DCAP

DAR ES SALAAM CLIMATE ACTION PLAN

2020 - 2050

Document Information

Version 1

Designed by;

E-Link Consult Limited

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Letter from Director, Dar es Salaam City Council

Dar es Salaam is the commercial hub of Tanzania and is one of the fastest growing cities in Africa It is the largest economic Centre of the country accounting to about 10 percent of the country's population. With the city's rapid growth and expansion as a result of urbanization, it is important to look into sustainability and ensure that both development and environment are taken into consideration. The city aims at ensuring that the lives of its residents are not negatively affected by taking bold actions to build a clean, safe, inclusive and resilient city while adapting to the impacts of climate change.

Climate change is already proving to be one of the major threats in Dar es salaam with more frequent flooding events, extreme precipitation and temperatures. Some parts of the city centre are now witnessing heatwaves, and, in some years, there has been droughts. These are among climate hazards in the city which pose threat to the development of the commercial hub as well as to the national climate change objectives and vision of ensuring sustainable development and achieving a high middle-income status.

The Dar es salaam City Administration has been working with C40 Cities Climate Leadership Group to develop this plan covering both mitigation and adaptation and produce the first Climate Action Plan (CAP) for the city. This plan of action demonstrates on how the city will address climate change challenges and provides sectoral climate change mitigation and adaptation strategies, actions, pathways and implementation roadmaps for building a sustainable, emissions neutral and resilient Dar es Salam - in line with the UN Sustainable Development Goals (SDGs) and objectives of the Paris Agreement.

This plan of action focuses on key high impact, practical actions that can significantly reduce GHG emissions in Dar es Salaam from the waste, energy, buildings, industry and transport sectors. The plan demonstrates how it will build a city that can adapt to the impacts of a changing climate and deliver multiple co-benefits to the city's urban residents.

Regarding COVID 19 pandemic, Dar es Salaam is fully aware of the implications on the efforts of tackling climate change, building a green, sustainable economy and improving peoples' lives. The plan considers these implications and the need for a green recovery to salvage the threatened sustainable development objectives. Dar es Salaam has embarked on a path that puts forth critical actions that are aimed at addressing the global health epidemic while dealing with the climate change challenge to protect the lives and livelihoods of the most vulnerable urban residents.

The CAP development process involved preparation of reports including the Appraisal report for Climate Action Planning, Rapid Climate Risk Assessment (CRA) Report that provides an initial city's overview of risks and hazards and preliminary a plan of action on how to adapt to climate change as well as building the city's resilience and adaptive capacity.

I would like to thank C40 Cities Climate Leadership for the continued technical support and guidance in our work in addressing climate change, the consultants who have been working tirelessly with the city team and other entities, partners and stakeholders for their contribution in the preparation of this document.

Mr. Jumanne K. Shauri,
Director,

Dar es salaam City Council (DCC)

The City's Commitment to C40's Climate Action Planning Programme

THE DAR ES SALAAM CITY COUNCIL

ALL CORRESPONDENCES SHOULD BE ADDRESSED TO THE CITY DIRECTOR

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DAR ES SALAAM CITY COUNCIL
CITY HALL
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Date: 04 August, 2016

C40 Cities Climate Leadership Group,
North West Entrance,
City- Gate House,
39-45 Finsbury Square level 6,
London EC2A 1PX,
UNITED KINGDOM

RE: STAFF TO SUPPORT OUR CITY ON CLIMATE CHANGE ACTIVITIES

I am delighted to express my support on behalf of the City of Dar es salaam to the Cities matter proposal submitted by the C40 Cities Climate leadership Group to the International Climate Initiative.

The project provides much needed capacity building and technical assistance to help develop a long term climate action planning framework, as well as improving engagement with our National Government on Climate action.

We are committed to reducing emissions of greenhouse gases and climate risks and, working with C40, we have been reporting annually through the CDP Platform.

With this letter, we request your technical support on this matter. However the Technical Advisor will be placed at respective Department dealing with Climate change issues.

Yours Sincerely

Isaya Mwita Charles

LORD MAYOR

DAR ES SALAAM CITY COUNCIL

Letter from Executive Director, C40 Cities Leadership Group

The City of Dar es Salaam committed to the C40 Cities' Deadline 2020 Programme in 2017. Through this Programme, which seeks to catalyse greater and more transparent contributions of cities to international climate change commitments, the city has received extensive technical assistance to develop its first city-wide climate action plan. Dar es Salaam's plan presents specific climate action implementation roadmaps that the city intends to adopt to meet the objectives of the Paris Agreement.

In full recognition of the urgency to address the climate crisis and limit global temperatures increase to 1.5°C above pre-industrial levels, Dar es Salaam's plan contains 44 mitigation and adaptation priority actions. During widespread stakeholder consultations, these actions were identified through the climate action planning process to lead Dar es Salaam towards an equitable, inclusive, climate-resilient and carbon-neutral city by 2050.

The Climate Action Plan highlights ambitious and transformational climate actions to reduce GHG emissions from the transport sector while promoting the uptake of clean mobility technologies and non-motorised transport options, enhancing waste and wastewater treatment, enhancing energy efficiency in buildings, using sustainable and clean energy while building the resilience of the city to the impacts of climate change.

The above transformational climate actions are aimed at delivering a green and just recovery, especially in the face of COVID-19, which has had significant impacts on the economic, social, health and environmental aspects of everyday existence.

The city's CAP mandate is in line with the new national government's focus to transition the United Republic of Tanzania into a climate-resilient development pathway through revitalising and advancing climate policy to reduce the dire impacts of climate change on people's livelihoods and infrastructure. This is also in line with achieving sustainable development that considers both socio-economic and environmental aspects and is cognizant of the severe climate impacts resulting from extreme weather events, saltwater intrusion and beach erosion, and urgent adaptation strategies in the city.

I would like to acknowledge Mayor Omary Said Kumbilamoto and the City Director Mr. Jumanne K. Shauri for their dedication and strong leadership in the entire climate action planning process through commitment to the Global Covenant of Mayors for Climate and Energy since 2018 to develop the first GHG emissions inventory for the city, set ambitious targets on how to cut down emissions and adopt resilient adaptation strategies to cope with the impacts of climate change as stipulate in the Climate Action Plan.

C40 aims at pursuing continuous engagement with the City of Dar es Salaam to actualize this plan of action and achieve bespoke ambitious climate targets set out in this transformational plan.

Mark Watts,
Executive Director,

C40 Cities Climate Leadership Group

Acknowledgements

The Dar es Salaam Climate Action Plan has been prepared in a time of realization of the negative impacts of climate change and climate variability on the city's social, economic, physical environment and the entire residents' livelihoods. Dar es Salaam CAP preparation could not be possible without cooperation and hard work of the city stakeholders as well as domestic and international experts. We would like to acknowledge their contribution and efforts. It is not possible to mention all people and institutions who contributed to the development of this strategy.

We would like to express our deep appreciation to the management and technical officers from the former Dar es Salaam City Council (DCC) for their professional and sustaining the efforts of developing this action plan. Their commitment made it possible to move through the needed steps and stages of developing the plan that reflects the realities of the city in the context of climate change.

We would like to appreciate the previous Dar es Salaam Lord Mayors and City Directors for their enormous contribution first in enabling our city to join C40 and second guiding the initial preparations of the Dar es Salaam CAP. In addition, we very much acknowledge the Municipal Mayors and Directors from Kigamboni, Kinondoni, Temeke and Ubungo municipalities. Their leadership and collaboration constitute a force needed to support Dar es Salaam CAP implementation.

On a special note, we would like to thank C40 Cities, its management and team of experts from global, regional and national offices for the financial and technical support during the entire Dar es Salaam CAP development process. Specifically, we extend our appreciation to Dar es Salaam C40 City Adviser (Yassin Mkwizu), Dar es Salaam Technical Manager (Maryrose Batenga), Technical Adviser for C40 Climate Action Planning (CAP) Programme, East Africa (Elizabeth Mwangi), the Head of CAP Programme for Africa (Paul Jorgensen) and Regional Director and Mayor Engagement Africa (Hastings Chikoko and Gifti Nadi respectively). We very much acknowledge professional and technical assistance from Ricardo Energy & Environment and Sustainable Energy Africa (SEA) teams for their continuous support in all 4 CAP Preparatory Workshops and writing of the Dar es Salaam CAP.
Lastly but not least, our special thanks go to the Dar es Salaam residents and other key stakeholders for their participation and supporting various initiatives aimed at improving the environment and lives of all of us leaving in the city. Our leadership and steering of Climate Action Plan for Dar es Salaam is made possible because of their assured endorsement on us.

.....

Hon. Omary S. Kumbilamoto
Load Mayor
Dar es Salam City Council

.....

Mr. Jumane Shauri
Director
Dar es Salam City Council

Acronyms and Terms

AFOLU	Agriculture, Forestry and Other land use
CAP	Climate Action Plan
CAPEX	Capital Expenditure
CDM	Clean Development Mechanism
CFF	Cities Finance Facility
CH4	Methane
CIRIS	City Inventory Reporting and Information System
CNG	Compressed natural gas
CO	Carbon Monoxide
CO2	Carbon dioxide
COP	Conference of the Parties
CRA	Climate Rapid Assessment
DANIDA	Danish Internation Development Agency
DART	Dar es Salaam Rapid Transit
DAWASA	Dar es Salaam Water and Sewage Authority
DCC	Dar es Salaam City Council
DCEO	Dar es Salaam City Environmental Outlook
DIT	Dar es Salaam Institute of Technology
DMDP	Dar es Salaam Metropolitan Development Project
DSP	Dar es Salaam Strategic Plan
DUTA	Dar es Salaam's University Tourism Association
EAC	East African Community
EMA	Environmental Management Act
EV	Electric Vehicles
EWURA	Energy and Water Utilities Regulatory Authority
GCF	Green Climate Fund
GDP	Gross Domestic Product
GHG	Greenhouse gas
GPC	Global Protocol for Community-scale Greenhouse Gas Emission Inventories
GWP	Global Warming Potential
INDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producers
IPPU	Industrial Processes and Product Use
JICA	Japan International Cooperation Agency
KOICA	Korean International Cooperation Agency
LEAT	Lawyer Environmental Action Team
LGAs	Local Government Authorities
LPG	Liquified Petroleum Gas
LUCF	Land-Use Change and Forestry
M&E	Monitoring and Evaluation
MOID	Ministry of Infrastructure Development
MRV	Monitoring, Reporting and Verification
N2O	Nitrous oxide
NAP	National Adaptation Plan
NAPA	National Adaptation Programme of Action
NC1	First National Communication
NC2	Second National Communication
NCCS	National Climate Change Strategy
NCMC	National Carbon Monitoring Centre
NDC	Nationally Determined Contribution
NEP	National Environmental Policy
NGOs	Non-governmental Organisation

NIT	National Institute of Transport
NMT	Non-motorised Transport
NOx	Nitrogen Oxides
OPEX	Operational Expenditure
PM	Particulate Matter
PMV	Personal Motor Vehicles
PPP	Private Public Partnerships
RAS	Regional Administrative Secretary's
RC	Regional Commissioner
REA	Rural Energy Agency
SADC	Southern African Development Community
SDGs	Sustainable Development Goals
SEI	Stockholm Environmental Institute
SGR	Standard Gauge Railway
SIDA	Sweden International Development Agency
TAN ROAD	Tanzania National Road Agency
TANESCO	Tanzania Electric Supply Company
TARURA	Tanzania Rural and Urban Roads Agency
TAZARA	Tanzania Zambia Railway
TBS	Tanzania Bureau of Standards
tCO2e	Tonnes of carbon dioxide equivalent
TEMESA	Tanzania Electrical Mechanical and Electronics Service Agency
TPDC	Tanzania Petroleum Development Corporation
TPSF	Tanzania Private Sector Foundation
TRC	Tanzania Railways Corporation
TURP	Tanzania Urban Resilience Programme
UDSM	The University of Dar es Salaam
UHI	Urban Heat Island
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organisation
USAID	United States Agency for International Development
UTT	Unit Trust of Tanzania
VETA	Tanzania vocational Education and Training Authority
VOCs	Volatile Organic Compounds
WHO	World Health Organisation

Executive Summary

Dar es Salaam commitment to tackling Climate Change

Dar es Salaam has committed to develop and implement an ambitious Climate Action Plan (CAP) that aligns with the global goal of limiting the average temperature rise to 1.5°C. Dar es Salaam will deliver these through considering adaptation and mitigation in an integrated way, ensuring this is based on evidence and is centred on an understanding of the city's powers, influence and wider context underpinned by robust monitoring and reporting procedures.

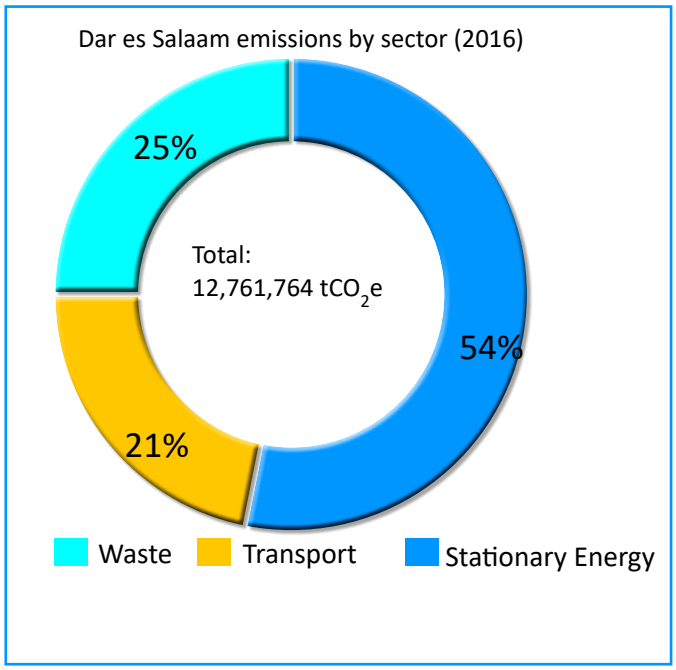
The adoption of the Paris Agreement on Climate Change at the 2015 Conference of the Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC), and its subsequent signing by nearly 200 countries, marked a historic turning point for climate action. Under the Paris Agreement, signatories committed to taking steps to limit the average global temperature increase. Action on climate change is also one of the UN's 17 Sustainable Development Goals (SDGs), which provide a holistic framework and vision for the world to address these issues. Following the ratification of the Paris Agreement by the United Republic of Tanzania, Dar es Salaam committed to C40's Deadline 2020 Programme in 2017, which is designed to support cities to deliver plans that translate the aspirations of the global climate accord into city-level action.

The CAP, therefore, represents a public commitment for the City to play its part in reducing the growth of future emissions, supporting the achievement of international and national climate change mitigation goals, reducing vulnerability to climate impacts, and achieving the 17 UN SDGs.

Based on analysis undertaken for this CAP, Dar es Salaam unconditionally commits to achieving the targets identified in the Ambitious Action scenario, of a 29% reduction by 2030 and a 65% reduction by 2050 compared to the business-as-usual scenario. Dar es Salaam is committed to supporting the goals of the Paris Agreement and the Deadline 2020 programme commitment and recognises that this means achieving at least a 30% reduction in GHG emissions compared to the business-as-usual scenario by 2030, and working towards carbon neutrality by 2050. The Extended Actions scenario for Dar es Salaam shows that the city could potentially achieve a 43% reduction in emissions by 2030 and 87% by 2050. Achieving this level of reduction will be conditional upon receiving support, and therefore represents Dar es Salaam's conditional target.

The Evidence for action

Dar es Salaam city compiled and reported its first greenhouse gas (GHG) inventory for 2016. This inventory serves as a baseline for setting city emissions reduction targets, assessing opportunities to reduce future emissions and monitoring progress over time. According to the 2016 inventory, Dar es Salaam is estimated to be responsible for twelve million tonnes of carbon dioxide equivalent (tCO2e) emissions. The largest contributor to emissions is the stationary energy sector, accounting for 54%, followed by emissions from the waste sector at 25%, and transport at 21%. The highest-emitting sub-sector is the residential sub-sector, followed by on-road transport and industry.



Alongside an increase in GHG emissions, Dar es Salaam is exposed to significant hazards due to its coastal geography and tropical wet-dry climate. There are also substantial vulnerabilities intrinsic to the population characteristics; approximately 70% live in unplanned settlements, largely occupying highly exposed areas while continuing high population growth rates will see Dar es Salaam reach mega-city status by 2030 (above 10 million). This will put an increasing strain on public services, food security, infrastructure and natural resources, further exacerbated by the changing climate. The Rapid CRA conducted for Dar es Salaam outlines the associated hazards, impacts, risks and vulnerabilities.

A Climate Action Plan for Dar es Salaam

The climate actions identified to support Dar es Salaam in achieving its climate goals have been structured around nine themes. The actions included in each are not exhaustive but incorporate the highest priority actions for both mitigation and adaptation. The themes aim to encompass both adaptation, mitigation and sustainable development priorities and are as follows:

Promoting Clean and Secure Energy

Ensuring Sustainable Resource Management

Encouraging Green, Accessible and Resilient Urban Environments

Promoting a Shift Towards Sustainable Transport Modes

Adopting Ultra-Low Emission Vehicles

Delivering a Cleaner City

Building Healthy Communities

Managing Disasters and Risks

Creating Resilient Communities and Economies

Climate Action Plan

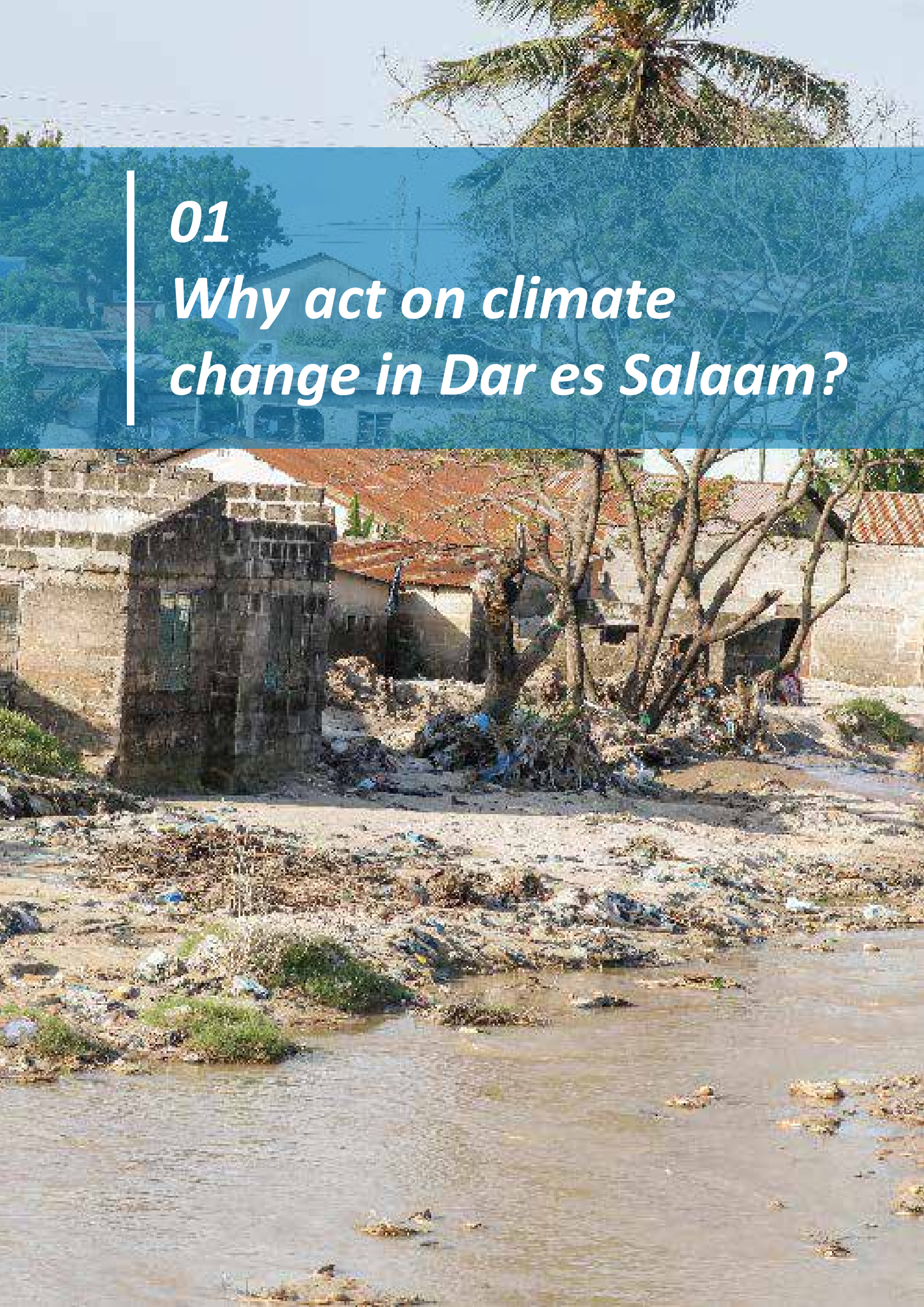
	2 Years	2-5 years	5 years	Beyond 5 years
Clean and Secure Energy				
Action 1: Enhance energy security and resilience of energy systems.		✓		
Action 2: Promote Public Private Partnerships to invest in modern and renewable energy services and projects.		✓		
Action 3: Increase the resilience of the energy system to climate change impact.		✓		
Action 4: Develop bylaws to encourage uptake of residential-scale renewables		✓		
Action 5: Programme to increase energy efficiency in commercial and residential buildings and encourage the uptake of small-scale renewables and energy efficiency improvements in existing buildings.		✓		
Action 6: A programme to promote energy efficiency improvements in industrial facilities, including fuel switching.		✓		
Sustainable Resource Management				
Action 7: Establish a regulation policy for charcoal production and use.	✓			
Action 8: Invest in the protection and conservation of water basins and catchments, including flood control and rainwater harvesting structures		✓		
Action 9: Promote integrated water resources management and development plans.		✓		
Action 10: Develop a strategy and regulations to ensure sustainable extraction of groundwater resources		✓		
Action 11: Promote appropriate agricultural practices that increase resilience to climate change		✓		
Action 12: Promote conservation of aquatic ecosystems and sustainable aquaculture initiatives		✓		
Green and Resilient Urban Environment				
Action 13: Develop vibrant and resilient nature-based green spaces governed by city bylaws.				✓
Action 14. Mainstream climate change issues into infrastructure design and development planning; enhance compliance of land use plans at all levels.		✓		
Action 15: Promote use of climate adaptive technologies in infrastructure designing and development		✓		
Action 16: Mainstream climate change issues into urban and rural planning		✓		
Action 17: The installation of solar lights on all public roads and in public places.	✓			
Action 18: Introduce a real-time traffic information system	✓			
Sustainable Mobility				
Action 19: Establish a Public Transport Master Plan by 2021.				✓
Action 20: Improvements to the feeder bus systems.				✓
Action 21: Promote and improve the efficiency of existing city railway networks and to construct more lines by 2040.				✓
Action 22: Construct Public Transportation Terminal.	✓			

	2 Years	2-5 years	5 years	Beyond 5 years
Low Emissions Transport Solutions				
Action 23: Increase the use of alternative fuels such as electricity within the vehicle fleet		✓		
Action 24: Improving the efficiency of freights by promoting a modal shift of long-distance freight from trucks to railways.				✓
Action 25: Establish a high import duty on old vehicles.	✓			
Clean City				
Action 26: Invest in solid waste dumpsite management.		✓		
Action 27: Increase the installation of new wastewater treatment systems to promote methane recovery		✓		
Action 28: Campaign to promote the waste hierarchy, including waste reduction interventions, increase re-use and recycling with a programme of waste reduction and reuse activities		✓		
Action 29: Promote wastewater reuse and recycling technologies		✓		
Action 30: Construct landfill facilities for the processing of solid waste in Kigamboni and Ubungo		✓		
Action 31: Increase the uptake of (waste-to-energy) and recycling activities at dumpsites through supporting community groups and other stakeholders.		✓		
Building Healthy Communities				
Action 32: Enhance capacity of the public health care systems to respond to climate change-related health risks		✓		
Action 33: Improve climate-sensitive diseases control programmes		✓		
Action 34: Improve knowledge on climate change-related occupational health risks		✓		
Managing Disasters and Risks				
Action 35: Promote climate-related disaster risk reduction in urban planning			✓	
Action 36: Strengthen management of coastal resources and monitoring systems of erosion and sea level rise			✓	
Action 37: Improve monitoring and early warning systems of both sea-level rise impacts and extreme weather events for building adaptive capacity			✓	
Action 38: Strengthen weather forecast information sharing for fishermen			✓	
Creating Resilient Economies and Communities				
Action 39: Promote resilient land use management and climate-sensitive development of human settlements		✓		
Action 40: Promote diversified tourism products		✓		
Action 41: Promote sustainable livelihood diversification for communities reliant on natural capital within the city		✓		
Action 42: Promote the availability of social services in both city and municipal areas		✓		
Action 43: Restore degraded tourist sites		✓		
Action 44: Enhance adaptive tourism infrastructural development		✓		

Implementation approach

Dar es Salaam City Council's capacity to deliver climate action is dependent on the structure, functions, and powers of the city departments and agencies to control or influence assets or services and access to adequate resources (both human and financial). Dar es Salaam recognises the need to identify cross-cutting governance and resourcing needs.

01
Why act on climate change in Dar es Salaam?



1. Why act on climate change in Dar es Salaam?

> *"The Vision of Dar es Salaam City Council is to be a leading safe city with sustainable development, competitive investment environment, managed on principles of good governance, where residents have decent living standards."*

In recognition of the need to adapt to future impacts of climate change and ensure that as one of the fastest-growing cities globally, Dar es Salaam maximises opportunities for low emissions growth and development. Dar es Salaam City Council has prepared this climate action plan (CAP), setting out the evidence and priorities for action.

1.1 Overview of the Climate Action Plan

1.1.1 What is a CAP?

Under C40's Deadline 2020 programme, Dar es Salaam has committed to develop and implement an ambitious Climate Action Plan (CAP) that aligns with the global goal of limiting the average temperature rise to 1.5°C.

The CAP aims to demonstrate how a city can contribute to the goals of the Paris Agreement and sets out the priorities for action. Dar es Salaam will deliver these through considering adaptation and mitigation in an integrated way, ensuring this is based on evidence and is centred on an understanding of the city's powers, influence and wider context underpinned by robust monitoring and reporting procedures.

1.1.2 Rationale and long-term vision

Climate change is one of the greatest threats facing the world in the 21st century. If not addressed, it will threaten the survival of entire nations and of life on Earth itself. Taking action to mitigate and adapt to climate change is therefore not optional but an urgent necessity.

While the effects of climate change are already being observed, it is generally accepted that if the global temperature rise reaches 1.5°C above pre-industrial levels, the impacts on natural and human systems will be severe and long-lasting, if not irreversible. These impacts include loss of ecosystems, sea-level rise, and more frequent severe weather events such as droughts, heatwaves, storms, and floods. All of these would have devastating consequences for health, livelihoods, food security and economic growth – with a disproportionate impact on poor and vulnerable populations. Climate action is therefore not only an environmental issue but also a social justice imperative, inextricably linked to challenges such as eradicating poverty and enhancing inclusivity.

The adoption of the Paris Agreement on Climate Change at the 2015 Conference of the Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC), and its subsequent signing by nearly 200 countries, marked a historic turning point for climate action. Under the Paris Agreement, signatories committed to taking steps to limit the average global temperature increase. Action on climate change is also one of the UN's 17 Sustainable Development Goals (SDGs), which provide a holistic framework and vision for the world to address these issues.

