting wings which will enable a comprehensive and exclusive focus on climate change mitigation and adaptation measures
3. Climate Officers at Zonal and Ward level to be nominated from among the existing employees, who would assist the Ward/Zonal Committee on climate agenda aspects by facilitating collection and provision of information on related aspects to the proposed new department in HQ.

Monitoring of Climate Actions

- Proposed ‘Department of Climate Change Initiatives’ to monitor implementation of climate actions identified in CAP
- Monitoring regime – Annual, Half yearly
- Proposed Department of Climate Change Initiatives to publish end-year report on ‘Status of Climate in Chennai’
- Monitoring indicators to be aligned with all existing measures i.e, Swachha Survekshan, Climate Smart Cities framework etc.

How to provide feedback?

The document is open for public suggestions through the email id:
chennaiclimateactionplan@gmail.com

from September 12th, 2022 to October 27th, 2022

We look forward to receiving your valuable comments/ feedback/ suggestions on the findings of the baseline studies (building the evidence), action and plan development of CCAP as outlined in the document. We would appreciate your suggestions on the identified draft actions and how they can be further strengthened with a focus on implementation. Please share your suggestions within the body of your email or as an attachment. You can also share attachments of key reports/ studies that are relevant reference for the CCAP.

Thank you!