Following the ratification of the Paris Agreement by the United Republic of Tanzania, Dar es Salaam committed to C40's Deadline 2020 Programme in 2017, which is designed to support cities to deliver plans that translate the aspirations of the global climate accord into city-level action.

The CAP, therefore, represents a public commitment for the City to play its part in reducing the growth of future emissions, supporting the achievement of international and national climate change mitigation goals, reducing vulnerability to climate impacts, and achieving the 17 UN SDGs.

A long-term vision for a sustainable economic recovery

The Tanzanian Development Vision 2025 sets out a pathway towards *'transforming the economy into a middle income and semi-industrialized state by 2025',* for which the five key attributes are:

- High-quality livelihood
- Peace, stability and unity
- Good governance
- A well-educated and learning society
- A competitive economy capable of producing sustainable growth and shared benefits.

In July 2020, Tanzania reached an important milestone in terms of economic progress when it 'formally graduated from low-income country to lower-middle-income country status'. This achievement was due to an increase in the Tanzanian Gross National Income (GNI) per capita following many years of economic growth. However, in the same year, the COVID-19 pandemic devastated economies worldwide, with knock-on effects seen across all sectors in the Tanzanian economy. The tourism sector, which represented over 17% of national Gross Domestic Product (GDP) in 2019, saw receipts decreased by 77%, and employment decreased by 50% over the course of the year. Export-oriented sectors such as agriculture, manufacturing and associated services were also severely impacted. As a result, the economic outlook is uncertain; it is not clear to what extent the recent gains will be maintained.

The impacts of the pandemic and associated economic downturn have highlighted stark social inequalities globally, as they disproportionately impact lower-income and vulnerable groups. This is particularly relevant for Tanzania, where the poverty rate is currently over 27%. The country, therefore, faces a major challenge of achieving a sustainable economic recovery while at the same time avoiding any adverse environmental impacts, including increased GHG emissions.

With that in mind, the CAP, therefore, seeks to address a wide range of environmental actions while also clearly setting out the social and economic co-benefits. This aligns with and builds upon the Dar es Salaam City Council Strategic Plan 2017/18 - 2021/22, which states:

> *"The Vision of Dar es Salaam City Council is to be a leading safe city with sustainable development, competitive investment environment, managed on principles of good governance, where residents have decent living standards.*

Implementation of the CAP will help Dar es Salaam forge a 'new normal' by addressing systemic risks and pursuing transformation over the longer term while meeting the immediate needs for creating sustainable jobs, the improvement of service delivery, and the alleviation of poverty and inequality.

1.1.3 Scope of the CAP

This CAP is intended to cover the whole of Dar es Salaam's urban area. Whilst administratively, the City Council boundary is now within the former Ilala Municipal Council, the city's coordination function on climate issues covers all areas of Dar es Salaam including the four Municipalities of Kinondoni, Temeke, Ubungo and Kigamboni. The Regional and Administrative Secretary for Dar es Salaam will coordinate and administer Dar CAP work that the new city administration cannot handle. Thus, the GHG emissions inventory and projections estimated for Dar es Salaam, and the actions identified, remain applicable to the whole city.

In addition, Dar es Salaam recognises that both climate change and the city's actions have impacts beyond its boundaries. Dar es Salaam City Council commits to ensuring that it prioritises actions that directly benefit the city's communities. Still, it can also provide positive indirect benefits to the city's hinterland, supply chains and networks across Tanzania and globally, ensuring the city plays its role in supporting national efforts to reduce emissions and increase resilience.

1.2 Dar es Salaam's climate change goals

Dar es Salaam aims to become a leading example of sustainable, resilient, low carbon development in Africa. We are committed to ensuring that all citizens and communities are supported in managing the impacts of climate change and benefit from the transition towards a lower emissions future.

1.2.1 Climate change mitigation

Following the ratification of the Paris Agreement in 2016, Tanzania prepared its first 'Nationally Determined Contribution' to the United National Framework Convention on Climate Change (UNFCCC), committing to reduce emissions between 10-20% by 2030 relative to the business as usual scenario and consistent with its sustainable development agenda .

According to C40's 'Deadline 2020' analysis, an ambitious CAP compatible with the Paris Agreement goals requires Dar es Salaam to reduce emissions by around 30% compared to business as usual by 2030 and reduce emissions to net-zero by 2050. Whilst a reduction target of 30% differs from the Tanzanian national target, it reflects the different basis of the target, emissions sources, and the importance of maximising the mitigation opportunities available to urban areas, particularly in fast-growing sectors such as Energy, Transport and Waste.

Although Dar es Salaam is one of the lowest emitting cities globally, recognising that the city is growing and climate mitigation brings many co-benefits, the city commits to working together with the national government, city stakeholders, and all citizens to transition to a lower emissions future and achieve an ambitious mitigation goal.

Therefore, Dar es Salaam **unconditionally** commits to achieving the targets identified in the city's Ambitious Action scenario of a **29% reduction by 2030** and 65% reduction by 2050 compared to the business-as-usual scenario.

Dar es Salaam is committed to supporting the goals of the Paris Agreement and the Deadline 2020 programme and recognises that this means achieving at least a 30% reduction in GHG emissions compared to the business-as-usual scenario by 2030, and working towards carbon neutrality by 2050. The **Extended** Actions scenario for Dar es Salaam shows that the city could potentially achieve a **43% reduction in emissions by 2030** and 87% by 2050. Achieving this level of reduction will be conditional upon receiving support, and therefore represents Dar es Salaam's conditional target.

Sections 3.1 and 3.2 provide further details on the GHG emissions baseline and future emissions pathways to achieve these ambitious goals.

1.2.2 Climate resilience and adaptation

Dar es Salaam is acutely aware of the importance of resilience and enhanced adaptive capacity to tackle climate change. As a city that regularly experiences extreme weather events, there is an intimate understanding of the need to prevent damages from climate impacts, recover from extreme events, and conserve social, natural and economic capital. Dar es Salaam is also aware of the long-term impacts of climate variability on key sectors. For example, extreme precipitation events and changing climate trends have caused increased flooding in the catchment area of the Msimbazi river, which flows directly through the city and creates dangerous conditions for highly vulnerable populations. While immediate impacts may cause damage to infrastructure, displacement and loss of life, long-term trends of flooding may disrupt agriculture, transport and health services, leading to cascading impacts on GDP, health and political stability.

Note: Climate Adaptation Terminology

Below are key terms used throughout the CAP that illustrate components of adaptation:

1

Sensitivity

Degree to which a system or species is affected, adversely or beneficially, directly or indirectly, by climate variability or change

2

Hazard

The potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems, and environmental resources

3

Exposure

The presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected

4

Impact

Effect on lives, livelihoods, health, ecosystems, economies, societies, cultures, services, infrastructure due to the interaction of climate changes or hazardous climate events occurring within a specific time period and the vulnerability of an exposed society or system

5

Vulnerability

The propensity or predisposition to be adversely affected; vulnerability encompasses a variety of concepts and elements, including sensitivity or susceptibility to harm and lack of capacity to cope or adapt

6

Adaptive capacity

The ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or respond to consequences

7

Resilience

The capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganising in ways that maintain their essential function, identity, structure, while also maintaining their capacity for adaptation, learning and transformation

8

Maladaptation

When intervention in one location or sector could increase the vulnerability of another location or sector, or increase the vulnerability of the target group to future climate change

To enhance climate resilience and adapt to climate change impacts, the CAP will focus on operationalising institutional mechanisms such as land use planning, promoting sustainable initiatives in economies, communities and ecosystems, and improving their capacity to monitor hazards so they may better prepare for and mitigate impacts. Flooding, heat, drought and sea-level rise threaten all sectors and communities, specifically those who live in poor and unplanned settlements. Building on the hazards and impacts identified within the rapid Climate Risk Assessment (CRA), Dar es Salaam's resilience and adaptation goals are framed around the following priorities:

- **Adapting to flood risk**
- **Conserving clean and safe water sources**
- **Disaster risk reduction**
- **Impact reduction through reduced vulnerability and increased resilience**

These are strategically aligned with development agendas and climate goals at local and national scales. Dar es Salaam City Council envisions a future that is safe, sustainable, prosperous and governed efficiently. This cannot be achieved without appropriate action to adapt to climate impacts and build social, natural and economic resilience. . The Tanzanian National Adaptation Plan (NAP) emphasises the urgency of this action stating a need to 'identify immediate and urgent' climate change adaptation. At the same time, the National Climate Change Response Strategy (NCCRS) 2021-2026 highlights the role of adaptive capacity in achieving long term resilience. These demonstrate an acute awareness that while there is an immediate threat from climate hazards, long term resilience should be prioritised to ensure the city is protected from future impacts.

1.2.3 Wider benefits

Dar es Salaam is committed to ensuring that the CAP not only addresses climate change but can also support achievements of broader sustainable development goals. CAP will bring health, economic and social benefits as such, the following benefits have been identified as priorities for this CAP:

Health benefits:

Improved air quality, proper management of solid waste and wastewater, and reduced heat effects. Poor air quality has contributed to respiratory diseases among Dar es Salaam residents, including indoor air quality from the use of charcoal and other solid fuels. Improved transport infrastructure, alternative fuels, and proper solid waste management will reduce GHG emissions while providing improved air quality to the city's residents. Climate actions aiming at improving wastewater will reduce vulnerability to waterborne diseases associated with poor wastewater handling. The CAP will also enable Dar es Salaam residents to access better services to enhance their health situation.

Economic benefits:

The range of actions identified in this CAP bring about both direct economic benefits through new business opportunities and job creation from the development of green infrastructure and roll-out of technologies, and indirect benefits through increasing the attractiveness of the city for visitors and businesses, greater efficiency in the movement of goods and people, and the development of new green

sectors and services. Benefits will arise from each of the targeted sectors of waste, energy and transport. For example, waste handling will be more challenging to the city and municipalities as the city population increases to 10 million by 2030. The actions in this CAP will bring about economic benefits as existing dumpsites are upgraded, thereby enabling the utilisation of waste into valuable resources, including biogas, with opportunities for waste handling and biogas utilisation businesses. Composting initiatives will also bring economic benefits to nutrient-rich soil needed to support urban farming and greening. These will both also provide employment opportunities for waste collectors and vendors. Actions targeting improving energy efficiency in private and public buildings will reduce energy costs, lowering bills for businesses and residents. Improved mass transport will reduce the time spent commuting from home to working areas and back again. This will allow residents to spend their time more productively working instead of commuting and reducing fuel consumption in traffic jams. The reduced commuting time will also allow more time with families, thus improving residents' social well-being and driving leisure businesses. Each proposed action will create employment opportunities.

Ecosystems and environment:

The actions in this CAP also promote environmental co-benefits for ecosystems and environmental quality. Tree planting, for example, will create job opportunities among seedling sellers, and CAP implementation will make Dar es Salaam a greener city, not just through increasing tree planting but also by maintaining the existing ones. Green walkways will attract residents to walk, potentially improving their health and creating space for socializing. Green spaces will stimulate domestic tourism within the city and as well as attracting external tourists. Promoting green space will also help mitigate the heat level within the central part of the city, already higher than peripheral areas.

Social & community:

The CAP is underpinned by the need for climate actions to support inclusive and sustainable development and ensure that the benefits are shared by all. The social and community benefits arising from actions include direct benefits such as increasing energy security and access by promoting renewable and alternative fuels, fuel switching, and electrification, providing greater access to lighting and technology for informal settlements, bringing further education and well-being benefits. Improving accessibility, public transport and urban spaces will open up the city and its opportunities to more communities. The impacts of climate change often disproportionately impact more impoverished and more marginalised communities. So, actions to increase resilience will positively impact such communities

Leadership:

Tanzania has other cities, including Mwanza, Mbeya, Arusha, Tanga and Dodoma. Dar es Salaam's CAP is positioning the city to be the front runner in the climate agenda and set a good example for other cities to follow. Furthermore, Dar es Salaam will act as a demonstration field to sector ministries on how their sectors can address climate change at the national level

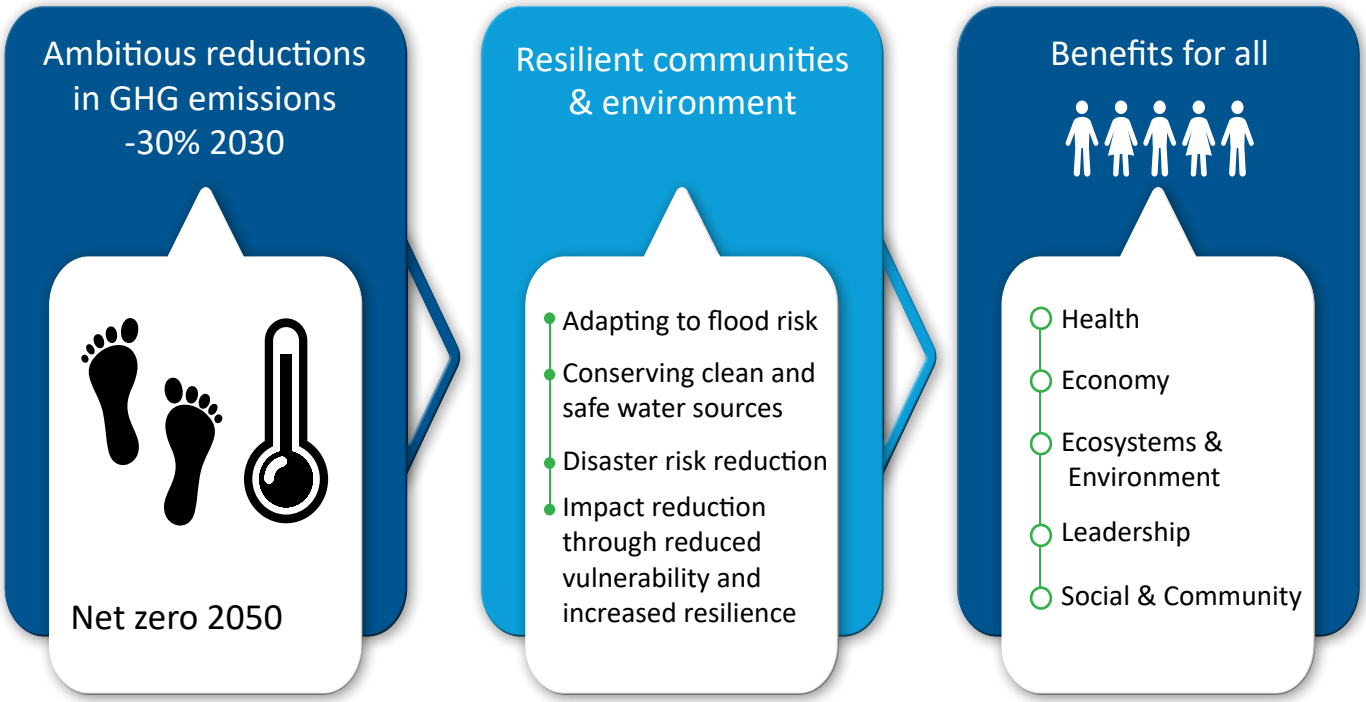
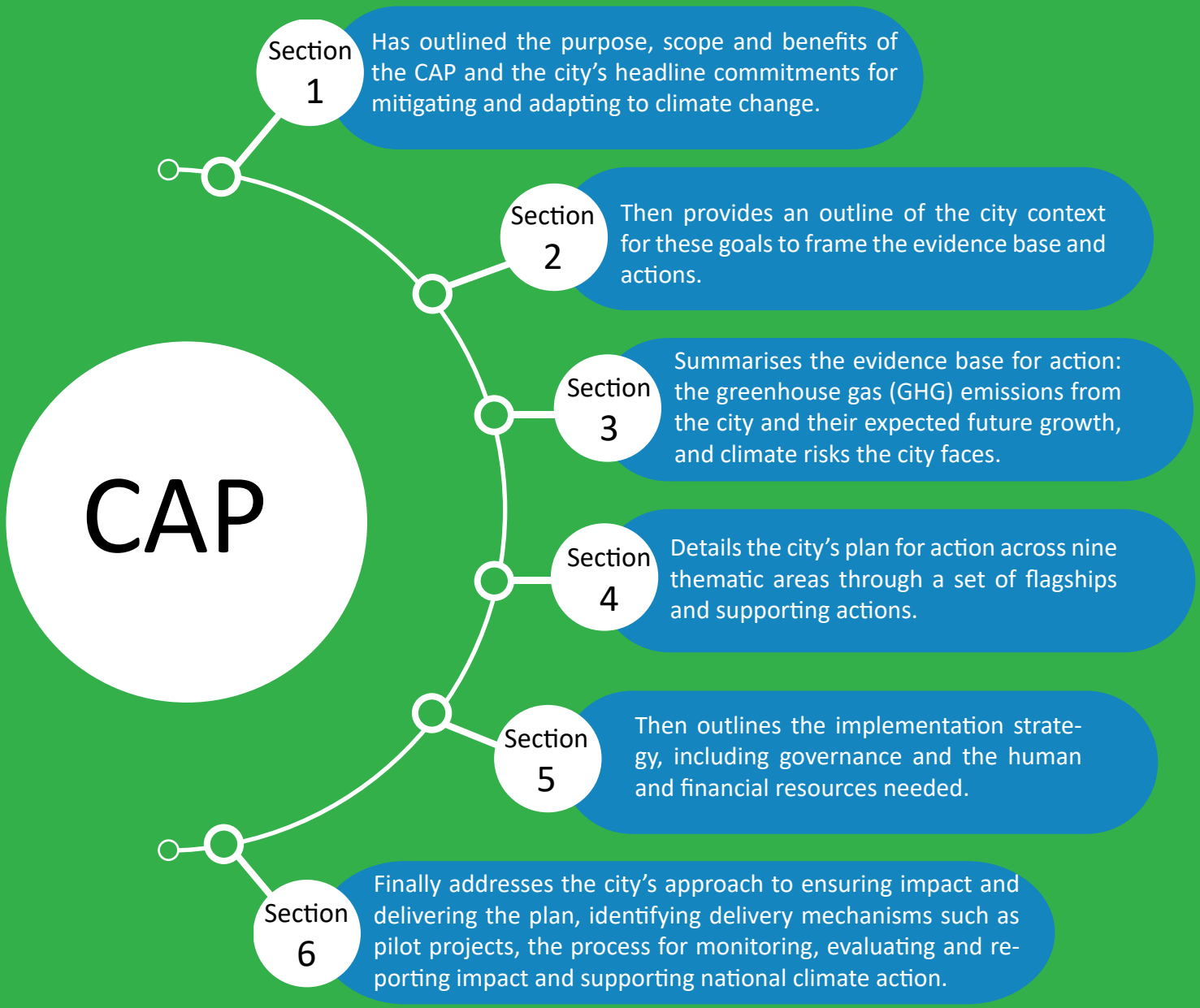


Figure 1: Dar es Salaam's goals

1.3 Structure of the CAP

This CAP is structured as follows:



02
The context for action

2 The context for action

Dar-es-Salaam is popularly known as the "Harbour (Haven) of Peace", the name originating from the Arabic word "Bandar-ul-Salaam", which means in Swahili "Bandari ya Salama". It is the former capital as well as the most populous city in Tanzania and a regionally important economic centre. Located on the Swahili coast, the city is one of the fastest-growing cities in the world.

2.1 City context

Dar es Salaam, located on the Swahili coast, is the most populous city in Tanzania and a regionally important economic centre. The city has undergone rapid urbanization in recent decades that's had a severe impact on resource availability and environmental quality. Since 1990, the population has risen from roughly 1.5 million to 7 million people; with an average population growth rate of approximately 5% per year for the past three decades, it is the fastest-growing city in East Africa and one of the fastest-growing in the world. As a result of the rapid urban growth, much of the city's land area comprises unplanned, densely populated informal settlements that lack essential water, sewer, and waste services.

With a modified type of equatorial climate, Dar es Salaam usually is hot and humid throughout the year, with temperatures up to 35ºC between October and March and cooler temperatures (around 25ºC) between May and August. The city has a short rainy season from October to December (known as Vuli) and a long rainy season between March and May (known as Masika). The average rainfall is 1000mm (lowest 800mm and highest 1300 mm).

The City is divided into three ecological zones: the upland zone, middle plateau, and lowlands. The main natural vegetation includes coastal shrubs, Miombo woodland, coastal swamps and mangrove trees. The Dar es Salaam City soils are not particularly fertile for agriculture, with soil erosion being a major problem. The City has four main rivers: Mzinga, Kizinga, Msimbazi and Mbezi and several seasonal streams. The aquifer contributes to the flow of the main rivers of Mzinga, Kizinga and Msimbazi, keeping them flowing during the dry period. Dar es Salaam hosts the main international airport, port and a ferry to Zanzibar Island (part of the United Republic of Tanzania). The Dar es Salaam port saves the landlocked countries of Zambia, Malawi, Democratic Republic of Congo (DRC), Burundi and Rwanda. The Tanzania Zambia Railway (TAZARA) line runs from Dar es Salaam to Zambia and was aimed to carry goods and people from Dar to Zambia. The road networks to SADC countries and Great lake countries begins from Dar es Salaam. By being a conduit to other countries, Dar es Salaam will remain an important city with business activities and a commercial hub to Tanzania and the SADC, EAC, and lake region countries. It is therefore important that the city is prepared by developing and implementing actions to address climate change with medium 2030 and long term 2050 targets.

The following sections provide an overview of the city's socio-economic context and current environmental quality challenges, along with a brief description of future trends. This context is critical for informing the CAP to help ensure it delivers benefits tailored to Dar es Salaam's unique needs.

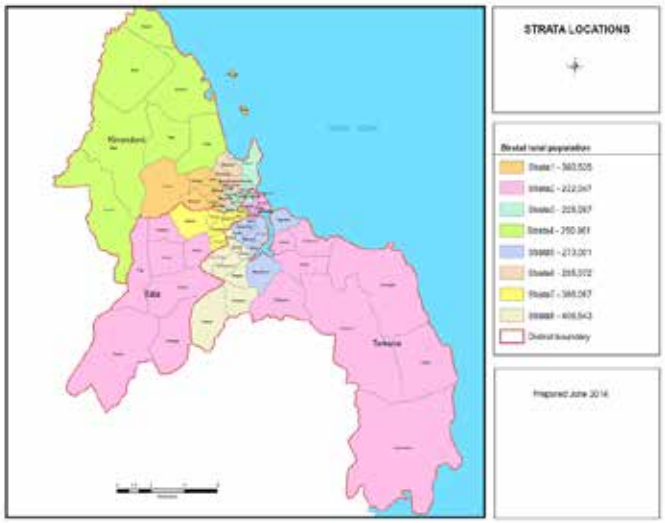


Figure 2: Dar es Salaam City map

2.1.1 Socio-economic context and key future trends

Dar es Salaam's population in 2012 equated to 4,364,541 according to the 2012 population census. Currently, the city population stands at 7,047,000. The city has an average 5.6% annual population growth rate, which is well above the national population growth rate of 2.9%. The population in Dar es Salaam is projected to be 9.7 million by 2030 and 15.6 million by 2050. The rapid population growth has been due to high rural-urban migration and a natural birth rate of about 4.5% per annum.

Dar es Salaam is Tanzania's main engine of economic growth and serves as an administrative and commercial centre. Due to its location, the city attracts more businesses and investments in various sectors. According to the 2nd National Communication, the economy of Tanzania grew by 7.4% in 2004 compared to 7.0% in 2013.

Waste generated per capital	Increased from less than 2,000 tonnes per day in 1998 to more than 4,000 tonnes per day in 2009 . Dar es Salaam could generate more than 12,000 tons per day by 2025, representing a tripling of the waste generated in just 14 years.
Waste Management	In 2014, 60% of waste was left uncollected and uncontrolled.
Industrial Pollution	Dar es Salaam accounts for 88% of all industrial pollution in Tanzania.
Charcoal production country share	50% or more of the total charcoal consumption in Tanzania occurs in Dar es Salaam city.
Charcoal Production	88% of households in Dar es Salaam use charcoal.
Population	The population in Dar es Salaam is projected to be 9.7 million by 2030 and 15.6 million by 2050.
Growth Rate	5.6%

The density of urban spatial growth	2,688 people per km2, compared to the 2002 Population and Housing Census population density of 1,786 persons/km2
Economic growth rate	annual average of 7.0%. The GDP in real terms grew by 6.9% in 2012, compared to 6.4% in 2011.
Private car ownership	The number of cars in the city has increased from 24,600 in 1979 to 605,000 to 705,000 in 2011.
% access to sanitation	10 % of the city's households use the piped system. 90 per cent of the population resorts to on-site sanitation systems or other kinds of domestic disposal.
% of people living in informal settlements	75%
% of people living below the poverty line	8%

2.1.2 Current environmental challenges

Continued growth and urbanisation are placing ever-increasing strain on the city, including public services, food security, infrastructure and natural resources, further exacerbated by the changing climate. The city's particular climate hazards include floods & storms, heat, drought, and sea-level rise. Climate change, combined with rapid urbanisation, creates new and intensifying existing challenges for Dar es Salaam's terrestrial, aquatic, coastal ecosystems and air quality. The significant environmental challenges in Dar es Salaam include the following:

Waste management

It is estimated that around 60% of waste generated in Dar es Salaam is not systematically collected. The lack of services, such as a comprehensive network for waste collection, transfer stations, transport and disposal systems, leads to waste dumped in riverbanks, drainage canals and open spaces. Waste that remains uncontrolled in streets may end up in storm water drains which can exacerbate annual flooding events and public health problems. These issues particularly affect the unplanned urban areas, so they disproportionately impact vulnerable populations.

Water resources

Dar es Salaam currently depends on three main water sources: The Ruvu River, the Kizinga River and boreholes. According to the Dar es Salaam City Environmental Outlook (DCEO) , the production from these sources is an average of 270,000 m3/day. In comparison, the demand is estimated to be 450,000 m3/day, resulting in a shortfall of about 180,000 m3/day. Over 50% of Dar es Salaam residents rely on groundwater (from the boreholes) due to the unreliable water availability from the river water supply. Other water sources need to be exploited to alleviate the water supply problems in Dar es Salaam City; however, options are limited. For example, recent studies have shown that several locations along the Msimbazi River are highly contaminated, making the water non-potable and the soil unsuitable for agricultural cultivation. These issues are likely to be exacerbated in future due to global climate change.

Marine environment

As a coastal city, the marine environment plays an important role in the natural ecosystem and social fabric of Dar es Salaam. For example, the city's marine system provides a habitat for endangered species. Mangrove forests exist throughout the coastal areas of Dar es Salaam but are highly threatened, particularly in Temeke District. However, marine resources are increasingly being polluted, depleted and/or misused through environmentally destructive fishing methods, introducing exotic flora and fauna, and discharging large amounts of urban wastes and effluent materials. Efforts are needed to safeguard the marine resources as they provide a livelihood to many people in the city.

Air quality

Air quality in Dar es Salaam is affected by fuel combustion in buildings, industry and the transportation sector. Cars are a large contributor in driving down the air quality within the city since gasoline-burning engines emit volatile organic compounds (VOCs) and nitrogen oxides (NOx) from fossil fuels. Air quality indicators in Dar es Salaam show that VOC and NOx levels regularly exceed national and World Health Organisation (WHO) standards. In addition to VOC and NOx levels, a spatial variability study measured concentrations of PM10 and PM2.5 in Dar es Salaam and found that PM2.5 varied from 27µg/m3 at the harbour site to 49µg/m3 at the traffic site. Both PM10 and PM2.5 levels measured in this study were several factors higher than those shown to elicit public health effects and exceeded WHO global standards on particulates. An additional source of harmful gases is the burning of charcoal. Charcoal is a primary source of cooking fuel in the city, contributing to local air quality degradation emitting nitrogen oxides, particulates, and other carcinogens. Consistent exposure to these harmful gases can cause acute lower respiratory infections in children, chronic bronchitis or chronic obstructive pulmonary disease in women, and other adverse health conditions.

Industry

Dar es Salaam is the economic hub of Tanzania, and a major trading location. The city has seen considerable growth, particularly in the construction sector, with new multi-storey buildings, bridges and roads. The Port of Dar es Salaam is the largest in the country. The port is prominent for entrepot trade with landlocked countries like Rwanda, Burundi, Zambia, and the eastern portion of the Democratic Republic of the Congo. Temeke is the city's industrial district, where manufacturing (both heavy and light industry) is located. Temeke is believed to have the largest concentration of low-income residents due to industry. However, such low-income areas have also suffered significant impacts from pollution due to their proximity. Some industrial organisations and facilities in Dar es Salaam fail to comply with existing environmental standards regarding water, air and soil pollution and waste management. Waterbodies such as the Msimbazi, Mzinga and Kizinga rivers and the Mlalakuwa stream have been contaminated, and waste management is a particular issue for industries located in informal settlements.

Urban agriculture

Environmental quality issues within the agriculture sector arise from its proximity to dense human populations sharing air, water and soil resources. The lack of suitable land for farming in urban areas sometimes forces farmers to cultivate on hazardous sites, e.g. along the highly polluted Msimbazi River or near the closed Mtoni dump. Soils near roadways and industrial areas risk heavy metal pollution from airborne lead and cadmium from gasoline exhausts. Furthermore, due to a lack of clean water, farmers are often forced to use polluted water for irrigation. These factors create significant public health risks, both for the farmers and agricultural workers and those who consume the products.

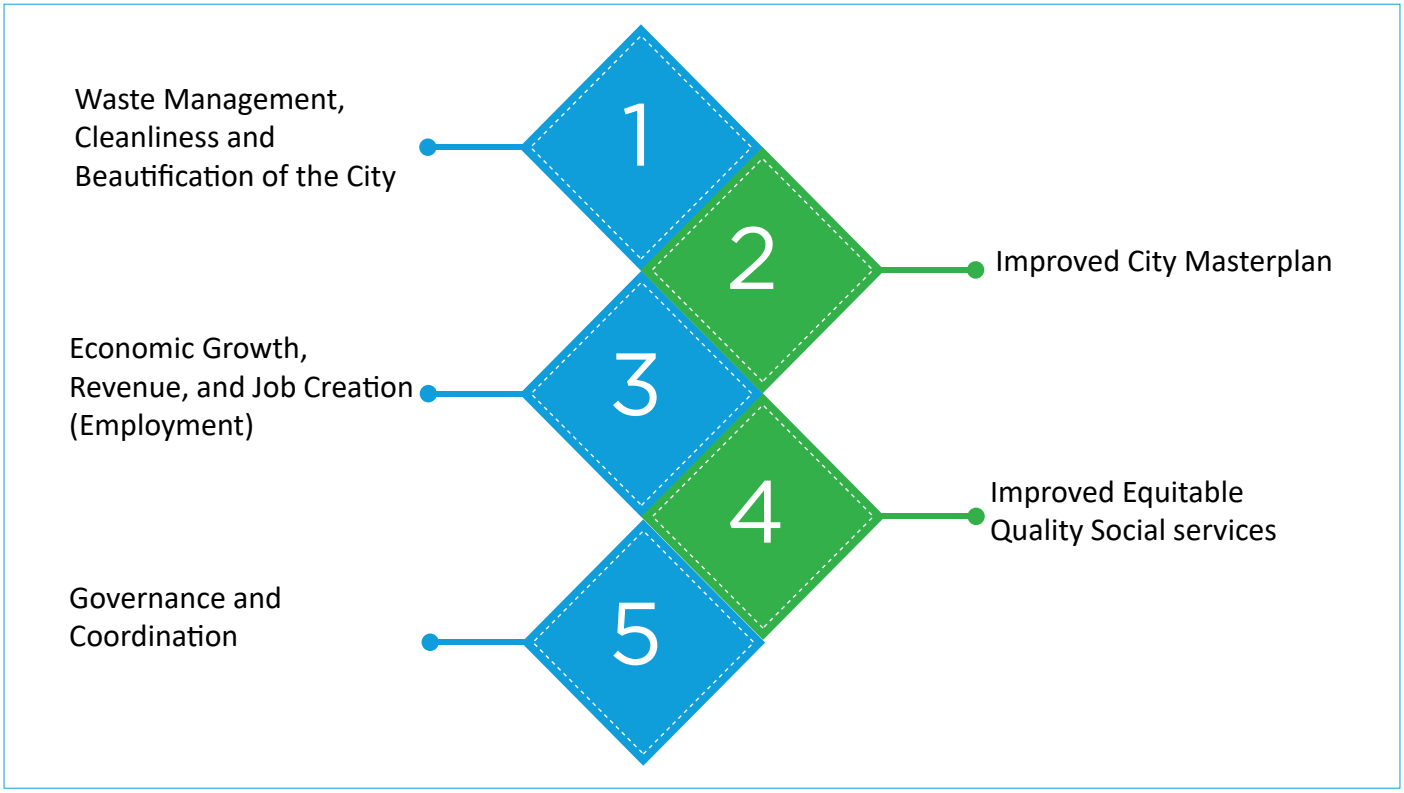
To tackle these issues, Dar es Salaam's CAP aims to ensure it addresses the degradation of environmental quality through a series of transformational actions to equip the city with a resilient and sustainable infrastructure, regulatory frameworks and working closely with affected communities.

2.2 Dar es Salaam's climate change journey

Dar es Salaam City Council, and the Government of Tanzania, have developed and implemented several policies and programmes that address climate, environmental, social and economic development goals and objectives. These are important for the policy framework that forms part of Dar es Salaam's climate governance and been considered in Dar es Salaam's CAP development.

2.2.1 Previous climate change initiatives and policy framework

Whilst this CAP represents the first climate change plan for Dar es Salaam. The city has been committed to addressing climate change as part of the city's development plans, forming the city's policy framework. The Dar es Salaam Transport Master Plan of 2018 and Dar es Salaam Metropolitan Development Project (DMDP) cover settlement, social services, economic and transport plans. The Dar es Salaam Strategic Plan (DSP) of 2016/2017 to 2021/2022 translates into the city context and plans to implement the National Five-Year Development Plans II & III towards Global Sustainable Development Goal (SDG-11). This aims to ensure cities are safe and secure for human settlement while stimulating innovations and development. The DSP focuses on critical areas such as:



Under the key results areas of the DSP, strategic targets already embed climate objectives; for instance, the 'city masterplan' key results area (#2) incorporates urban greenery for urban cooling and resilience to climate change.

The City Council's previous activities related to climate change can be divided into three categories:

1. Development programmes and research projects:

Whilst intended to address the development deficit, there have been many research and analysis projects on urbanisation and development (e.g. UN-HABITAT and World Bank studies on green urban development), and crisis response projects, such as the International Federation of Red Cross and Red Crescent Societies Emergency Plan of Action for Floods in Tanzania.

2. Specific mitigation-related measures:

Predominantly these have included activities such as

a. Tree planting
b. The protection of coral reefs and mangrove vegetation
c. Using more efficient cooking stoves
d. Promoting the use of natural gas instead of oil and coal or using briquettes (to cut down on fuel/wood/charcoal use)
e. Using energy-saving streetlights
f. An improved public transport system (including implementation of further BRT and park and ride)
g. Methane gas capture at waste disposal sites. In Dar es Salaam, several industries have already switched to natural gas

3. Direct adaptation measures:

Predominantly included rainwater harvesting, building sea walls, groynes, and mitigating flood risk.

Dar es Salaam has also developed several international alliances concerning climate change, including membership of the Mayors' Task Force on Climate Change, Disaster Risk and Urban Poor; ICLEI Local Governments for Sustainable Development; the World Bank (such as the Tanzania Urban Resilience Programme – TURP) , and membership of C40. This help provides supportive enabling conditions for climate action in Dar es Salaam.

2.2.2 National climate policy framework

At a national level, Tanzania has enacted various policies, legislation, strategies, plans and programmes that can help the country respond to the impacts of climate change either directly, such as the NCCS (and recent NCCRS 2021-2026), or indirectly, such as the National Adaptation Plan (NAP). Below, Figure 3 presents a timeline series of relevant national policies. It is worth mentioning since writing the CAP Tanzania has recently published its third Five Year Development Plan in June 2021.

Figure 3: Tanzanian climate response timeline

Most activities related to climate change in Tanzania stem from two key legislation: The National Environmental Policy (NEP), developed in 1997, and the 2004 Environmental Management Act (EMA). Since enacting the National Environmental Policy in 1997, the country has reported its first National Communication (NC1) to the United Nations Framework Convention on Climate Change (UNFCCC) in 2003 and the second (NC2) in 2014. Tanzania's Intended Nationally Determined Contribution (INDC) was submitted in 2015 and has since been ratified and adopted as the country's first Nationally Determined Contribution (NDC).

Additional national policies include the National Adaptation Programme of Action (NAPA, 2007), the National Climate Change Strategy (2012) and National Climate Change Response Strategy 2021-2026 (NCCRS, 2021), and Tanzania's Five-Year Development Plans. These were first enacted in 2011 to help set out a pathway for reaching the goals set out in its Development Vision for 2025.

Tanzania is also a participant in regional climate action initiatives such as the Building Adaptation to Climate Change in Health in the least Developed Countries, through Resilient Water, Sanitation and Hygiene project, the Global Framework for Climate Services Adaptation Programme in Africa, and a combination of ODA sponsored development initiatives. These vary in scope, scale and funding, and are conducted in partnership with national and local institutional bodies.

2.3 City governance structures, processes and powers

Dar es Salaam City Council's capacity to implement climate actions is dependent on the structure, functions, processes and powers of the different city council departments and other agencies. The city council plays a key role in controlling or influencing assets or services. To help identify opportunities for accelerating efficient and effective delivery, and as context for implementing this CAP, the governance and administrative (e.g. civil service/city agencies) structures and functions of the city and the city's powers relevant to climate action delivery are outlined.

2.3.1 City administrative structure

Dar es Salaam City Council is headed by the City Mayor, who is elected among the city councillors. The City Council also has an executive city director responsible for all the technical and administrative matters within the jurisdiction. The President appoints the Executive City Director. There are five departments in Dar es Salaam City Council, namely 1) Finance, Personnel and Administration, 2) Works, Fire and Rescue Service, 3) Waste Management, 4) Urban Planning, Environment and Transportation, and 5) Health Services Department as shown in Figure 4 (below). Climate change responsibilities in Dar es Salaam City Council are located under the Head of Environment and Waste Management Unit, Urban Planning and in the city Environmental Conservation departments. The Environment Management Act (EMA,2004) requires all authorities to have environmental units to coordinate environmental related initiatives. The two departments of Waste Management and Urban Planning, Environment and Transportation have been merged in the new city administration to Solid Waste Management and Environmental Conservation department which is coordinating Dar CAP work. Current and future changes in the city administration will maintain a department dealing with environment as requirement by EMA (2004), which will also continue to coordinate CAP implementation.

In Dar es Salaam City Council three pillars make up the city governance structure:

Firstly, the City Director encompasses different officers, including those responsible for managing climate change. The City Director and staff play a vital role in the implementation of climate actions and policy objectives. In addition, the City Director provides a clear direction for the city by aligning the city ambitions with national environmental goals. Following changes on the city administration of dissolving the Dar es Salaam City Council and promoting the Ilala municipal to become the new City Council, the new city Director will coordinate climate change issues under the previous administration.

Secondly, the Mayor and councillors guide decisions on the city budget and developing city plans. These are elected officials and represent different municipalities. Their role is to assist the Mayor with decisions. Following changes in the city administration, the new Mayor mandate will be limited to the Geographical of the Ilala.

Thirdly, the third pillar within Dar es Salaam's governance structure is the Regional Commissioner ('President of the Region'), alongside the Regional Administrative Secretary's (RAS) office. The RAS office is the official link between the central government and local authorities concerning the implementation of climate change initiatives. Following changes in the city administration, the RAS office will coordinate environmental and climate issues in Kinondoni, Temeke, Ubungo and Kigamboni.

All three pillars are important and have been involved in the CAP development process, to ensure political support. Each pillar has its own role, but power is evenly distributed.

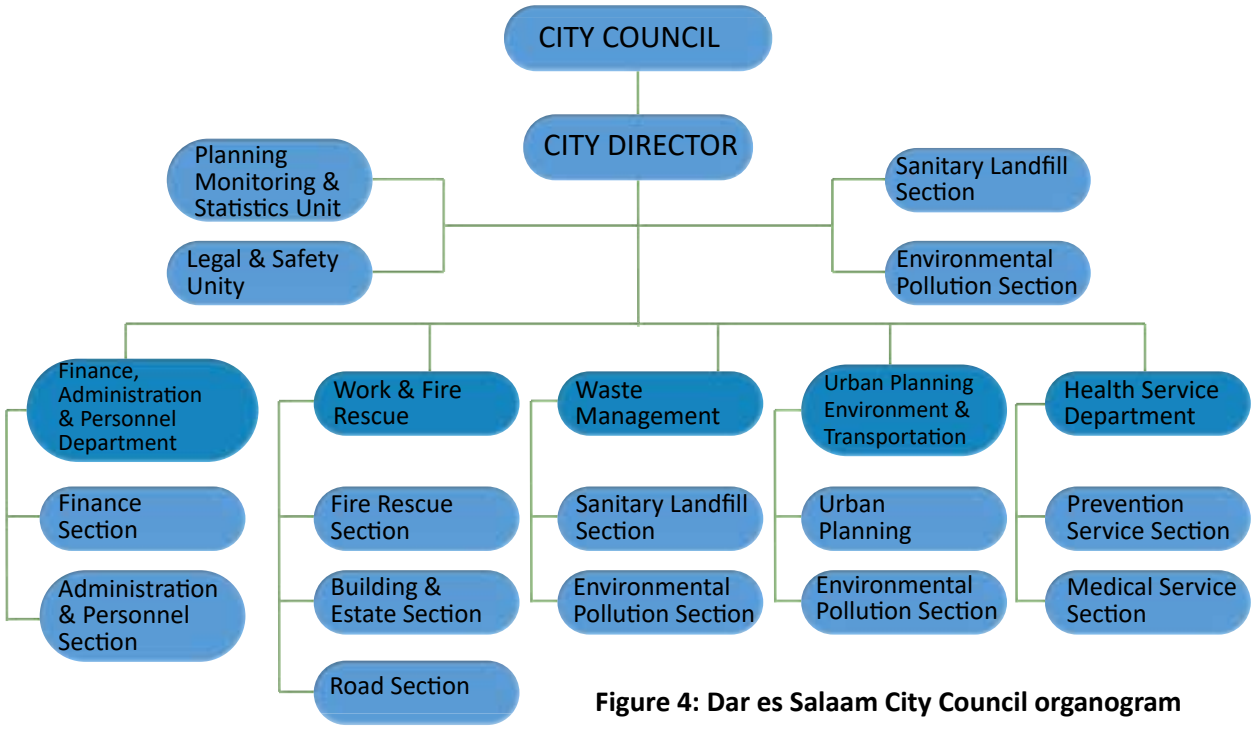


Figure 4: Dar es Salaam City Council organogram

Until February 2021, the city was structured into five municipalities of Ilala, Kinondoni, Temeke, Kigamboni and Ubungo. Kigamboni and Ubungo were established in 2015 from Temeke and Kinondoni, respectively. Each Municipal council has its plans, documents, and delivery strategies. The Dar es Salaam City Council has a coordinating role and attends to issues that cut across all five municipalities. The City Council used to set the policy and makes strategic decisions. The local municipalities were tasked with the implementation of plans and actions. The city governance structure changed in February 2021 when the Minister under the President's Office responsible for Reginal Administration and Local Authority dissolved the Dar es Salaam City council and promoted the Ilala Municipal Council to be the new Dar es Salaam Council. Ilala is currently the promoted city Council and is Dar es Salaam City Council. Administratively, the geographical coverage of the new administration is the Ilala. City-level initiatives like Climate Action Planning will be coordinated by the new administration of the entire Dar es Salaam area, including the 4 Municipalities. The vertical structures are shown in the diagram in Figure 5 below. The organogram will change to Dar es Salaam city administrative changes.

It is important to note that any climate change solutions in the city are formulated at five primary levels: city, municipal (as above), and then at the ward, street and household level. This aligns with the National Climate Change Strategy (NCCS), National Climate Change Response Strategy (NCCRS) and Environment Management Act (EMA).

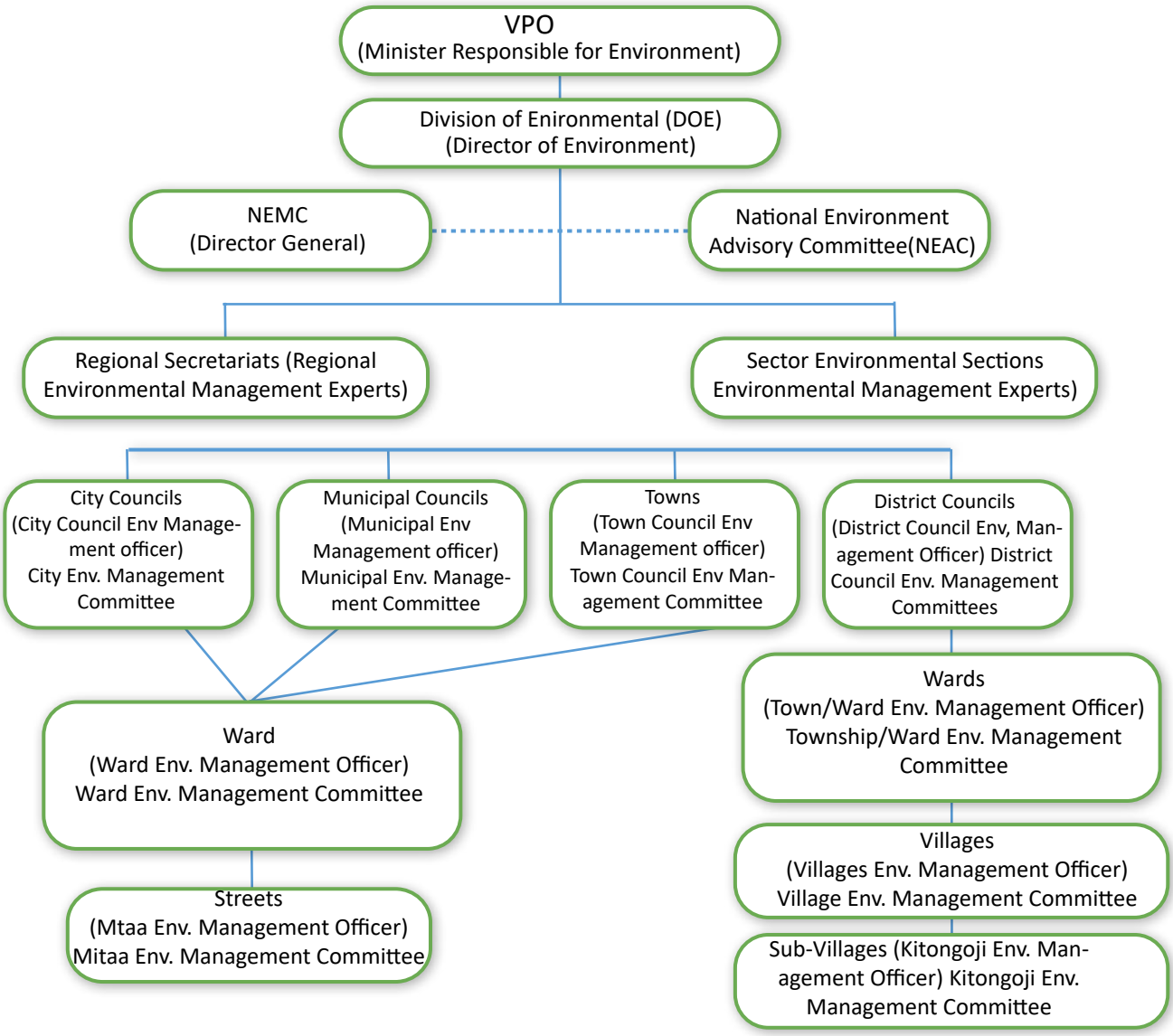


Figure 5: Dar es Salaam city governance

2.3.2 City powers and capacity

Understanding the city's power and capacity to implement climate actions is important for identifying where and how the city can implement actions. Other stakeholders need to be engaged as delivery partners. From an assessment of city powers and capacity conducted as part of the 'strategic appraisal' stage in the CAP process, Dar es Salaam was found to have the lowest overall power and capacity concerning the electricity, energy in buildings, and water and wastewater management sectors. The city has the highest capacity and powers in waste management, transportation planning, and infrastructure and management. Disaster management and natural capital management had medium power and capacity scores.

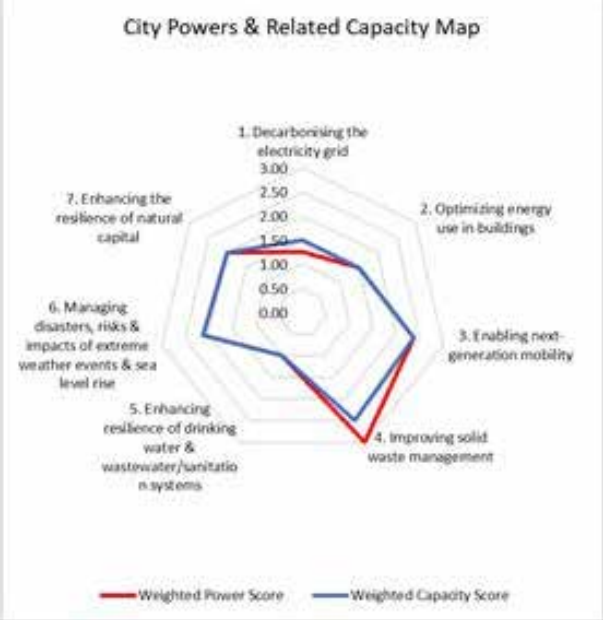


Figure 6: Dar es Salaam's power and capacity scores

The level of power and capacity has been taken into consideration in the identification and planning of actions. For example, the key stakeholders within the energy and buildings sector would be 05 and within the water and wastewater sector the subsequent lead stakeholders are 06. The details of actions in section 4.2 identifying lead and supporting organisations reflect this.

2.4 CAP development process

2.4.1 CAP process overview

This CAP has been developed through a programme of stakeholder engagement, involving representatives from Dar es Salaam's City Council, sector experts, national government ministries, NGOs, community groups and private sector organisations. The CAP aims to ensure ongoing inclusivity and ownership of the city's actions on climate change by all these stakeholder groups.

The Dar es Salaam Climate Action Planning started in January 2019 with an appraisal to review the existing governance and power of the city to prepare and implement CAP. The appraisal informed the CAP journey, particularly on the stakeholders and who should be included in the process. The appraisal was followed by a stakeholders' analysis which examined in detail their anticipated capacity and contribution during the preparation and the implementation of the CAP.

The city organised the first workshop on 13th and 14th August 2019. This workshop invited stakeholders from the five Municipalities of Ilala, Kinondoni, Temeke, Ubungo and Kigamboni, and relevant national agencies working in Dar es Salaam. Participants were taken through the C40 Cities and CAP process. The workshop introduced the city's GHG Inventory. Participants were taken through the data sources, and the methodology used when developing the inventory. The first workshop was endorsed by the City Director, which laid a strong foundation on the ownership of the CAP for the city leadership and technical team.

The second workshop was held from 1st to 3rd October 2019. This workshop provided stakeholders with an understanding of the national and city context, creating a vision for Dar es Salaam in 2050. Workshop activities included developing emission reduction trajectories through climate actions, comparing visions and identifying opportunities to improve scenarios.

The third workshop was held on 16th October 2020 and enabled stakeholders to build an understanding of GHG impacts, the existing, planned and ambitious scenarios. The workshop also analysed the feasibility of ambitious climate actions for key sectors and validated assumptions that were used to model Dar es Salaam's scenarios.

The fourth workshop was conducted from the 9th to 11th of February 2021. The workshop was useful in enabling the city and stakeholders to define and agree on priority actions, ready for implementation. Within three days of the workshop, participants agreed on approved flagship climate actions for the Energy and Buildings, Transport and Waste sectors. All actions are aligned with the climate change priorities of Dar es Salaam and National climate policies. Participants also agreed on draft sectoral strategy roadmaps for the implementation of the actions and identified potential pilot projects. The workshop was also used to validate the Rapid Climate Risk Assessment and the identification of hazards, associated risks and impacts and actions to address the risks and impacts. The output of the fourth workshop has provided valuable input for the CAP. The majority of stakeholders participated in all workshops thus, making a meaningful and consistent representation and ownership of the final product.

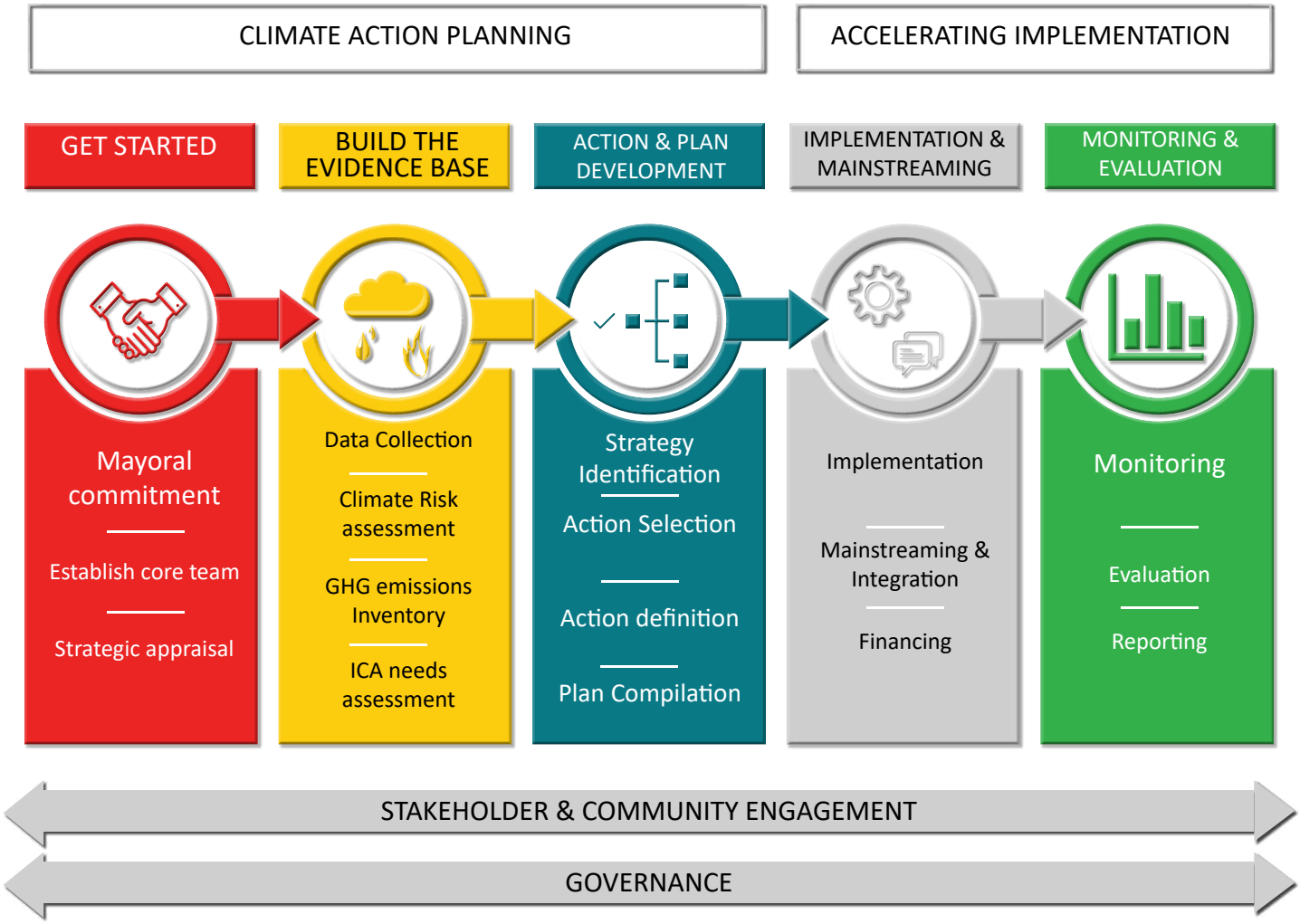


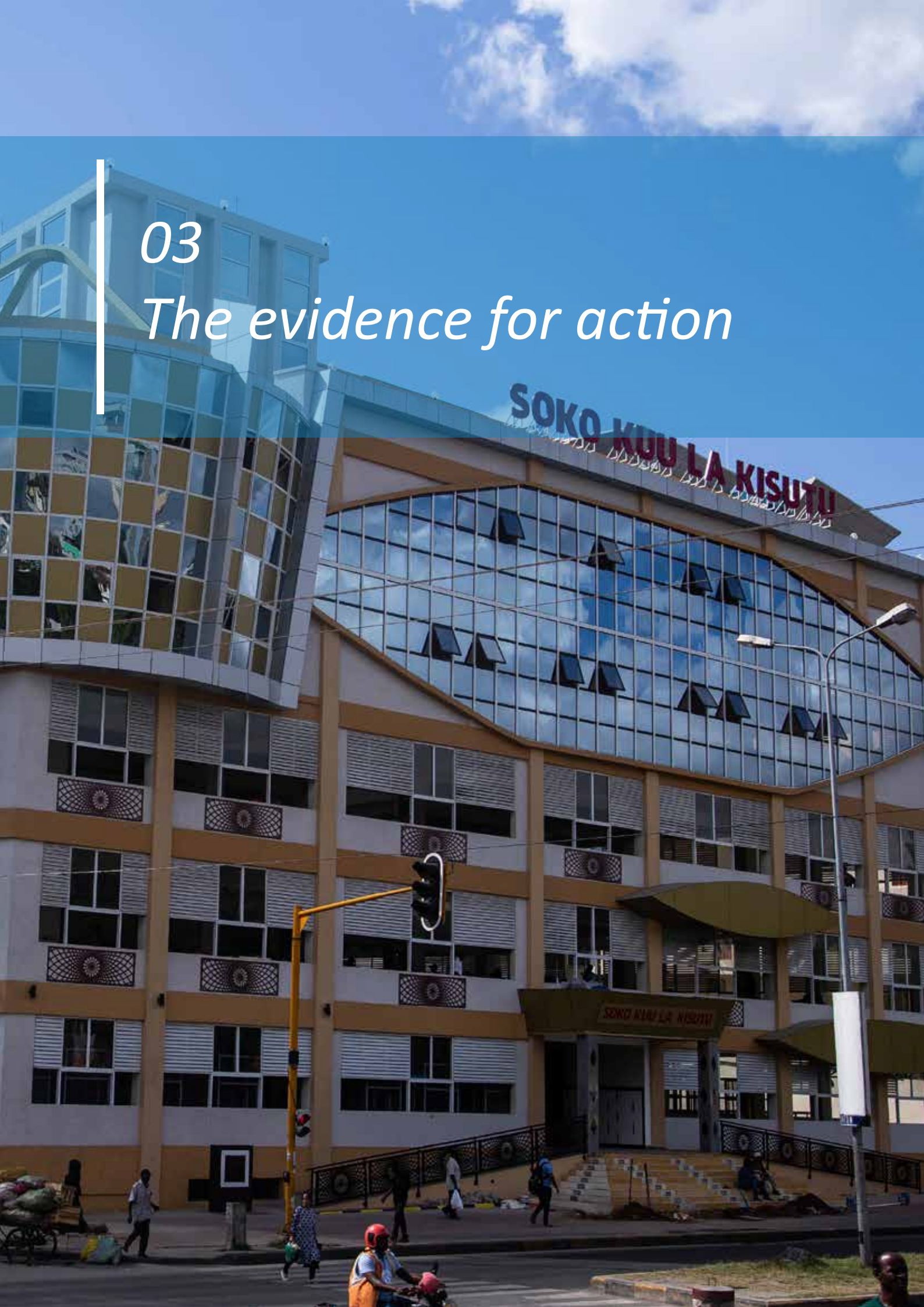
Figure 7: CAP development process

The following organisations have been involved in the CAP development process:

Table 1: Overview of the organisation who attended each workshop as part of the CAP process

Workshop 1 – GHG Inventory	Workshop 2 – Mitigation Scenario Planning	Workshop 3 – Action Prioritisation	Workshop 4 – Ready to Implement
ASM City Council	CFF	Ardhi University	Ardhi University
CFF	DART Agency	DCC	DCC
DART Agency	DCC	Dar es Salaam Institute of Technology	DIT
DCC	DIT	GIZ	Ilala Municipal Council
GIZ	GIZ	Ilala Municipal Council	Kinondoni Municipal Council
Ilala Municipal Council	IMC	IMC	NCMC
Kigamboni Municipal Council	Kigamboni Municipal Council	Regional Commission Office	Regional Secretary
Regional Commission Office	NCMC	SEI – Africa	TANESCO
Regional Secretary	TAA	TAA	Temeke Municipal Council
SEA	TANESCO	Temeke Municipal Council	Ubungo Municipal Council
TANESCO	TMC Environment	Ubungo Municipal Council	
Temeke Municipal Council	Ubungo Municipal Council		
TMC Environment			
Ubungo Municipal Council			

03
The evidence for action



3 The evidence for action

3.1 Taking stock of greenhouse gas emissions

Data on a city's current emissions and projections of likely future emissions is crucial for robust, evidence-based planning. It helps identify the most impactful and locally appropriate climate mitigation actions, which will assist a city in transitioning towards the goal of carbon neutrality by 2050, in line with the Paris Agreement.

3.1.1 Dar es Salaam's GHG inventory

Dar es Salaam city compiled and reported its first greenhouse gas (GHG) inventory for 2016. This inventory serves as a baseline for setting city emissions reduction targets, assessing opportunities to reduce future emissions and monitoring progress over time.

The inventory used the GPC, a global standard for local-level emissions reporting. The GPC aligns with international emission-reporting guidelines published by the Intergovernmental Panel on Climate Change (IPCC) – used by national governments – but is adapted to be more relevant to a local urban context. The GPC has a minimum reporting requirement (called BASIC) that requires a city to report on the three major GHGs and the three sectors that account for the majority of emissions in a city context. The three gases are carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O). The following BASIC emissions sectors and sources are relevant to Dar es Salaam:

Stationary energy:

Includes emissions related to the use of energy in buildings (homes, commercial buildings, government buildings and industries), either in the form of solid, liquid or gaseous fuels (scope 1 emissions) or grid electricity (scope 2 emissions), as well as fugitive emissions from natural gas pipelines.

Transportation:

Includes emissions related to the use of fuels (scope 1) by on-road transportation and rail within the city boundaries.

Waste:

Includes emissions from solid waste treatment (e.g. from landfill, composting, incineration and burning) and wastewater treatment (e.g. from anaerobic lagoons, latrines, septic systems and open discharge) within city boundaries (scope 1).

Non-mandatory sectors that were not included are industrial processes and product use (IPPU), agriculture, forestry, and other land use (AFOLU). These sectors are typically lower emitters in an urban context.

Biogenic emissions from the burning of wood and charcoal are usually not included in GPC BASIC inventories, however, it is good practice to include these emissions if the use of these fuels is unsustainable. Deforestation related to wood and charcoal use is occurring at a faster rate than the forest can regrow and is therefore unsustainable. As a result, biogenic emissions related to the burning of wood and charcoal was included in the city's BASIC inventory.

City emissions were calculated using available energy and waste-related data, which was entered into an excel-based tool, the City Inventory Reporting and Information System (CIRIS), to produce a BASIC inventory (including biogenic emissions).

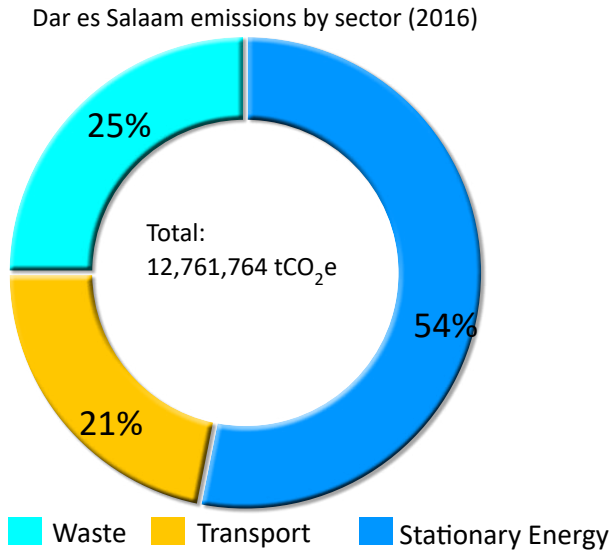


Figure 8: Greenhouse gas emissions by sector in Dar es Salaam (2016)

According to the 2016 inventory, Dar es Salaam is estimated to be responsible for a total of eight million tonnes of carbon dioxide equivalent (tCO2e) emissions. A comparison with emissions in previous years in Dar es Salaam was not possible since this is the city's first inventory.

The largest contributor to emissions is the stationary energy sector, accounting for 54%, followed by emissions from the waste sector at 25%, and transport at 21% (Figure 8). The highest-emitting sub-sector is the residential sub-sector, followed by on-road transport and industry.

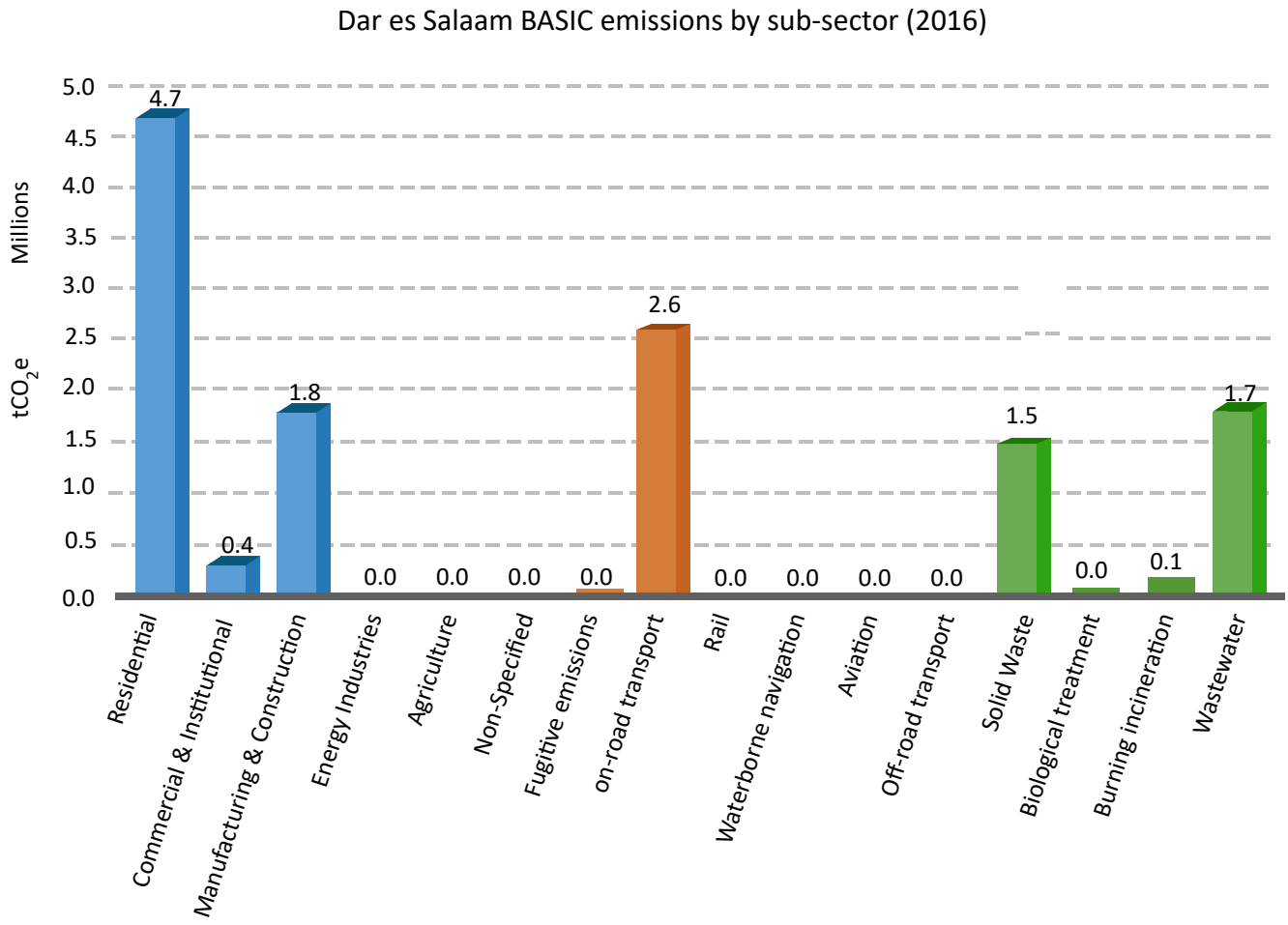


Figure 9: Greenhouse gas emissions by sub-sector in Dar es Salaam (2016)

There is some uncertainty associated with the results, as data was not always available. In these cases, the inventory team benchmarked against other cities, downscaled national data and/or used international estimates in accordance with best practice. Assumptions are transparently documented, with proposed improvements in the Greenhouse Gas Emissions Inventory Report and CIRIS. Data for the residential and solid waste sub-sectors have the highest confidence, while the highest uncertainty is in data for the commercial, manufacturing and transport sub-sectors.

Most energy-related (stationary energy or transport) emissions result from the use of charcoal, wood and electricity in the built environment (residential, commercial, institutional and industrial sub-sectors) and gasoline and diesel use by on-road transport (Figure 10).

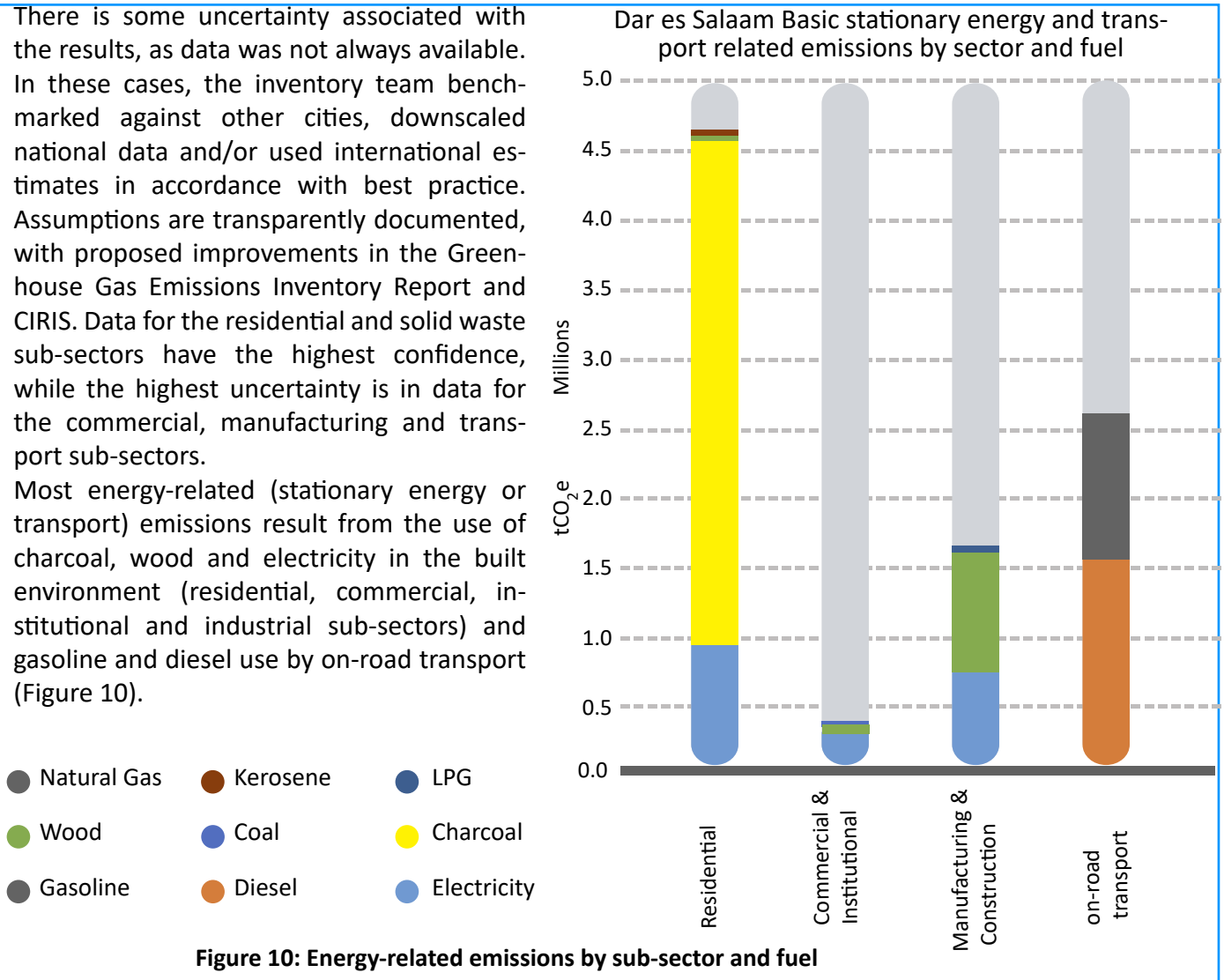


Figure 10: Energy-related emissions by sub-sector and fuel

3.1.1.1 Stationary energy emissions

Stationary energy emissions result from the burning of fuels (such as kerosene, LPG, coal, charcoal, wood) and the use of electricity by households (residential sector), commercial and institutional buildings and facilities, and the manufacturing and construction sectors. The majority of stationary energy emissions are from the residential sector, followed by manufacturing (Figure 11). Dar es Salaam has a high energy demand because of the large number of industries and businesses compared to other regions in the country.

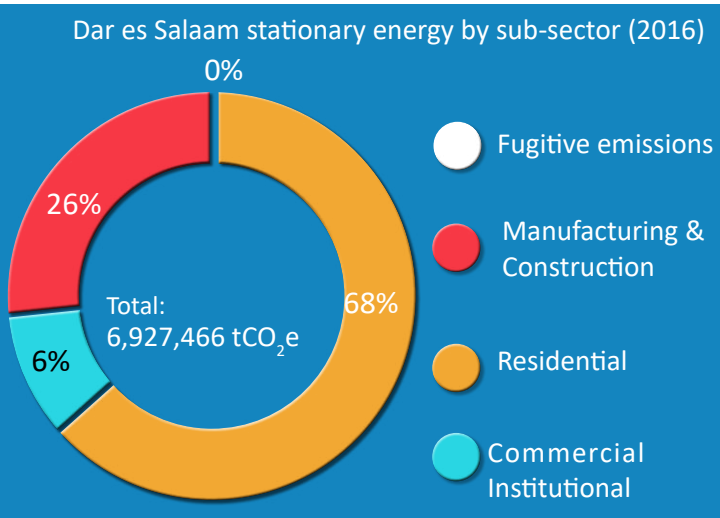


Figure 11: Greenhouse gas emissions from stationary energy in Dar es Salaam (2016)

Stationary energy is usually the highest-emitting sector in an urban context, but when including only non-biogenic emissions it is relatively low in Dar es Salaam. This is due to a substantial share of its electricity being generated by renewable sources, such as hydro, or lower-emissions fossil fuels, such as natural gas. There is also high use of biofuels, such as charcoal and wood, by households. Most emissions from biofuels are considered biogenic (natural, renewable origin) and are therefore not counted towards an inventory BASIC total. Yet if biofuel use is unsustainable, where wood and charcoal are used at a higher rate than can be replaced by forest regrowth, biogenic emissions should be included, as is the case in Dar es Salaam's inventory. Biogenic stationary emissions are also related to human health issues, resulting from smoke inhalation from the use of biofuels cookstoves. As such, it is important to highlight the scale of biogenic emissions.

When Dar es Salaam includes biogenic sources, emissions increase from 2.3 MtCO2e to 6.9 MtCO2e, making the stationary sector the largest-emitting sector (Figure 12). Most of the additional biogenic emissions are associated with the use of charcoal. A small number of biogenic emissions are associated with organic solid waste decomposition in landfill.

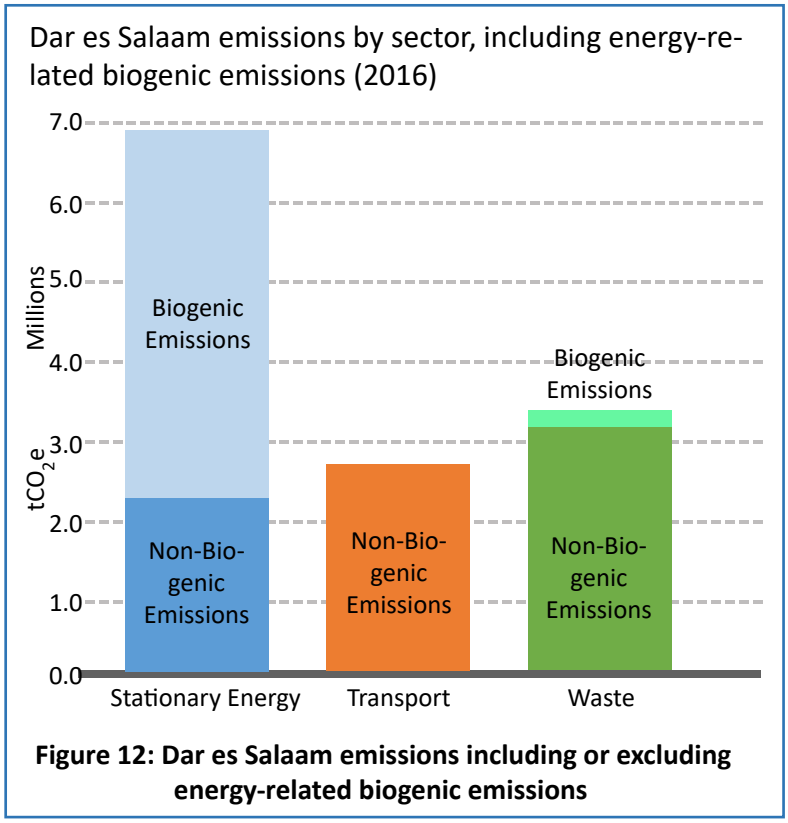


Figure 12: Dar es Salaam emissions including or excluding energy-related biogenic emissions

3.1.1.2 Transport emissions

Dar es Salaam is considered the commercial centre of the country. Economic activities are key drivers behind the movement of goods and people. This concentration of economic activities and vehicular movement, combined with high congestion and a rapidly expanding population, results in on-road transport being the highest-emitting sub-sector, contributing 21% to total city emissions (Figure 8).

On-road transport emissions result from the burning of diesel and petrol in private and commercial on-road vehicles. Emission from diesel use by rail could not be disaggregated from that of on-road transport diesel use and is therefore included in the emissions from on-road transport.

Emissions from jet fuel use at Julius Nyerere International Airport was estimated due to data availability. Still, it was not counted in the city's BASIC total since most emissions from aircraft occur outside the city boundary and is therefore classified as a BASIC+ emissions source. Similarly, emissions from waterborne transport also do not form part of a city's BASIC emissions inventory. Waterborne transport emissions were not estimated due to a lack of data availability. Figure 13 shows the scale of aviation-related emissions compared to on-road transport emissions.

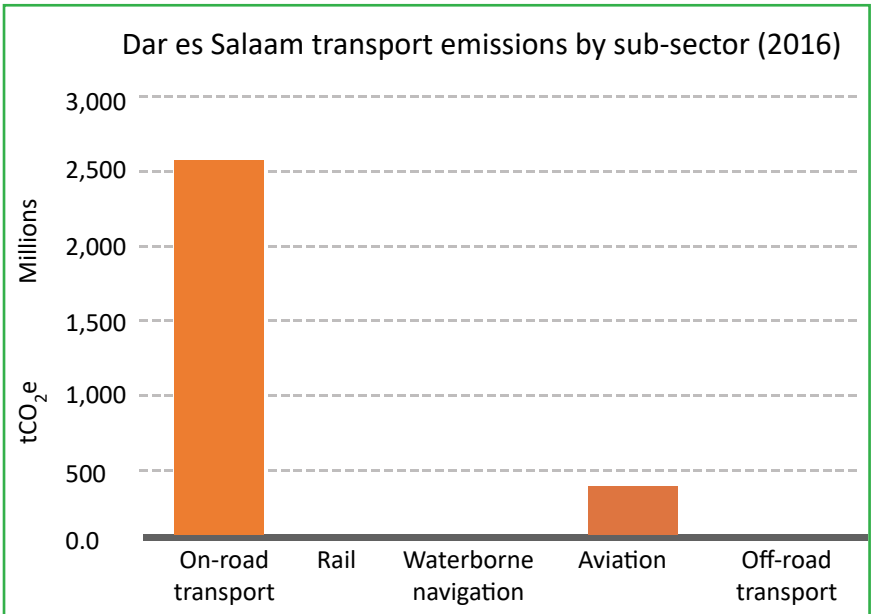


Figure 13: Greenhouse gas emissions from transport in Dar es Salaam (2016)

3.1.1.3 Waste emissions

Emissions from waste arise due to the decomposition of organic matter under anaerobic conditions, in landfill or through composting (biological treatment), resulting in the generation and release of methane (CH4) into the atmosphere. Methane has a higher Global Warming Potential (GWP) than carbon dioxide (CO2) but does not stay in the atmosphere for as long . Waste emissions are also produced by burning or incineration of waste, but this forms a small portion of overall waste-related emissions (Figure 14). Wastewater and solid waste disposal are the fourth and fifth-highest emitting sub-sectors, respectively, in Dar es Salaam, contributing 13% and 11% to total emissions, respectively (Figure 8).

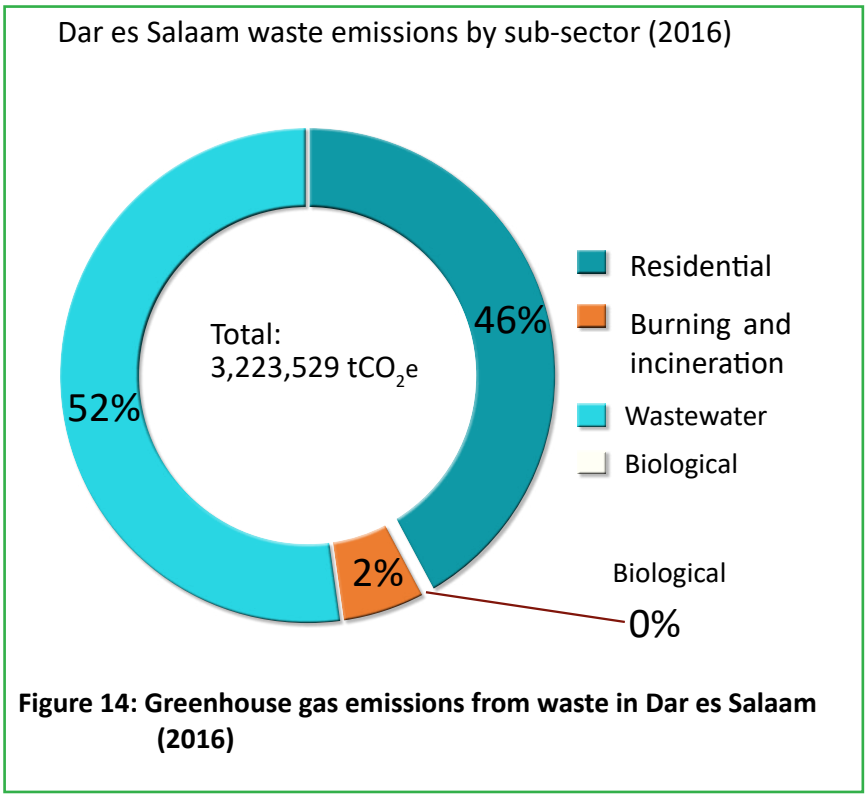


Figure 14: Greenhouse gas emissions from waste in Dar es Salaam (2016)

3.1.2 Benchmarking emissions

GHG emissions per person in Dar es Salaam (Table 2) are comparable to many African cities (Figure 15), which have relatively low emissions per person compared to the average European and North American city. This is largely due to lower energy use due to inadequate access to or the high cost of modern energy sources. The related high use of less expensive biofuels, such as wood and charcoal, generates biogenic emissions that are not counted in a city's BASIC emissions total.

Table 2: Dar es Salaam emissions inventory indicators (2016)

BASIC emissions per person (tCO2e)	2.1
BASIC emissions per unit land area (km^2)	9,161
BASIC emissions per unit GDP (USD million)	1,850

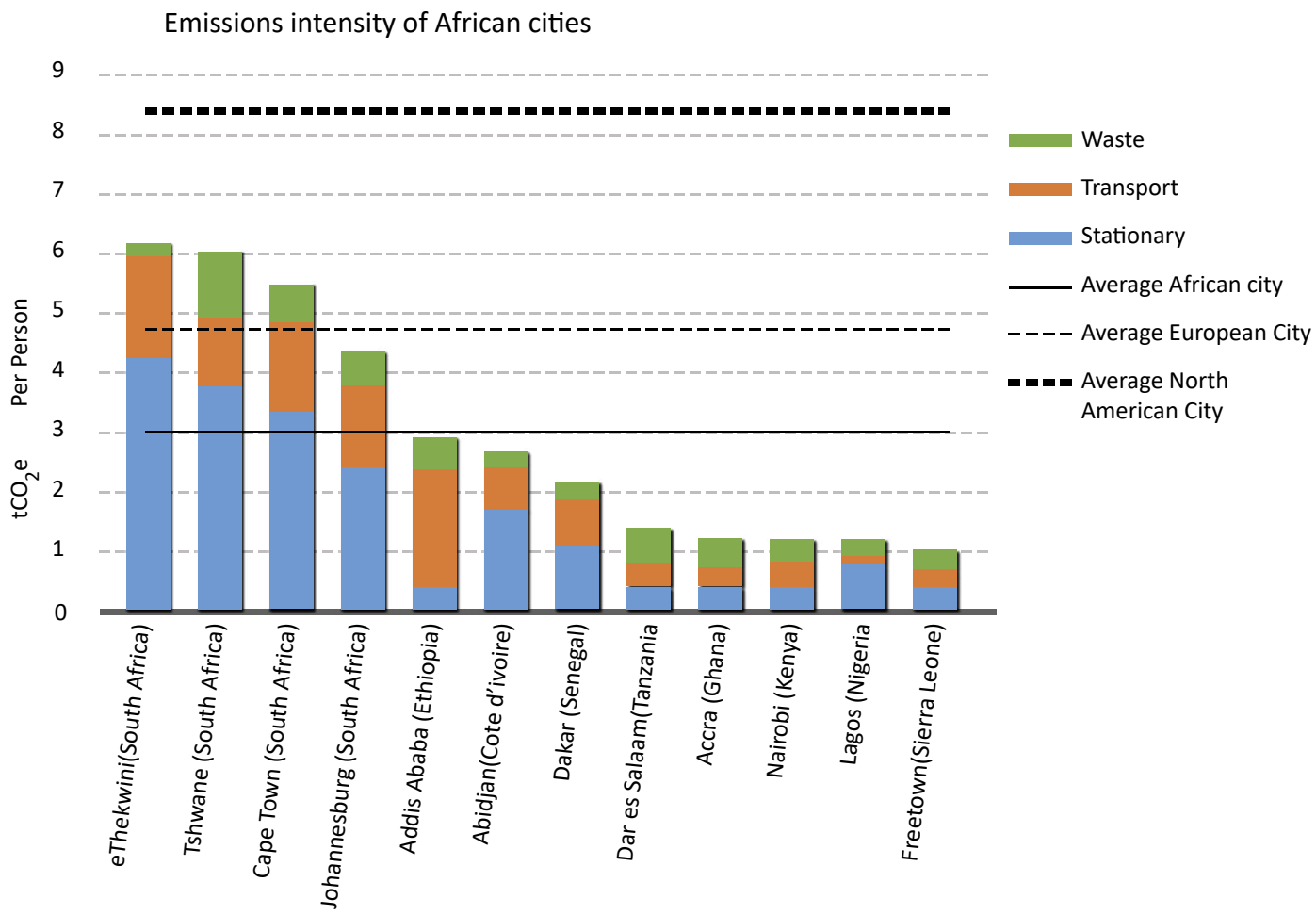


Figure 15: Emissions intensity comparison across African cities

Tanzania's Second National Communication to the UNFCC contains inventory data for 2000. More recent data for 2014 is provided by the World Resources Institute Climate Analysis Indicators Tool. Land Use, Land-Use Change and Forestry (LULUCF) was the highest-emitting sector, contributing 72.7% of the total GHG emissions, followed by agriculture at 17.3%, energy at 7.8%, waste at 1.6% and Industrial Process and Product Use (IPPU) at 0.6%, as presented in Figure 16.

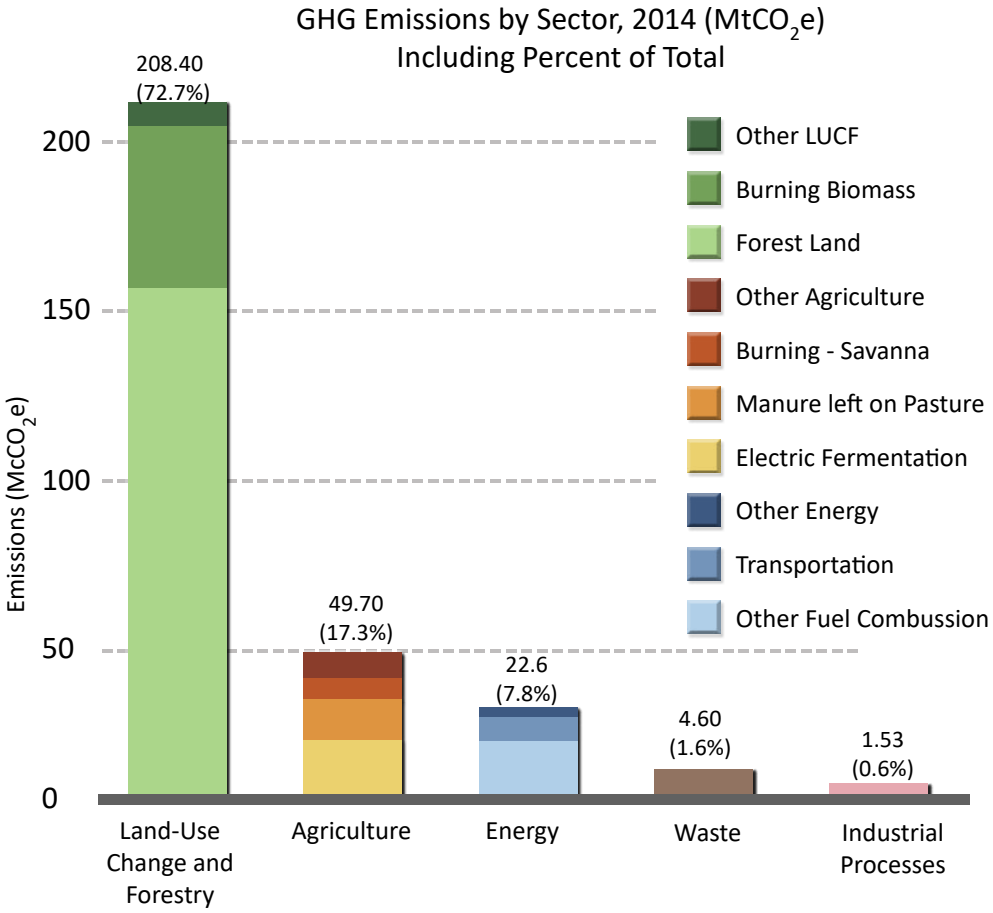


Figure 16: Greenhouse gas emission by sector in Tanzania (2014)

Dar es Salaam's BASIC inventory does not include emissions from agriculture, forestry and land-use change or industrial processes. Therefore, a direct comparison can only be made on the energy and waste sectors. The national inventory does not include biogenic emissions within the energy sector, therefore only non-biogenic emissions from Dar es Salaam's stationary energy and transport sectors were compared with the national energy-related emissions. When comparing combined stationary energy and transport emissions, Dar es Salaam accounts for 22% of the national total (Figure 17). Most of the country's waste generation occurs in Dar es Salaam, which is why Dar es Salaam accounts for 70% of national waste emissions.

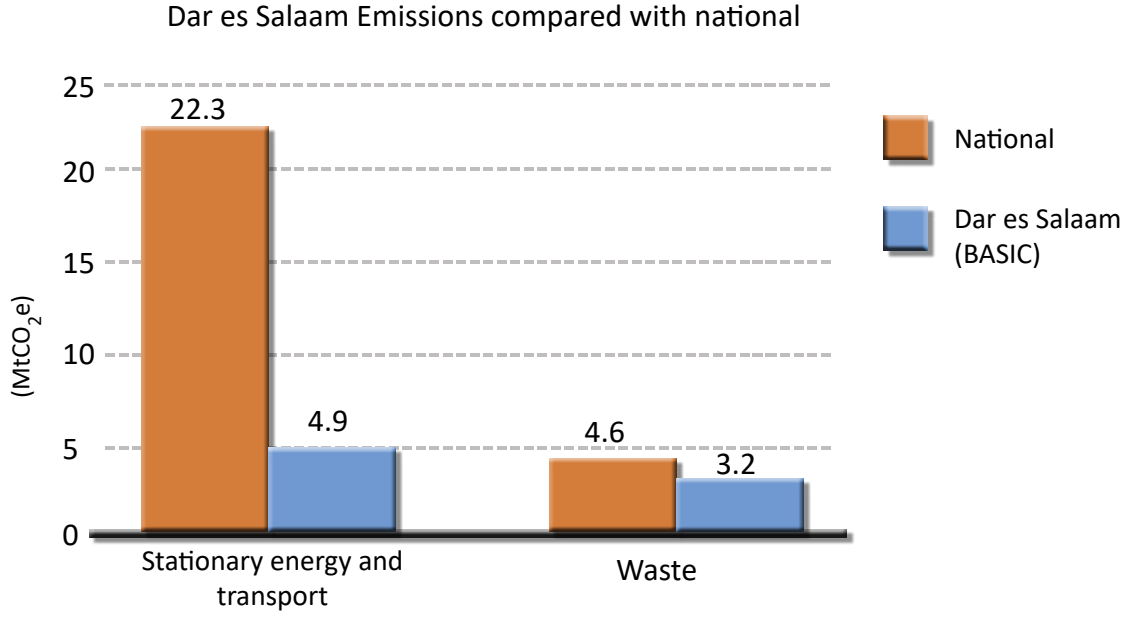


Figure 17: Comparison of national emissions with emissions from Dar es Salaam

3.2 Projecting emissions and setting reduction targets to 2050

3.2.1 Business as usual scenario

Economic and population growth rates were applied to the 2016 baseline inventory in the Pathways Scenario Planning Tool to create a Business as Usual (BAU) emissions projection until 2050. BAU represents a theoretical benchmark of the future if no climate action was taken, where emissions more than triple – increasing 293% by 2050 (Figure 18).

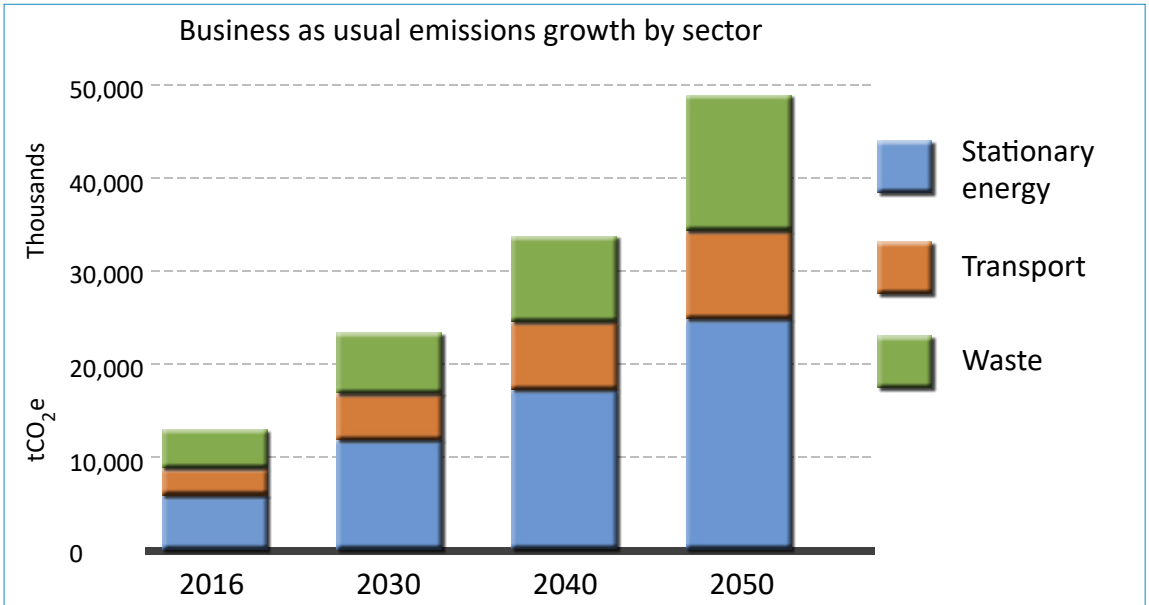


Figure 18: Business as Usual emissions scenario for Dar es Salaam

Similar to the city's inventory, it was decided to include biogenic emissions within the futures modelling due to its importance in the city's context. As such, the Pathways tool then allows for the full emissions impact analysis of a shift from biofuels, for example, a switch from charcoal for cooking to a transition fuel such as LPG.

3.2.2 Climate action scenarios

To explore the actions needed to reduce emissions in line with the Paris Agreement, several climate action emissions scenarios were generated. These were informed by stakeholder consultation with City departments, as well as national and local policies and plans. For the CAP, the two most important scenarios are:

Ambitious Action Scenario (unconditional):

This scenario represents ambitious yet achievable action. It is based on strategies and actions that the city is already planning to undertake but with more ambitious assumptions of the level of implementation, for example, or new strategies and actions that are deemed feasible. Ideally, ambitious actions should enable the city to achieve the 'Deadline 2020' commitment of a 30% reduction in emissions by 2030 and significantly shift emissions towards the goal of net-zero by 2050.

Extended Action Scenario (conditional):

This scenario has been developed to show the impact on emissions if even further action is taken and how the 'Deadline 2020' targets could be met or exceeded. This scenario assumes that the city has addressed the implementation barriers that prevent more ambitious levels of action in the Ambitious Action Scenario. This scenario was developed because the Ambitious Action scenario for Dar es Salaam does not quite deliver the reductions necessary to achieve the 'Deadline 2020' commitment.

Emissions reductions in both scenarios are framed as a percentage reduction from BAU. Table 3 outlines BAU emissions, as well as the emissions and the emissions reduction potential of the two climate action scenarios.
Emissions reductions achievable under the Ambitious Actions Scenario will be Dar es Salaam's 'unconditional' commitments, whilst those of the Extended Scenario represents 'conditional' targets.

Dar es Salaam is committed to supporting the goals of the Paris Agreement and Deadline 2020 and recognises that this means achieving at least a 30% reduction in GHG emissions compared to the business-as-usual scenario by 2030, and working towards carbon neutrality net zero emissions by 2050.

Based on the Pathwaysis analysis, Dar es Salaam unconditionally commits to achieving the targets identified in the Ambitious Action scenario, of a 29% reduction by 2030 and a 65% reduction by 2050 compared to the business-as-usual scenario.

Achieving more ambitious reductions will be conditional upon receiving support. The Extended scenario shows that Dar es Salaam could potentially achieve a 43% reduction by 2030 and 87% by 2050. These represent Dar es Salaam's conditional targets.

Table 3: Dar es Salaam BAU scenario and mitigation targets

	2016	2030	2040	
Emissions by scenario (tCO_2e)				
BAU	11,750,933	21,901,134	32,275,330	46,147,359
Ambitious	11,750,933	15,824,247	17,446,894	15,976,763
Extended	11,750,933	12,739,340	10,327,057	4,651,472
Emissions reduction compared with BAU				
Ambitious	N/A	-28%	-46%	-65%
Extended	N/A	-42%	-68%	-90%

A graphic representation of these scenarios is shown in Figure 19, alongside the emissions reduction that needs to be achieved (represented by the grey area) to show adequate progress towards achieving an emissions reduction pathway in alignment with the Paris Agreement, which aims to keep global warming below 1.5°C.

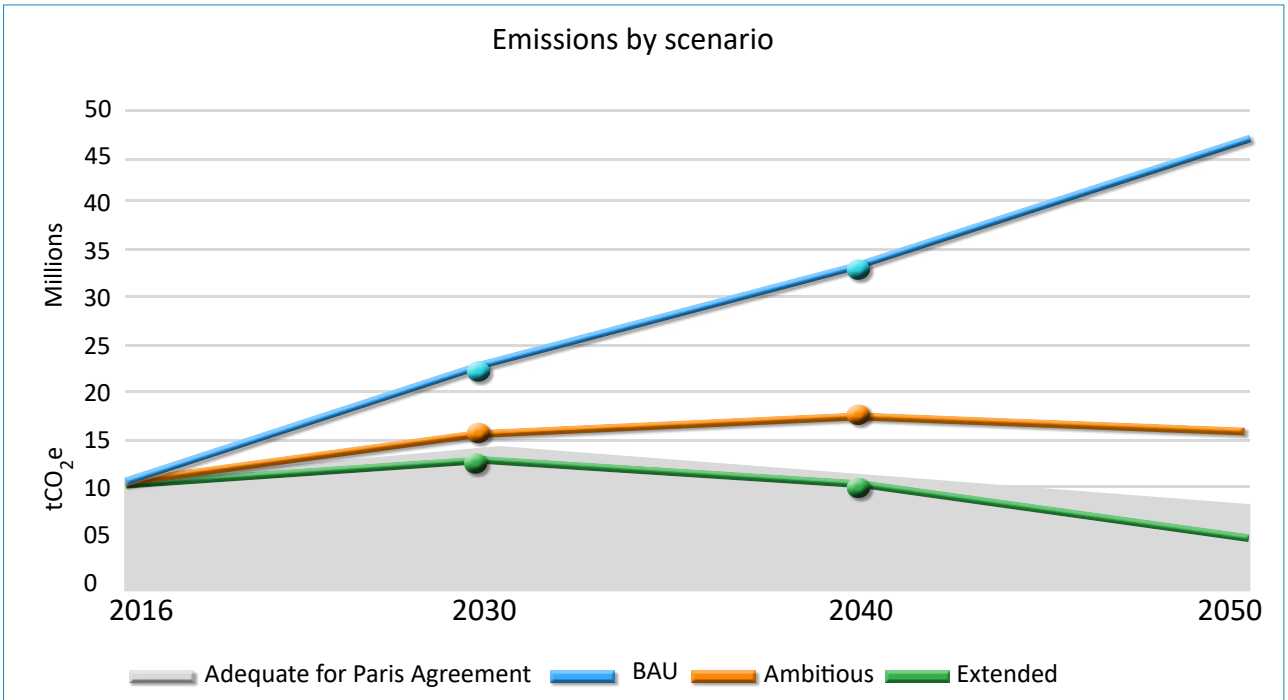


Figure 19: Dar es Salaam emissions by scenario compared with Paris Agreement compatibility

Substantive barriers will need to be addressed in order to meet the trajectory of an Extended Scenario. These barriers include:

Table 4: Summary of barriers to climate actions

Barrier description	Example(s)
High capital cost	• Upgraded wastewater treatment plants and related connection costs • Landfill gas capture infrastructure • Electric vehicle cost and charging infrastructure cost • The renewable grid will require storage
Uneconomical	• Replacement of functional equipment that has not reached the end of life
Higher operational costs	• Electric equipment in industry run at a higher cost than conventional fossil fuel equipment in some cases • Recycling and composting have a higher operational cost than landfilling
Not in the City's control	• Shift to EV will require a ban on conventional vehicles, which is in national control • Grid decarbonisation is in national control • Much of the bus fleet is in private hands • Shift to electrification will require grid strengthening / upgrade
Difficult to service / convert rapidly growing population and informal areas	• Need to link communities to modern wastewater treatment, electricity grid, etc • Informal housing roofs not structurally sound for solar water heater
No legislative and financial controls	• Required where a shift may not be economical, e.g. electrification of industry, shifting away from fossil fuels for cooking, etc.
Lack of expertise	• Required where a shift may not be economical, e.g. electrification of industry, shifting away from fossil fuels for cooking, etc.
Technology lock-in	• Investment previously focused on CNG vehicles, rather than electric vehicles
Behaviour and cultural preferences	• Cultural preferences in cooking fuels used • Range anxiety on electric vehicles
Lack of suitable sites	• Sites for recycling and composting • Sites for renewable power plants

3.2.3 Impactful climate actions

The actions with the highest potential for transformational emissions reduction are efficiency in new buildings; grid decarbonisation (through renewables); wastewater treatment expansion and improvement, including biogas capture; a shift from private to public or non-motorised transport; efficiency and fuel switching in informal households; electrification of transport (public and private); industrial efficiency; and landfill gas capture (Figure 20). The top 10 most impactful actions account for a combined emissions reduction potential of between 26 and 35 million tCO2e by 2030 (depending on the scenario). Achieving this emission reduction will require ambitious action across all sectors, and action by, or partnership with, national government and the private sector.

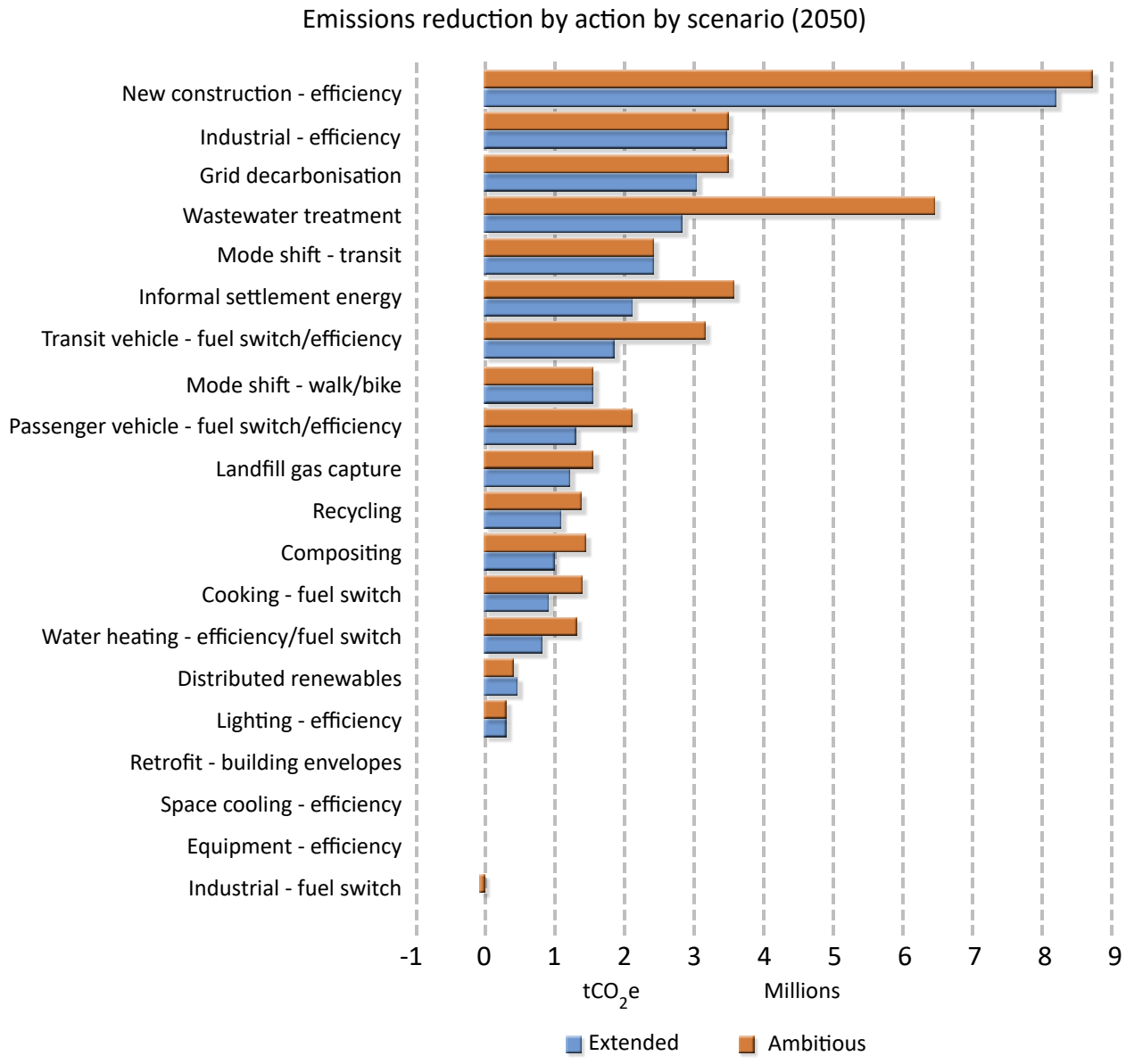


Figure 20: Estimated emissions reduction by action by scenario

Emissions reduction for industrial fuel switching in the extended scenario is negative (emissions increase), because the scenario includes a switching to the use of wood and wood waste and, as mentioned earlier, biogenic emissions from wood are included within the scenario modelling. If this biomass fuel can be sourced from sustainable forests, emissions will reduce for this action, rather than increase.

3.2.4 Targets to deliver the scenarios

Table 5 Example diagram of actions and city targets

Theme	Target	2030	2050
Promoting Clean and Secure Energy	% share of renewable energy in total primary energy consumption	75%	85%
	% of buildings with solar PV installed	10% residential and 2.5% commercial	40% residential and 10% commercial
	% of residential buildings that are renovated to high-efficiency standards	5%	15%
	% of total buildings that have upgraded their water heating to solar water heating systems	30%	70%
	% of total buildings equipped with energy-efficient appliances	5%	50%
	% of total buildings that have upgraded their lighting to LED	50%	100%
	% of equipment that is ultra-high efficiency	30%	58%
Ensuring Sustainable Resource Management	% of households using advanced/high efficiency cookstoves	30%	70%
	% of households using solar hot water	30%	60%
	% of new buildings that are equipped with advanced cooking technology	50%	100%
Promoting a Shift Towards Sustainable Transport Modes	% of trips taken by minibuses	53%	25%
	'% of trips taken by BRT	20%	40%
	% of trips taken by cycling	3%	8%
	% of trips taken by walking	17%	25%
Adopting Ultra-Low Emission Vehicles	% of bus fleet to electrifying	20%	80%
	% of bus fleet to CNG	5%	15%
	% of private vehicle electrifying	10%	50%
Delivering a Cleaner City	% of paper waste recycled	35%	80%
	% of plastic waste recycled	35%	80%
	% of food waste composted	35%	80%
	% of landfill gas captured	15%	45%
	% of wastewater treated with an advanced treatment technology (Activated sludge treatment and/or anaerobic digestion with biogas capture)	15%	50%

3.2.5 Residual emissions

In 2050, the remaining emissions for the Ambitious Action Scenario are primarily from stationary energy use, in particular the industrial and residential sectors, followed by emissions from wastewater treatment, solid waste disposal and on-road transport. The Extended Action Scenario decreases residual emissions substantially, with the remaining emissions largely within the solid waste sector, followed by fuels used in the residential sector and on-road transport. This analysis highlights opportunities for further ambitious action over time, as well as the impact of addressing the barriers of achieving the Extended Action Scenario.

The City is committed to tracking and monitoring emissions through updates to the GHG inventory on at least a 2-yearly basis. The city will also seek to identify opportunities over time to address residual emissions and support the transition of the city to carbon neutrality by 2050.

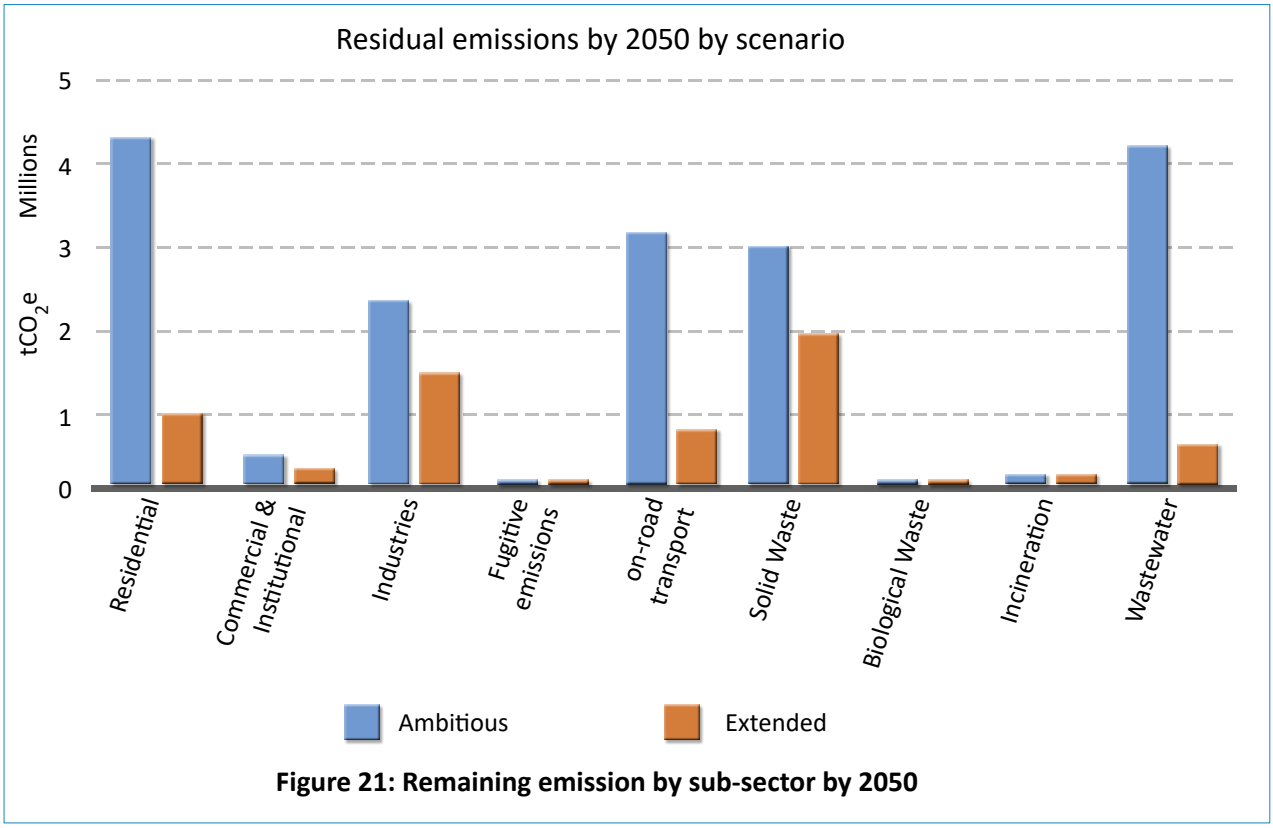


Figure 21: Remaining emission by sub-sector by 2050

3.3 Assessing climate risks

3.3.1 Climate hazard & impact assessment

Dar es Salaam is exposed to significant hazards due to its coastal geography and tropical wet-dry climate. There are also substantial vulnerabilities intrinsic to the population characteristics; approximately 70% live in unplanned settlements, largely occupying highly exposed areas, while continuing high population growth rates will see Dar es Salaam reach mega-city status by 2030 (above 10 million). This will put an increasing strain on public services, food security, infrastructure and natural resources, further exacerbated by the changing climate. The Rapid CRA conducted for Dar es Salaam, summarised below, outlines the associated hazards, impacts, risks and vulnerabilities.

The Rapid CRA conducted for Dar es Salaam is based on C40's Rapid CRA Module, developed as a tool to help cities assess their climate risks. The module outlines an approach to determine what impacts from climate hazards will affect the city, how to determine the relevance of impacts based on level of risk, and how to lead workshops with city stakeholders to create impact diagrams. It also contains tools that aid the identification and prioritisation of hazards and impacts and contextualise impacts to key sectors and communities.

It is important to note that the rapid CRA identified a significant adaptation deficit within the city; in respect of the severity of known and projected impacts, Dar es Salaam is largely unprepared for shocks and stresses caused by climate change. The combination of significant exposure to climate hazards and highly sensitive communities with a weak capacity for resilience has resulted in a strong risk of climate impact.

Prioritised Hazards

Four key climate hazards have been identified as drivers for prominent impacts within Dar es Salaam: floods & storms, heat, drought and sea-level rise. Although projections vary for future outcomes, globally, there have been visible trends towards rising mean temperatures, rising sea level, increasing flood events and increasing drought or drying periods.

Prioritised impacts were identified within the rapid CRA based on a determined level of risk (likelihood and disruptiveness of event) on a low-medium-high scale. Three impacts have been highlighted as having very high prioritisation:

1. Flash/river flood
2. Extreme temperature
3. Submergence

These are addressed in turn below.

Firstly, there is a unique threat of flash flooding within Dar es Salaam due to the position and activity of the Msimbazi River. The river valley runs through the city, such that 15% of its total area lies within the flood plain – some of which contains residential areas and infrastructural assets. Historical climate events have caused the river's slopes and banks to erode substantially, which has been compounded with an increase in extreme precipitation events, leading to regular flooding events of at least one per year in the past decade. Secondly, extreme heat events have been exacerbated by stronger warming trends for night-time average temperatures, which prevents daily cooling periods and exacerbates the Urban Heat Island (UHI) effect[2] , driven by urbanisation and industrialisation of the city.

Finally, sea-level rise threatens Dar es Salaam's coastal areas with permanent flooding and submergence. Not only will this increase the likelihood of flooding and the severity of its physical impact through damage and displacement, but this will also have significant consequence for the city's water resources. Residents have increasingly relied on ground water for potable water sources, increasing the incidences of borehole drilling. Sea level inundation and submergence will lead to salination of these ground water sources and impact food security and human health. Table 6 outlines all prioritised 'Medium' to 'Very High' risk hazards identified within the rapid CRA.

Hazard	Risk	Prioritisation
Flood & Storms	Flash flood	Very high
	River flood	High
	River-bank erosion	High
	Coastal erosion	High
	Extreme precipitation	Medium
Heat	Extreme temperature	Very high
	Extreme hot days	High
	Urban heat island	High
Drought	Increase of heat	High
	Water source depletion	High
	Damaged soil	High
	Wind erosion	Medium
	Drying wetland	Medium
Sea Level Rise	Submergence	Very high
	Coastal flooding	High
	Excessive beach erosion	High
	Salt-water intrusion	Medium

Table 6: Prioritised medium to high-risk hazards. Source: Dar es Salaam Rapid CRA, 2021.

[2]*This refers to the phenomenon whereby urban areas exhibit higher average temperatures than rural areas. It is due to a variety of factors, including but not limited to: (a) the prevalence of construction and road surface materials that absorb heat and release it slowly to the surroundings, (b) energy use in buildings, industry and transport resulting in waste heat, (c) built-up zones creating barriers to wind flow which would otherwise cool the area, and (d) fewer areas of plants, trees and waterbodies that provide natural cooling.*

Hazard Mapping

To aid an understanding of spatial and temporal displacement of hazards within Dar es Salaam, the Rapid CRA compiled the following hazard maps to demonstrate experienced and projected temperature change and flood risk (Figure 22). These figures show the potentially catastrophic consequences of climate change within the Dar es Salaam district. Figures 23a and 23b highlight the vulnerability of urban areas to flood risk, specifically key infrastructural assets exposed to flooding; the city acknowledges that there are also many low-income communities or unplanned settlements within high-risk zones, which is reflected in their existing initiative to relocate flood victims to Mabwepwande, led by the Kinondoni Municipal Council.

Figure 22: Average temperatures with baseline 1971-2000 projected for rcp8.5 and rcp4.5 to 2071-2100, and projected average temperature change.

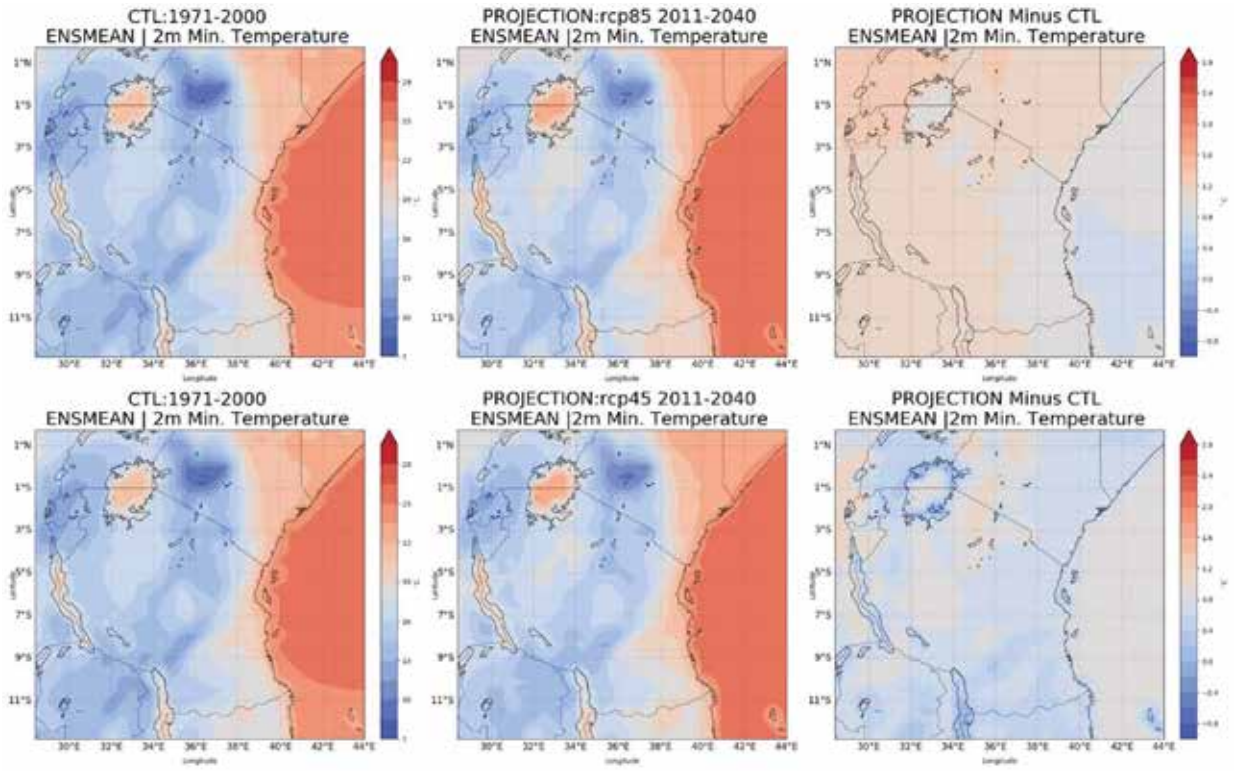
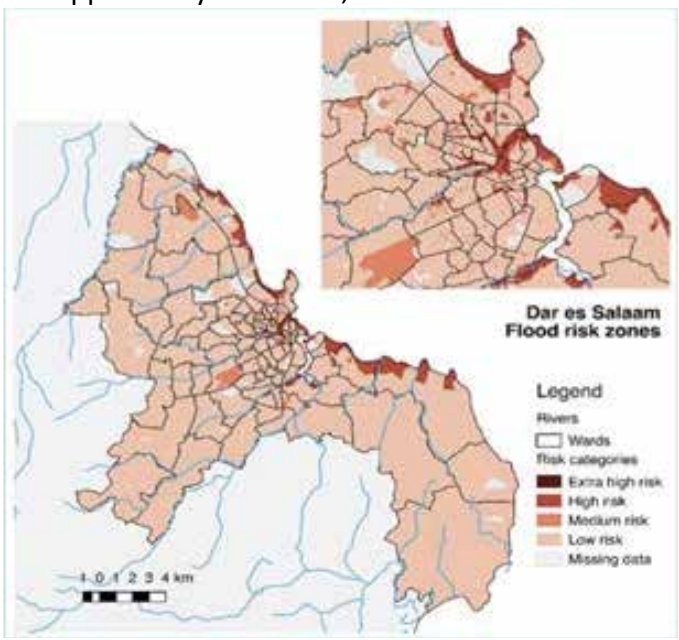
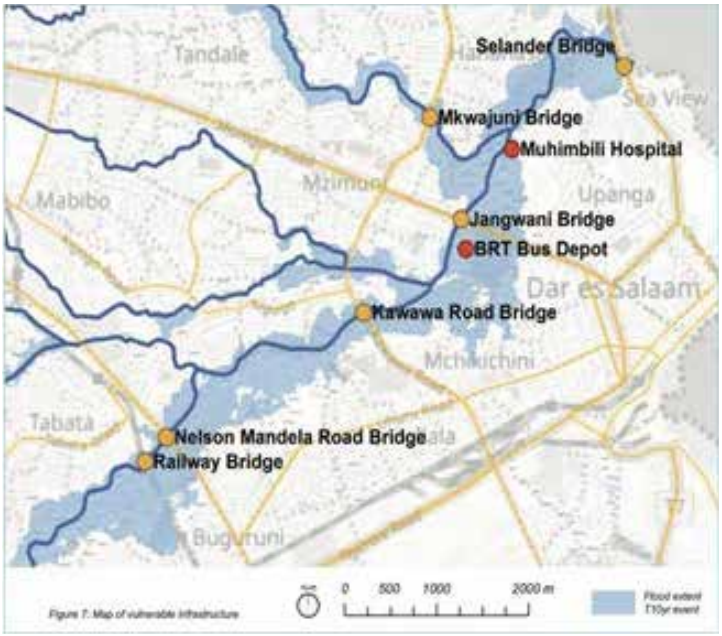


Figure 23: a) Flood risk zones in Dar es Salaam.

Source: World Bank, 2019. b) 10yr event flood impact on key infrastructure. Source: The Msimbazi Opportunity Volume A, 2019.





Prioritised Impacts and Vulnerabilities

The Rapid CRA has prioritised impacts by the threat to social, natural and economic capital, producing a list of ranked impacts from each climate hazard. Flood and storm have been highlighted as predominantly affecting economic and social capital. This is a consequence of the high exposure and the high sensitivity of the population. Hazards related to heat will impact a combination of social, natural and economic capital. The severity and frequency of extreme heat is intrinsically tied to climate variables, particularly temperature and precipitation. The coping strategies and behaviours to adapt to the impacts result in an increase in energy and water consumption due to the increase in cooling needs. Hazards associated with heat will also have severe consequences for ecosystem and human health, leading to a further increase in community sensitivity.

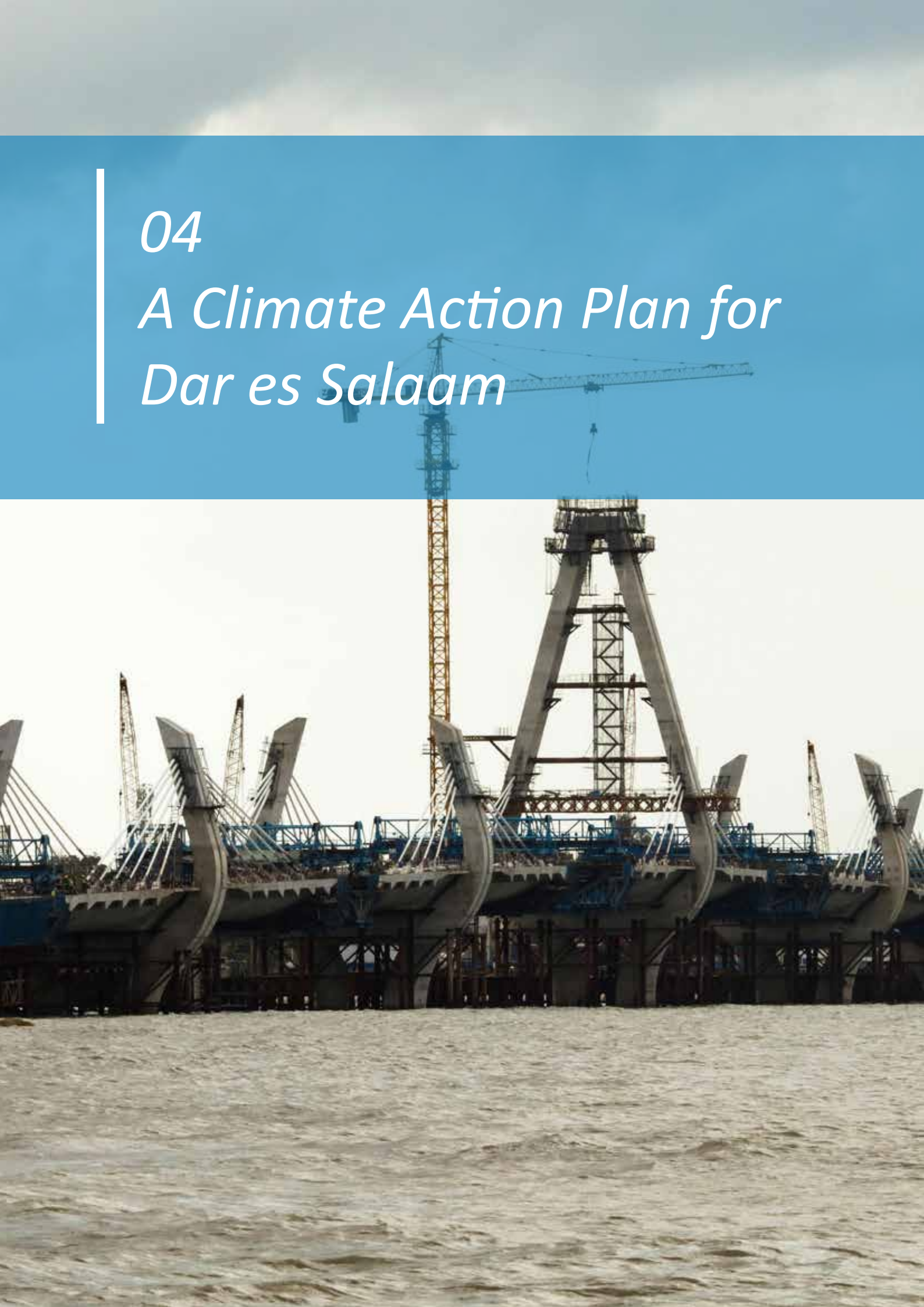
Similarly, drought will also severely impact natural and social capital. In combination with the impacts associated with heat, drought will reduce the amount of water accessible for sanitation needs, also decreasing air quality, leading to an overall increase in risk to health. While impacts such as degraded air quality and poor hygiene are considered a stress on human health, the city is also vulnerable to disease outbreak – an impact of climate change that Dar es Salaam has experienced increasingly during the 21st century. The final hazard, sea-level rise, is predominantly associated with physical, environmental and social damage. Destruction from storm surge and extreme events will be sustained by inundation and coastal encroachment. Although Dar es Salaam has erected a sea wall to mitigate the impact and protect coastal communities and infrastructure, further action is required to prevent damage, displacement and salination of water resources.

Table 7 contains all prioritised impacts aligned to hazard and impacted capital.

Hazard	Rank (high-low)	Impact	Capital Affected
Flood & Storms	1	Damage to infrastructure	Economic
	2	Damage to houses	Social
	3	Reduced GDP	Economic
	4	Water-borne disease	Social
	5	Displacement of people	Social
Heat	1	Extreme precipitation	Natural
	2	Increased energy consumption (increased budget)	Economic
	3	Increased domestic water consumption	Social/Natural
	4	Biodiversity loss	Natural
	5	Skin diseases	Social
Drought	1	Poor air quality	Natural
	2	Respiratory diseases	Social
	3	Poor sanitation and hygiene	Social
	4	Biodiversity loss	Natural
	5	Decreased GDP	Economic
Sea Level Rise	1	Damage of coastal infrastructure	Economic
	2	Displacement of people	Social
	3	Damage to coastal ecosystem	Natural
	4	Water shortage	Natural
	5	Land loss/decline	Natural

Table 7. CRA prioritised impacts from flood, heat, drought and sea-level rise, aligned to social, natural and economic capital. Source: Dar es Salaam Rapid CRA, 2021.

04
A Climate Action Plan for Dar es Salaam



4 A Climate Action Plan for Dar es Salaam

4.1 Themes and actions

The climate actions identified to support Dar es Salaam in achieving its climate goals have been structured around nine themes. The actions included in each are not exhaustive but incorporate the highest priority actions for both mitigation and adaptation. The themes aim to encompass both adaptation, mitigation and sustainable development priorities and are as follows:

Figure 24: Dar es Salaam's climate change themes

4.1.1 Action development and prioritisation process

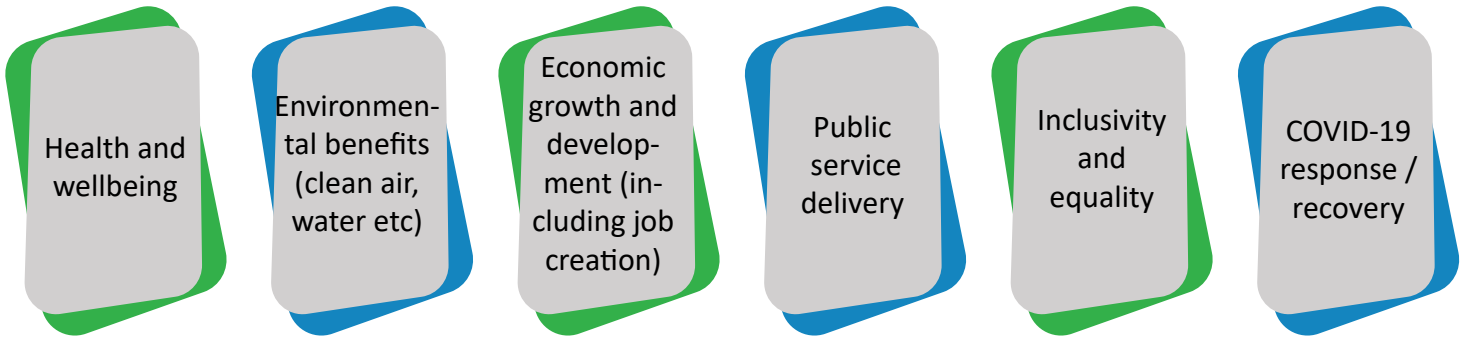
Dar es Salaam's climate actions have been identified through a series of discussions and workshops with key stakeholders and industry representatives, identifying a long list of actions before prioritising the actions the city intends to take forward in the next five years. The process is summarised below in Figure 25. Existing actions and policies were identified through a 'strategic appraisal', which was used to develop an initial long list of actions and initial mitigation scenarios for the city. These were explored in a 'scenario planning' workshop in October 2019, developing visions for the city and identifying additional potential mitigation actions. The Pathways model was also utilised to identify additional opportunities for the city to mitigate emissions, as well as stakeholder experience.

Figure 25: Mitigation action prioritisation process

The prioritization process utilized an assessment and scoring process, based on a series of questions, under three main elements:

Policy Alignment & Support:	Resources available (financial, technical, human):	Benefits:
The extent to which the action aligned with existing plans and policies in the city and nationally and the support from stakeholders and the community	The extent to which the necssary resources to implement the actions were or could be easily available	The extent to which the actions delivered additional benefits, including:

Benefits:



Stakeholders were consulted and submitted their scores both via online survey tools and in-person during the action prioritization workshop (October 2020). The highest scoring actions formed Dar es Salaam's short-list of priority actions which were further validated with key stakeholders. Actions were also prioritised on the basis of their emissions abatement potential. The final workshop on 'implementation planning' (February 2021) utilized stakeholder knowledge combined with previous scoring to distinguish between 'flagship actions' and supporting actions, identify key implementation steps via 'roadmaps', and detail potential pilot projects. Stakeholders also validated climate risks and hazards from the Rapid CRA.

Although similar, there was a separate prioritisation process for adaptation actions, using the Rapid CRA as the foundation. Within the Rapid CRA, climate impacts were assessed based on their likelihood and level of disruptiveness and subsequently given a rating of low-medium-high priority. Existing adaptation actions outlined in the Tanzania NCCS (2012)[3] were identified based on their ability to address the prioritised impacts and ultimately reduce vulnerability or increase resilience. Selecting actions that already exist within national strategies increases the robustness of the proposed adaptation action plan. The actions are contextual to existing mechanisms, decision-making structures, and tools available within Tanzania; this ultimately streamlines the implementation process. Figure 26 demonstrates the adaptation action prioritisation process.

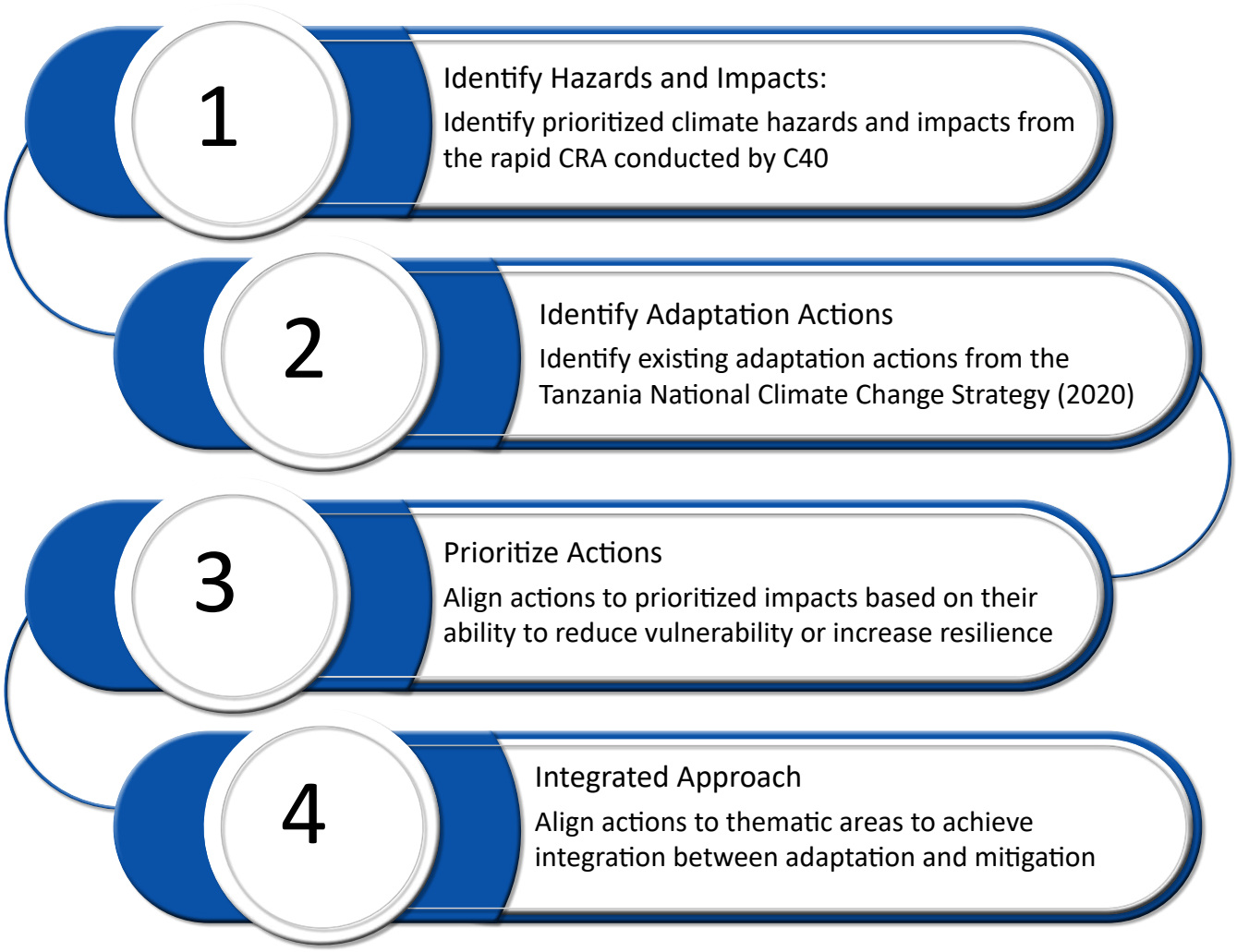


Figure 26: Adaptation action prioritisation process

[3] Note that the CAP was developed before the launch of the National Climate Change Response Strategy (NCCRS) 2021-2026. The actions contained in this CAP have been reviewed to ensure they still align to the priorities of the latest NCCRS as well as the City.

These actions are presented below, with additional technical details provided by the expert team from C40, Ricardo Energy & Environment and Sustainable Energy Africa. The CAP aims to mainstream the city's current plans and policies, thereby, each action has been developed by building on existing city policies, structures and initiatives.

Dar es Salaam recognizes the importance of adapting to climate change. The process undertaken here has highlighted the likely priority areas for action based on the city's Rapid CRA and national adaptation plans. However, at this stage, the city has not undertaken detailed action planning for adaptation in the city. This remains a significant area for work and will be addressed in further updates. The City takes responsibility for developing an implementation strategy based on its detailed action plan.

4.1.2 Action plan structure

Flagship Actions: the highest priority actions, delivering the maximum benefits and/or strongest alignment to existing priorities and plans. These received the highest stakeholder support and more detailed analysis. They 'anchor' each theme and are unconditional.

Supporting Actions: actions that support the delivery of the theme objective. They may be high scoring in terms of benefits or policy alignment but may be conditional upon further resources and support.

For each flagship action, a blueprint roadmap has been developed to illustrate the various mechanisms and elements required to implement each action effectively, including:

A	Climate strategy What climate strategy is the action responding to.
B	Type of action Whether the action is a stand-alone project, part of a larger programme or a policy initiative
C	Climate impact An estimation of the GHG emissions (CO_2e) reduction. These are based on the assumptions from the **Ambitious actions scenario.**
D	Lead agency The key organisation responsible for implementation
E	Collaborating agency(s) or stakeholder(s) Supporting organisations that may contribute to the implementation of the action
F	Resourcing plan (funding & financing) An outline of the expected funding routes for the action
G	Level of city control The extent to which Dar es Salaam City Council has the capacity to implement the action and oversee the operation
H	Alignment with policies & plans The extent to which the action aligns with existing plans and policies

I Co-benefits
The broader benefits for society and the environment that may be brought about through the implementation of the action

J Sub-actions
The interim steps required to achieve implementation of the action

To facilitate each priority action, supporting actions have also been proposed. Each supporting action is summarized, identifying the potential lead agency/agencies, time scale, co-benefits etc.

4.1.3 CAP principles

As well as the Themes above and Actions detailed below, the CAP also advocates a set of cross-cutting principles in delivering the goals that are foundational to all the actions prioritised. These include:

1. Ensuring all actions, plans, policies and investments consider climate risks and vulnerabilities and avoid maladaptation
2. Ensuring that climate actions are inclusive, and the benefits are equitably distributed
3. Ensuring that co-benefits of climate actions are maximised and negative impacts are avoided

4.2 Action details

4.2.1 Promoting Clean and Secure Energy

The energy sector in Tanzania contributes about 6% of the total GHG emissions . Tanzania's electricity generation in 2019 was derived mostly from natural gas (48%), followed by hydropower (31%), petrol (18%), solar photovoltaics (1%), and biofuels (1%). Tanzania Electric Supply Company Limited (TANESCO) is the state public utility provider under the Ministry of Energy and Minerals. Approximately 59% of total capacity is supplied by TANESCO, while Independent Power Producers (IPPs) and Emergency Power Producers (EPPs) provide 26% and 13%, respectively, which they sell wholesale to TANESCO. Also, Small Power Producers (SPPs) account for 2% of total capacity. Although the power sector of Tanzania has generally been dominated by hydropower, poor rainfall since 2000 has resulted in a shortage of water to generate electricity, which has often resulted in power supply shortages.

Tanzania is committed to building resilient energy infrastructure through various means, including diversifying the country's energy mix. In addition to addressing power shortages, this would also help decrease GHG emissions from the power sector. On a national level, the aim is to increase the use of renewable energy through sources such as, geothermal, solar, hydro, and wind turbines. The city has already undertaken several actions to initiate implementation at a local scale, such as encouraging the uptake of small-scale renewables, promoting energy-efficient technologies for supply and transmission, and developing capacity within the private sector to encourage Private Public Partnerships (PPPs) to attract investment towards renewables.

54% of the city's total BASIC GHG emissions originated from stationary energy. Of this, nearly half is from energy use in residential buildings, from electricity, fossil fuels (charcoal, LPG, kerosene, diesel and other liquid fuels) and biomass (wood, agricultural by-products, dung, etc). Transformational actions in this sector will be key in reaching ambitious targets and will also deliver a range of social and environmental co-benefits.

One of the key challenges will be to expand access to power infrastructure while also ensuring that it is sustainable, resilient and affordable. Domestic use of electric power is almost exclusively concentrated in urban areas. At present, total national electricity access is just 36%, but the Government plans to increase electricity access to 75% by 2025. To ensure that the population has better access to electricity, while simultaneously limiting demand on power infrastructure, -national level policies aim to improve energy efficiency in buildings and industry.

Existing Policies and Plans

NDC: Prioritises investment in energy diversification to ensure overall energy security for social and economic development, and promotion of clean technologies for power generation and diverse renewable sources such as geothermal, wind, solar and bioenergy.

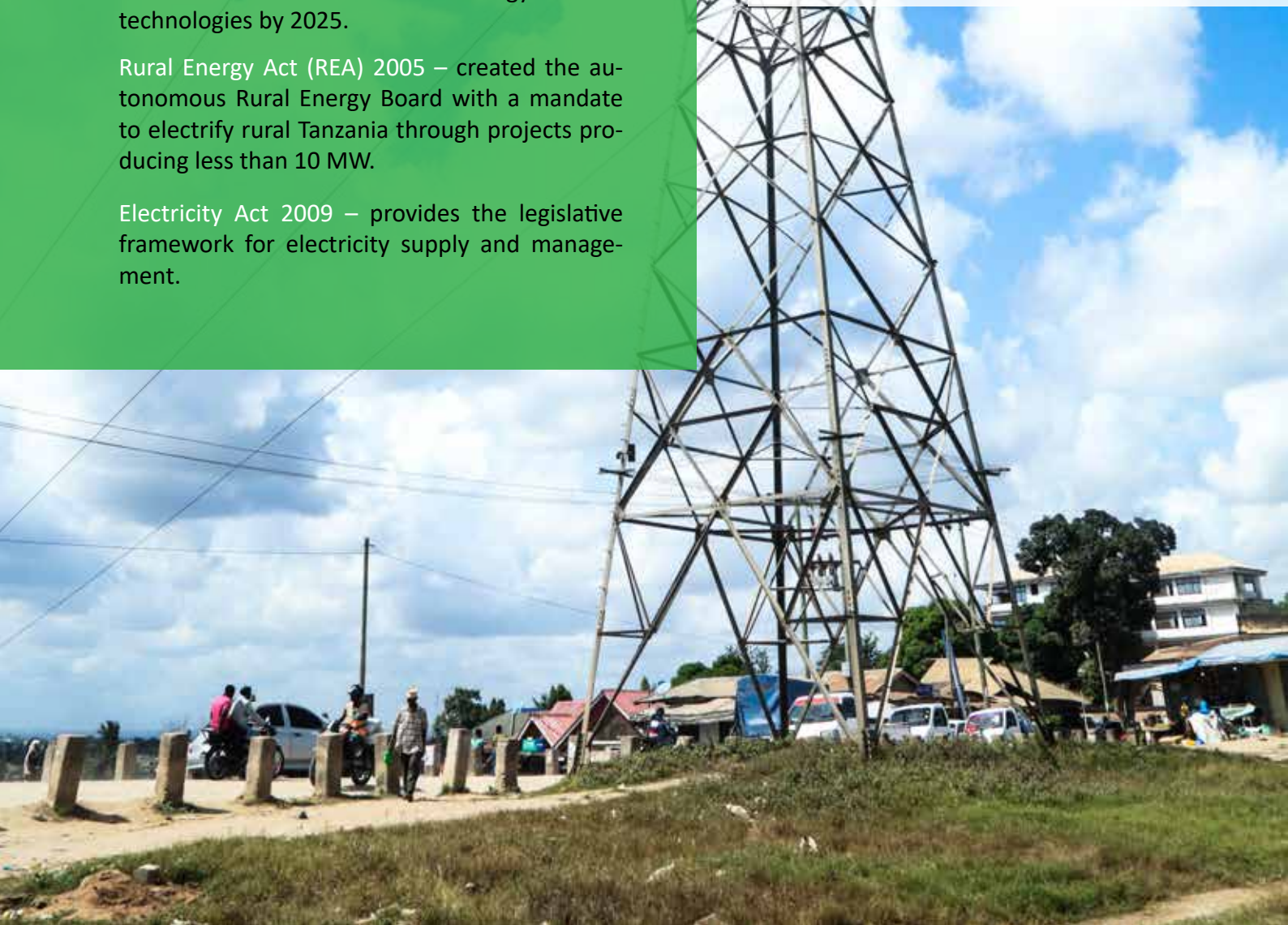
NCCRS – targeting At least 3 clean, reliable and accessible energy sources by 2025; at least 1000 MW power generated from Renewable energy sources by 2026; increased electrification; and the national energy budget increased by 25% for enhanced renewable energy and energy efficiency technologies.

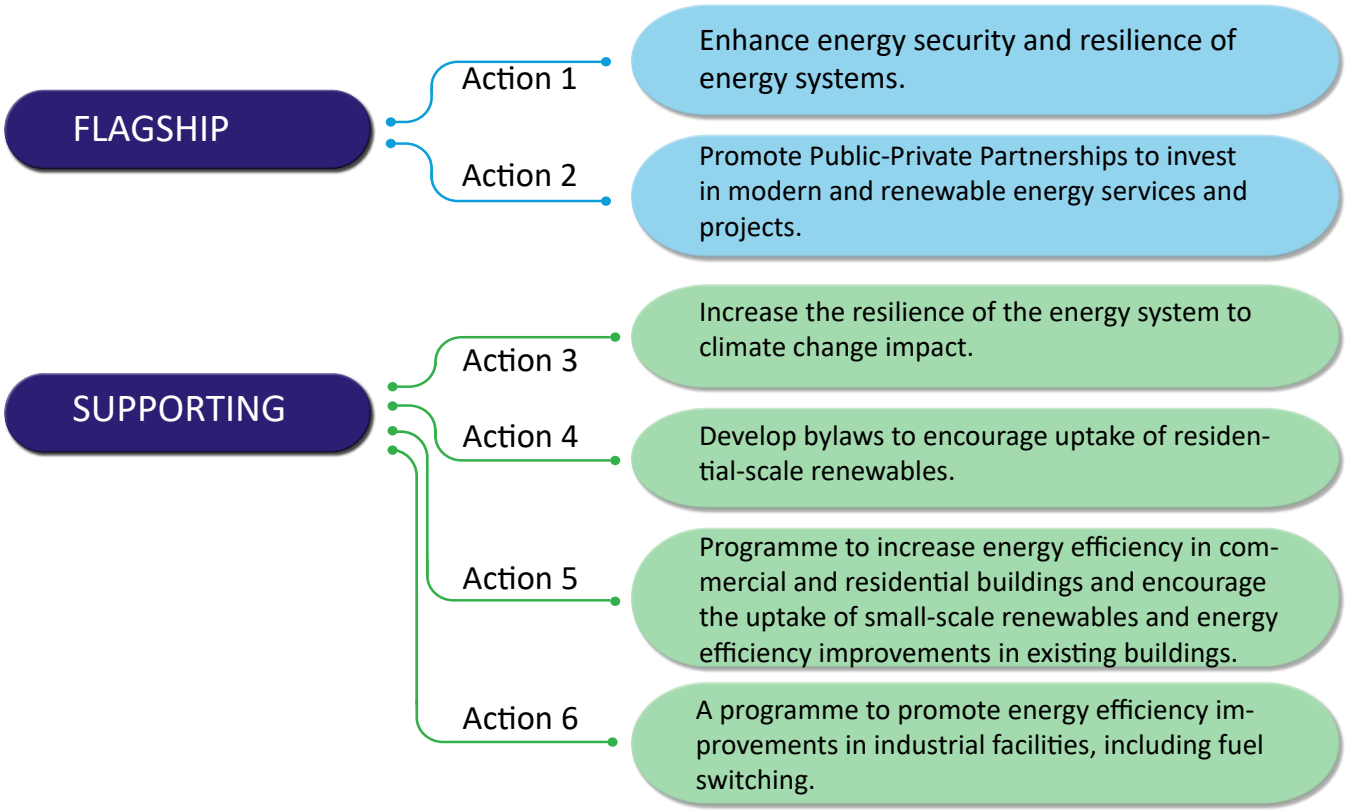
National Energy Policy (NEP) 2015 – aims to invest in energy diversification to ensure overall energy security with objectives to enhance the diversification of affordable energy sources by 2025 and increase the use of energy-efficient technologies by 2025.

Rural Energy Act (REA) 2005 – created the autonomous Rural Energy Board with a mandate to electrify rural Tanzania through projects producing less than 10 MW.

Electricity Act 2009 – provides the legislative framework for electricity supply and management.

Assets and infrastructure are also exposed to flooding, extreme weather, sea-level rise and submergence, while other hazards such as extreme heat and drought will increase strain on energy demands for cooling systems. Through the process of energy diversification, the city must consider the exposure of new and existing assets. Changing climate variables will affect output levels of solar, wind and hydro technology, while extreme events threaten critical infrastructure. To achieve resilience within energy systems, climate impacts must be considered in design and development.





Flagship actions

Action 1: Enhance energy security and resilience of energy systems. This action will be achieved by reducing dependence on unsustainable energy resources through promoting renewable energy in the city.

This action incorporates two key elements

1. Development of the Nyerere hydropower plant by the national government will result in a greater share of renewable energy in the national electricity grid.

In 2018, the government approved plans to develop a 2,115 MW new hydropower plant to span the Rufiji River, around 130 miles southwest of Dar es Salaam. Construction began in 2019 and is expected to finish in 2022. The Nyerere hydropower plant will play a major role in reducing Dar es Salaam's dependency on fossil fuel consumption such as coal through the greater provision of low carbon electricity. The Nyerere hydropower plant has a strong political commitment and is aligned with the current policy. The action is expected to have benefits for human health and air quality, with a reduction in the use of solid fuels. The project is also expected to offer economic benefits.

Important considerations in the development of the Nyerere hydropower plant include:

- Acknowledging the sensitivity of hydropower to climate change. Fluctuations in precipitation across the catchment area will affect hydropower productivity, and heat and drought hazards will cause stress on water and sanitation infrastructure. This may therefore decrease the energy security of Dar es Salaam.

- The city must prepare for the adverse effects of development on regional ecosystems, ecosystem services and the strength of Dar es Salaam's natural capital. For instance, degradation of environmental health, soil quality, soil stability, water quality and biodiversity that will increase the sensitivity of ecosystems to changes in climate variables, and therefore increase vulnerability.

2. Development of local renewable energy within the city of Dar es Salaam.

While the hydropower plant will increase the contribution of renewable electricity to the national grid, additional widespread renewable energy uptake is necessary to meet the ambitious decarbonisation targets that have been set. This action is aimed at encouraging such uptake within the city of Dar es Salaam.

Action 3 also reiterates the need to build resilience within energy systems and to acknowledge the risks they face from climate impacts.

A

Climate strategy
Renewable Energy

B

Type of Action
Project

C

Climate impact
Decarbonizing the grid + distributed renewable generation =

- 1.6 Mt CO2e reduction per year by 2030
- 3.6 Mt by 2050 under the ambitious scenario.
- 24% of the city's unconditional reduction target in 2030

City target: 34% of all electricity renewable by 2020 and 75% by 2030
Maladaptation:
Potential to increase sensitivity of the energy sector, natural capital and communities to climate change, ultimately increasing vulnerability and decreasing long term resilience, exacerbating energy insecurity

D

Lead agency
TANESCO

E

Collaborating agency(s) or stakeholder(s)
Ministry of Energy, Dar es Salaam City Council, Municipalities in Dar es Salaam

F

Level of city control
Central Government have the capacity to allocate funding to this project and to coordinate with PPPs (TANESCO)

G

Alignment with Policies & Plans

- Tanzania Nationally Determined Contribution
- National Climate Change Strategy (NCCS) (2012)
- Tanzania Energy Policy (2015)

H

Co-benefit

- Community benefits (e.g. expanding access to electricity while guarding against price hikes in fossil fuels, increased comfort)
- Environmental (e.g. improved air quality from reduced use of diesel, kerosene and other fuels; use of energy-efficient technologies resulting in lower energy demands than would otherwise occur)

I

Sub-actions

As implementation of the Nyerere hydropower plant is nationally led, these sub-actions focus on the city

1.1 Increase utilization of solar energy on public buildings

1.2 Identify opportunities (projects etc.) to develop and harness energy from wind and wave power around the city

1.3 Establish policy for charcoal production and use (see also action 7) to incentivise and shift households to using renewable energy

1.4 Diversify and improve technology for charcoal production and use

Action 2: Promote Public Private Partnerships to invest in modern and renewable energy services and projects.

This action will promote the uptake of small-scale renewables through the establishment of a package of strategies and policies to create a positive economic and investment environment in support of PPPs for renewable energy development. Private investment and expertise, including infrastructure finance through public-private partnership (PPP) models, is essential for the delivery of climate-smart infrastructure. Given the massive capital requirement, promotion and support of PPPs can support renewable technologies in Dar es Salaam and across the wider region. This action will work in conjunction with improving and streamlining the planning and permitting process for renewable energy technologies and energy efficiency measures. This action aligns with current city and national policy to promote smaller-scale renewable energy investment and is expected to receive political and social support. The city has the in-house capacity to implement this action. However, there may be a requirement for further capacity building as the projects become more common. The action is expected to have benefits for both local businesses and local communities, with increased opportunities and availability of renewably generated electricity and technologies.

A

Climate strategy

Renewable Energy

Type of Action

Project

B

C

Climate impact

City target to increase the proportion of grid electricity generated from renewable sources, (e.g. solar, wind, waste and hydro etc.) to a minimum of 85% in the city by 2050. 40% of residential and 10% of commercial buildings to have distributed renewables by 2050.

Distributed renewables =

- 138 kt CO2e reductions per year by 2030
- 550 kt by 2050.

D

Lead agency

TPDC & Private sectors

E

Collaborating agency(s) or stakeholder(s)

Dar es Salaam City Council Government

F

Resourcing plan (funding & financing)

Federal and City Government loans/grants in collaborations with PPP

G

Level of city control

City-level control for decentralized renewable energy and a city council partnership on grid expansion and stability.

H

Alignment with Policies & Plans

Tanzania Nationally Determined Contribution

National Climate Change Strategy (NCCS) 2012

Tanzania Energy Policy (2015)

I

Co-benefit

- Economic (e.g. extra power can be exported, providing a potential revenue stream for households)
- Environment (e.g. indoor and outdoor air quality improvements from reduced combustion of fossil fuels; reduced noise pollution from generators)
- Social and inclusivity (e.g. increased electrical access ensuring greater equality of opportunity for access to education, more free time for women)
- Energy security (reduced levels of crime, safer communities as streetlights in use)

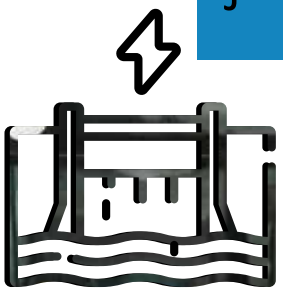
J

Sub-actions

2.1 Identify specific PPP needs and opportunities in the city through consultation and engagement (e.g. locations, technologies, services) such as renewable energy, streetlighting etc.

2.2 Review current legislative/regulatory frameworks

2.3 Identify support needs to develop and implement a tender process for priority PPPs



Supporting Actions

Supporting Action	Brief Description	Alignment with Policies/National Objective	Climate Impact	Lead Agency	Co-benefits
3. Increase the resilience of the energy system to climate change impact	Improve the adaptive capacity of energy infrastructure by building resilience into design and development or through retro-fitting, which will ensure energy security in the face of climate impacts.	Tanzania NCCS (2012) **National Objective:** Energy To develop a less carbon-intensive and climate change-resilience energy infrastructure and grow using low carbon path	Contributes to carbon mitigation by strengthening low-carbon energy systems	Ministry of Energy	Energy security Economic benefits (e.g. prevents damage to infrastructure resulting in GDP loss)
4. Develop bylaws to encourage uptake of residential-scale renewables	Improve the residential housing sector in Dar es Salaam by: developing finance mechanisms and subsidies to support the uptake of small-scale renewables; introduce new building standards, which set requirements for energy efficiency and renewables; implement a bylaw requiring old buildings to be retrofitted with energy efficiency measures.	Tanzania NDC, NCCS 2012 National Five-Year Development Plan of 2016/17-2020/2021	Distributed renewables = 138 kt CO2e reductions per year by 2030 and 550 kt by 2050.	Ministry of Energy	Community benefits (e.g. greater thermal comfort, lower bills, improved reliability of power and lighting Economic benefits (e.g. lower bills, new employment and industrial opportunities) Environmental benefits (e.g. improved indoor air quality from fuel switching)
5. A programme to increase energy efficiency in commercial and residential buildings.	Improve the residential and commercial sector in Dar es Salaam by: developing finance mechanisms and subsidies to support the uptake of energy efficient technology. This may be enforced by implementing a bylaw requiring old buildings to be retrofitted with energy efficiency measures and new buildings to declare energy ratings which must be above a certain efficiency rating to pass to the development phase within the city.	National Five-Year Development Plan of 2016/17-2020/2021	Up to 35% of the city's projected emissions reductions from building energy improvements by 2030 (2.3 Mt CO2e) and 40% by 2050	DCC	Community benefits (e.g. greater thermal comfort, lower bills, improved reliability of power and lighting Economic benefits (e.g. lower bills
6. A programme to promote energy efficiency improvements in industrial facilities, including fuel switching.	Improve the energy efficiency of industrial facilities operating in Dar es Salaam by establishing a team of officers to conduct energy audits, which will help identify areas of improvement	Tanzania NDC NCCS 2012, NCCRS 2021,	Industrial energy efficiency and fuel switching = 437 kt CO2e reduction per year by 2030 and 1.7 Mt per year by 2050	DCC	Technological shift (e.g. promoting renewables and efficiency in larger industries helps to drive local knowledge and demand, awareness of technologies, and creating a local market) Environmental (e.g. air quality benefits from reduced fossil fuel combustion and more efficient/cleaner technology) Economic benefits (e.g. job creation from new installations/upgrades; new market opportunities; cost savings from industries)

4.2.2 Ensuring Sustainable Resource Management

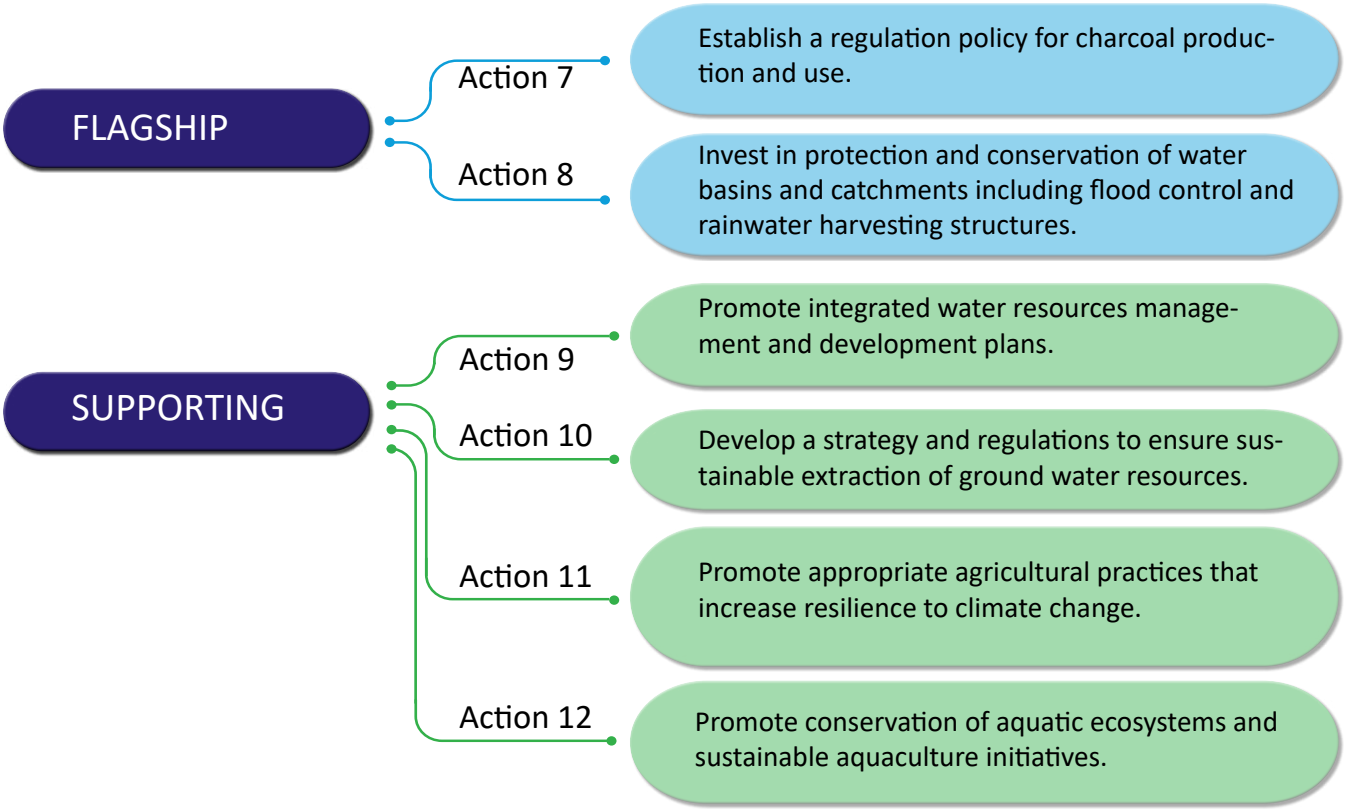
Sustainable resource management is a key focus area for Dar es Salaam City Council and is an important national objective. The city aims to manage resources in a sustainable manner that avoids exploitation or depletion. This includes using natural resources for fuel (such as charcoal and wood), water, land, and terrestrial and aquatic ecosystems. This requires the city to shift towards the use of more renewable sources of energy and more sustainable management and protection of natural resources.

Wood energy demand accounts for approximately 90% of Tanzania's overall energy supply, and almost 90% of that demand comes from the household sector. Charcoal (popularly known as 'mkaa' in Kiswahili) is one of the country's main economic sectors. Forests are the main source of biomass-based fuels, and increasing use and preference for using charcoal has been a major driver of deforestation. More than 88% of households in Dar es Salaam are using charcoal, and the city consumes approximately half of Tanzania's annual charcoal supply. Charcoal demand has nearly doubled over the past ten years due to high urbanisation and high (perceived) prices of other cooking fuels like LPG or electricity. In addition, the government of Tanzania and Dar es Salaam City Council have recently emphasised the health impacts of indoor air pollution from using biomass for cooking. Carbon monoxide (CO) and particulate matter (PM) produced from traditional cooking practices can result in serious respiratory illnesses, specifically among women and children.

High rates of urban poverty within Dar es Salaam have led to a sprawl of poor and unplanned settlements with low levels of infrastructure, access to services, and low economic capacity. As a result, other natural resources have also been impacted in the city and require more sustainable management. Ground water levels have been depleted through unregulated borehole activity, lowering the water table and exacerbating the sensitivity of ground water resources to heat and drought. Flooding events cause pollution of water resources and erode natural permeable surfaces, and with an increase of drought periods or extreme heat days, depletes the volume of potable water. Cascading impacts of polluted ground water include degraded soil quality, decreased water availability and reduced nutrient content, affecting agriculture, food insecurity, livelihoods and human health. Soil quality is also a determinant of soil stability – a key variable of structural integrity for housing, building and infrastructure development. A changing climate will further exacerbate resource depletion. Therefore, sustainable management of resources, conservation of natural capital, and promotion of regenerative practices are therefore considered a high priority for the city.

Existing Polices and Plans

- **NDC implementation plan:** Reducing the consumption of charcoal in urban and rural areas by promoting affordable alternative energy sources through a regulation policy for charcoal production and use. Multiple priorities under adaptation actions that support sustainable and climate resilient resource management.
- **NCCRS:** Targets a reduction in Biomass consumption of 10% from the current consumption in the energy mix by 2025, by promoting affordable alternative energy sources, and deliver a national biomass legal framework by 2026. Also targets at least 50% of the community practicing climate smart agricultural land management by 2026.
- **Forest Act 2002:** Requires all-natural forests to be well protected and managed with approved management plans. In that context, no tree cutting should be allowed without legal permits.
- **Tanzania Vision 2025:** aims to effectively reverse current adverse trends in the loss and degradation of environmental resources (such as forests, fisheries, fresh water, climate, soils, biodiversity) and in the accumulation of hazardous substances.



Flagship action

Action 7: Establish a regulation policy for charcoal production and use.

This action aims to reduce the consumption of charcoal by promoting alternative energy sources in place of charcoal consumption. This action is strongly supported by national policy. This action requires the implementation of new regulations and policies to manage charcoal in the city, including the sale, distribution and use. This action requires careful and effective engagement with local communities to increase awareness and effectively phase out the use of inefficient solid fuel stoves by promoting the uptake of alternatives, including electrification. This action can offer co-benefits in the form of reduced air pollution and associated human health impacts. However, given the lower cost of charcoal over other fuel sources, the city will need to ensure a combination of incentives and alternatives are available to manage the economic impacts on residents.

A

Climate strategy
Fuel switching

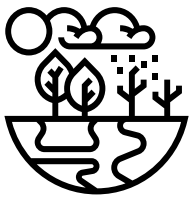
Type of Action
Policy / Programme

B

C

Climate impact
Fuel switching for cooking =

- 937 kt CO2e reduction per year by 2050



D

Lead agency
Ministry of Energy

E

Collaborating agency(s) or stakeholder(s)
Dar es Salaam City Council, Tanzania Forest Services, Rural Electrification Agency

F

Resourcing plan (funding & financing)
This action will require the support of the city authority but is nationally led.

G

Level of city control
City level control to enforce regulation policy with the endorsement from National Government

H

Alignment with Policies & Plans

- Tanzania Nationally Determined Contribution
- National Climate Change Strategy (NCCS) 2012, National Climate Change Response Strategy (NCCRS) 2021
- Tanzania Energy Policy (2015)

I

Co-benefit

- Community health (e.g. improved indoor air quality, with particular benefits for women)
- Environmental (e.g. reduced deforestation for charcoal production; improved air quality in low-income areas)

J

Sub-actions

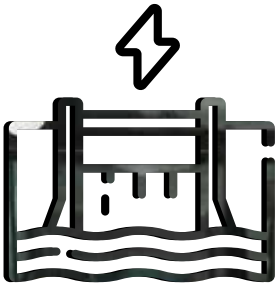
7.1 Research and interviews with communities to understand the barriers to using alternative energy or deploying alternative cookstoves. This research would focus on women insight to understand the barriers to efficient cookstoves (e.g. higher costs / prefer the traditional way of cooking).

7.2 Increase awareness of the associated health impacts of charcoal use; this can be delivered to the public through awareness campaigns.

7.3 Subsidies/incentives for alternative fuel cookstoves to combat low uptake in low-income communities.

7.4 Promotion of efficient cookstoves to be endorsed by National Government.

7.5 Development of partnerships with the private sector, community organisations and financial institutions to support the development of a market and supporting services for alternative energy



Flagship action

Action 8: Invest in protection and conservation of water basins and catchments, including flood control and rainwater harvesting structures.

This action encourages water conservation through investment in flood control and harvesting infrastructure to ensure long term protection of water sources. Dar es Salaam acknowledges that while climate change is creating stress on water bodies through drought, heat and extreme events, unsustainable practices have a compounding impact. If sectors and communities can foster sustainable management of water resources, including protecting existing bodies and diversifying infrastructure to harness sources, they can build resource resilience for long-term water security. This action also provides co-benefits for community health. It is known that resource poverty and flood risk are significant issues within Dar es Salaam's unplanned settlements. By investing in this action, the city can reduce the vulnerability of poor communities and reduce the risk of disaster from climate shocks and stresses. Improved access to clean water will promote community health, while flood control measures will mitigate residential damage and loss of life.

A

Climate strategy

Resource conservation

Type of Action

Policy

B

C

Climate impact

Increase in natural carbon capture storage capacity through improved ecosystem health.

Target

20% increase in water basin and catchment areas conserved by 2030

70% increase in water basin and catchment areas conserved by 2050

D

E

Lead agency

Ministry of Water and Irrigation

Resourcing plan (funding & financing)

TBD

F

G

Level of city control

City level control to enforce regulation policy with the endorsement from National Government

Alignment with Policies & Plans

National Climate Change Strategy (NCCS) 2012, National Climate Change Response Strategy (NCCRS) 2021

DCC Flood Resilience Project

DCC Water-Food-Energy Nexus Project (Kinondoni Municipal Council)

H

I

Co-benefit

- Community health (e.g. increased availability of clean, potable water)
- Environmental (e.g. improved health of ecosystems including water quality, water availability, soil quality, soil stability, biodiversity)

Supporting Actions

Supporting Action	Brief Description	Alignment with Policies/National Objective	Climate Impact	Lead Agency	Co-benefits
9. Promote integrated water resources management and development plans	Encourage the efficient and sustainable management of resources.	Tanzania NCCS (2012), Tanzania NCCRS (2021) **National Objective:** Freshwater Resources To ensure sustainable management and resilience of freshwater resources under a changing climate.	Promotes water resource conservation Reduces local sensitivity to heat and drought Increases availability of freshwater resources	Ministry of Water and Irrigation	Increases community health Community benefits (e.g. improved health, reduced settlement vulnerability) Environmental benefits (e.g. water quality and availability) Economic benefits (e.g. increased productivity of agriculture)
10. Develop sustainable exploitation of ground water resources	Conserve water through the protection of ground-water sources to increase water security, availability, soil health and soil stability.	Tanzania NCCS (2012), Tanzania NCCRS (2021) **National Objective:** Freshwater Resources To ensure sustainable management and resilience of freshwater resources under a changing climate. Water-Food-Energy Nexus Project (Kinondoni Municipal Council) DCC	Promotes water resource conservation Improves ecosystem health and biodiversity Reduces the likelihood of river flooding Improves quality and stability of soil	Ministry of Water and Irrigation	Community benefits (e.g. improved health, reduced settlement vulnerability) Environmental benefits (e.g. water quality and availability, decreased ecosystem sensitivity) Economic benefits (e.g. increased productivity of agriculture, sustainable livelihoods)
11. Promote appropriate agricultural practices that increase resilience to climate change	Encourage sustainable and resilient agricultural practices within Dar es Salaam that protect and conserve natural resources for long term resilience against climate impacts and hazards. Target: Increase amount of urban farming land practicing climate smart agriculture by 10% in 2030 and 30% in 2050.	Tanzania NCCS (2012), Tanzania NCCRS (2021) **National Objective:** Agriculture To enhance the resilience of the agriculture sector to climate change for sustainable livelihoods Water-Food-Energy Nexus Project (Kinondoni Municipal Council) DCC	Improves ecosystem health and biodiversity Improves quality and stability of soil Improves retention of below ground carbon	Ministry of Agriculture	Economic benefits (e.g. increased productivity of agriculture) Community benefits (e.g. increased food security)
12. Promote conservation of aquatic ecosystems and sustainable aquaculture initiatives	Encourage ecosystem health through conservation and sustainable management, particularly relevant for mangroves which provide key natural protection from sea-level rise and storm surge.	Tanzania NCCS (2012), Tanzania NCCRS (2021) **National Objective:** Fisheries To enhance the resilience of fishing resources	Improves ecosystem health and biodiversity Improves quality of coastal waters Protects natural sea defences Protects and improves the health of fisheries	Ministry of Livestock and Fisheries	Economic benefits (e.g. sustainable livelihoods) Community benefits (e.g. increased food security) Increased public health

4.2.3 Encouraging Green, Accessible and Resilient Urban Environments

The rapid urban development of Dar es Salaam has created a range of social and environmental challenges. One of the key challenges has been the widespread growth of informal settlements that are characterized by the lack of basic public services and facilities. Many of these settlements occupy former areas of open space: according to the Ministry of Land and Human Settlement, roughly 30% of urban green spaces in Dar es Salaam are occupied by informal settlements, and the remaining 70% are threatened. Dar es Salaam recognises that urban ecosystem services provide a range of essential services and can reduce climate vulnerability, protecting biodiversity, and improve health and well-being. The city aims to limit environmental degradation through the development of a sustainable urban master plan and implementing a range of new policies and initiatives.

Rapid urban development has also severely impacted the city's social, economic and infrastructural resilience. It is known that 70% of the population live in unplanned and poor settlements, which lack the capacity to withstand or adapt to impacts due to low social and economic capital. Unplanned settlements are characterised by a lack of access to resources, lack of access to services, low-quality infrastructure and impermanent infrastructure. All of which increase community sensitivity to climate change and reduce the resilience of urban spaces dramatically.

This theme includes goals of improving the city's green spaces, in line with national and city policies and objectives to enhance green spaces, ensure resilient land use management, and promote healthy and safe human settlements. This includes increasing the accessibility of the city to all communities through improved urban planning, provision of space for recreation, improvement of spaces to encourage safety, walkability and non-motorised transportation, and expansion of green areas through 'urban greening' initiatives.

Existing Policies, Plans and Initiatives

- **NDC:** actions including promoting resilient land use management, urban planning, and climate-sensitive development of human settlements.
- **NCCS:** Establishing infrastructure for and promoting use of non-motorized transport, and proper urban planning to facilitate sustainable transport.
- **NCCRS:** promotes adaptation and mitigation actions outlined in the Dar CAP including greening the city, risk and vulnerability assessments, improved waste management, urban planning and mass transit.
- **Draft Dar es Salaam 2012 - 2032 masterplan and Five-Year Development Plan II:** recognise that green spaces are not well protected and that there are shortages of these spaces in Dar es Salaam; as such, the five-year plan has advocated for the creation of these spaces by 2020.
- **Dar es Salaam Metropolitan Development Project (World Bank):** aims to allocate investments in infrastructure, community upgrading, urban planning and capacity building. Includes the Dar Open Spaces Upgrading, which aims to enhance a select number of open spaces for inclusive/ recreational use while contributing to the strengthening of Dar es Salaam green infrastructure.
- **National Human Settlements Policy (2000):** policy to promote efficient, healthy, safe and secure, and aesthetic sustainable human settlements, where everyone has adequate and affordable shelter.
- **Urban Planning Act (2007):** provides for the orderly and sustainable development of land in urban areas, to preserve and improve amenities.

These bring added benefits of enhancing resilience to future climate impacts as well as encouraging more sustainable behaviours. The Tanzanian National Climate Change Strategy of 2013, the Tanzania National REDD strategy of 2012, the Tanzania National REDD Strategy Implementation Plan of 2012 and the Strategic Plan for DCC of 2016/2017 – 2021/2022 support the establishment of the city's green spaces.

The following actions in this thematic area detail how the city will achieve this green and resilient city goal.

FLAGSHIP

- Action 13: Develop vibrant and resilient nature-based green spaces and improve accessibility, governed by city bylaws.
- Action 14: Mainstream climate change issues into infrastructure design and development planning; enhance compliance of land use plans at all levels.

SUPPORTING

- Action 15: Promote use of climate adaptive technologies in infrastructure designing and development.
- Action 16: Mainstream climate change issues into urban and rural planning
- Action 17: The installation of solar lights on all public roads and in public places.
- Action 18: Introduce real-time traffic information system.

Flagship action

Action 13: Develop vibrant and resilient nature-based green spaces and improve accessibility, governed by city bylaws.

This action aims to establish bylaws to govern urban spaces to promote and encourage the uptake and use of green infrastructure and the creation of vibrant and accessible green spaces in the city, both for land owned by public entities and private landowners such as developers. Dar es Salaam City Council also aims to increase the mode share of walking, cycling, and public transport, proposing investments in high-quality walking and cycling facilities that are embedded in green spaces and green infrastructure through integrated transportation planning. This action will therefore include improvements to footpaths, the construction of secure bicycle parking and cycleways, and the introduction of measures to improve the accessibility of the city to pedestrians through incentive schemes (such as bicycle purchase subsidies), plus measures to reduce vehicle traffic in city spaces (such as car-sharing and car-free days) and a supporting awareness campaign to reduce traffic and create more pleasant, people-first spaces for all citizens. This will all enhance the ability of citizens to move around safely and sustainably and increase the resilience of the urban environment.

This action is expected to receive political and social support, given the benefits for local communities and economies. It is also in alignment with city policies on improving walking and cycling. The city has the capacity and technical skills to implement this action, and funding is expected to be available from city and national budgets, although third-party funding may also be required. This action offers several co-benefits for health & wellbeing, environmental impacts, improving the liveability of the city etc.

A

Climate strategy

Modal shift and resilient urban environments

B

Type of Action

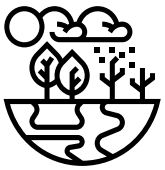
Policy / Programme

C

Climate impact

Mode shift to walking and cycling =

- 1.6 Mt CO2e reduction per year by 2050



D

Lead agency

DCC

E

Collaborating agency(s) or stakeholder(s)

TAN ROAD, TARURA, DMDP, Department of Urban and Rural Development, Faculty of Natural Resources and Agricultural Sciences & Division of Landscape architecture

F

Resourcing plan (funding & financing)

This action will require the support of the city authority in collaboration with donors and the national budget.

G

Level of city control

City Council and led by National Government

H

Alignment with Policies & Plans

Dar es Salaam Transport Policy and Master Plan

I

Co-benefit

- Community health (e.g. improved indoor air quality, safer walking environments to improve quality of life)
- Environmental Benefits (e.g. improved air quality from non-motorized transport options)
- Mobility & accessibility (e.g. reduction in journey times, improved connectivity

J

Sub-actions

13.1 Encourage financial incentives for cycling and supports the upfront costs of bicycles

13.2 Rehabilitate and build walkways to encourage walking and improve pedestrian safety

13.3 Build the appropriate infrastructure for walking, cycling, and parking, including undertaking feasibility studies, design, and construction

13.4 Develop emission-free zones and safeguard natural greenspaces from urbanization

13.5 Promote urban greening in existing spaces and uptake and development of additional green spaces in new developments

Flagship action

Action 14: Mainstream climate change issues into infrastructure design and development planning; enhance compliance of land use plans at all levels.

This action aims to embed climate risk into design, development and planning across all sectors and industries. The process of mainstreaming allows institutional mechanisms, such as regulation or planning, to ensure development considers climate change as a key factor for consideration. This not only fosters resilient infrastructure but also creates a market for the development of innovative climate-adaptive infrastructure and technology.

A

Climate strategy

Resilient infrastructure

Type of Action

Programme

B

C

Climate impact

Potential to reduce emissions from infrastructure development through the use of sustainable processes and materials.

Lead agency

Ministry of Works, Transport and Communication

D

E

Target

At least 80% of the sectors within Dar es Salaam mainstream climate change adaptation targets and measures into infrastructure designing and development by 2026

At least 40% of new buildings and infrastructure within Dar es Salaam have adopted green technologies by 2026.

National building standards and code of practices applicable for Dar es Salaam developed by 2026

Resourcing plan (funding & financing)

National budget targeted to Dar es Salaam through TAN ROAD, TARURA, Internal infrastructure budget from the city and the four municipalities, DMDP project and donors.

F

G

Level of city control

City-level control to enforce regulation policy with the endorsement from National Government

H

Alignment with Policies & Plans

National Climate Change Strategy (NCCS) 2012

National Climate Change Response Strategy (NCCRS), 2021

I

Co-benefit

- Reduce contribution to climate change (e.g. reduced emissions from infrastructure development)
- Job creation and economy (e.g. from new employment opportunities around resilient infrastructure)

Supporting Actions

Supporting Action	Brief Description	Alignment with Policies/National Objective	Climate Impact	Lead Agency	Co-benefits
15. Promote the use of climate adaptive technologies in infrastructure designing and development	Promote innovation in research, development and technology to create and implement tools or mechanisms to increase adaptive capacity and resilience of urban spaces.	Tanzania NCCS (2012) National Objective: Infrastructure To promote climate-proof infrastructure	Reduces carbon emissions from infrastructure development Reduces environmental impact from infrastructure development Conserves natural capital	Ministry of Works, Transport and Communication	Infrastructure resilience Economic benefits (e.g. sustainable development, technological innovation and growth)
16. Mainstream climate change issues into urban and rural planning	Embed climate risk into urban and rural planning to ensure that urban/rural systems are protected and resilient to climate change.	Tanzania NCCS (2012) National Objective: Human Settlements To have human settlements that are resilient to climate change	Appropriately manages land use to either mitigate climate impacts or adapt to climate change Reduces environmental degradation Conserves natural capital	Ministry of Lands, Housing and Human Settlements	Infrastructure resilience Community benefits (e.g. reduced vulnerability of settlements)
17. The installation of solar lights on all public roads and in public places.	The Dar es Salaam Urban Transport Authority (DUTA) has embarked on a project to brighten the streets of Dar es Salaam by replacing existing streetlights with solar technology. Phased roll-out of replacement bulbs and improvements in supporting technology, where necessary.	National Five-Year Development Plan of 2016/17-2020/2021 Dar es Salaam Transport Policy	Not estimated	DUTA & DCC	Community safety (e.g. promoting safer walking at night) Environmental benefits (e.g. renewable energy reduced emissions and reduced demand on energy grid)
18. Introduce real-time traffic information system	Use intelligent transport systems (ITS) to assist effective utilization of existing road traffic infrastructure using information and telecommunication technology	National Five-Year Development Plan of 2016/17-2020/2021 Dar es Salaam Transport Policy	Not possible to estimate	DUTA & DCC	Community benefits (reduced traffic congestion on roads, improved journey times) Environment benefits (e.g. air quality improvements – reduction in pollutant concentrations)

4.2.4 Promoting a Shift Towards Sustainable Transport Modes

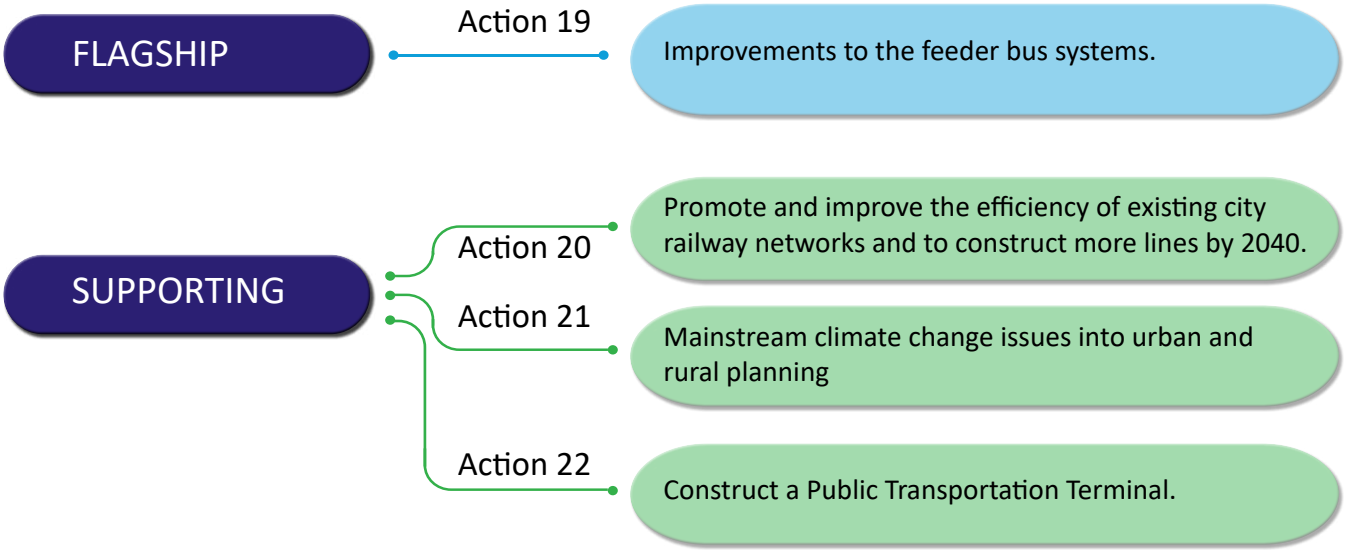
Currently, demand for transportation in Dar es Salaam is met by a combination of *'daladala'* minibuses, shared taxis, motorbikes, the bus rapid transit and railway links, in addition to private vehicles. It is predicted that as the population and urbanisation growth rates increase, there will be a greater demand for both private and public transport connections. The city also suffers from significant congestion and air pollution problems, causing frequent delays and impacts to the economy, health and wellbeing. There is an urgent need to develop and grow sustainable mobility and transport options within the city. The transport sector is also closely tied to climate hazards and impacts. The main transport corridors within the city are exposed to river and flash flooding events, while an increase in traffic will contribute to the urban heat island effect and exacerbate heat impacts. Although improving the sustainability of transport will mitigate contribution to heat impacts, there must also be consideration of the resilience of the transport sector.
This includes understanding its sensitivity to climate change and its ability to adapt to current and future impacts, and the sector's capacity for change. Dar es Salaam recognises the key role affordable, accessible and resilient public transport plays in controlling a peak in GHG emissions from private modes, improving air quality in the city, encouraging a shift to public modes and ensuring development mitigates climate impacts while reducing vulnerability.

On-road transportation is the second-largest emitter of GHG emissions, making up 20% of total emissions

Furthermore, ensuring that sustainable transport development is aligned with effective land use planning and regulations in order to maximise the benefits form these investments will be key. This could also align with National strategies (i.e. in the NCCRS) around the creation of eco-smart communities that integrate climate proofing and low carbon technologies and infrastructure.

- **Dar es Salaam Rapid Transit (DART):** Dar es Salaam won the 2018 Sustainable Transport Award for launching the first line of its long-planned Bus Rapid Transit (BRT) system, known as DART. The first BRT in the region and an ambitious urban transport project, the BRT has reduced travel time for some commuters by over half, in many cases reducing 2-hour commutes to 45 minutes in one direction. The first phase has implemented BRT across 20.9 kilometres (km). The following two phases have completed the design process and the construction of 19.3 Km (phase 2) and then an additional 23.6 km of infrastructure will commence soon. Currently, just under 200,000 passengers use the system every day.
- **NCCRS:** Promotion of an efficient transport system with minimum GHGs is a key theme, with strategies including the promotion of low cost and low carbon mass transport modes such as BRT and other means of mass transport, and promoting non-motorized modes and means of transport by creating cycling and pedestrian walkways
- **NDC implementation plan:** prioritises the promotion of low emission transport systems through deployment of mass rapid transport system and investments in rail and road infrastructures; and promotion of alternative energy.
- **Dar es Salaam Transport Master Plan:** provides priorities of investments in the transport sector within the city including public transport and connection between different parts of the city

This theme includes priority and supporting actions that will deliver an integrated, modern and sustainable transport system with a strong emphasis on multi-modal transportation. The following actions aim to increase connectivity by introducing green corridors, park and ride stations, expanding the coverage of the BRT and links to other transport services to streamline the city's transport infrastructure.



Flagship action

Action 19: Establish a Public Transport Masterplan

Dar es Salaam's growing demand for public transport networks can be seen in the scale of congestion within the city. This theme focuses on the alleviation of traffic congestion and associated negative environmental impacts in the city by increasing the attractiveness of public transport links. Thus, this action focuses on expanding and enhancing public transport infrastructure.

The Public Transport Masterplan will incorporate a programme to expand the BRT system in Dar es Salaam and to invest in an electric Standard Gauge Railway (SGR) train. This action is aligned with the city's plans and policies and will be designed to benefit local communities by addressing traffic congestion within the city. The Public Transport Masterplan will introduce improvements to the city's public transport networks that will offer benefits for local communities and the environment.

This action will shift demand from private mode to public mode(s) of transport by expanding the BRT network in seven more phases, from phase 2 to 7. The expansion of the BRT will include a review of service parameters such as fare policy, e-ticketing system, electrifying the bus fleet service frequency, passenger comfort standards, safety standards. The scheme will also link to broader transport schemes, including park and ride (P&R) stations, green corridors to enable better walking and cycling access to the BRT and car-sharing. Furthermore, the BRT proposal incorporates NMT by creating pedestrian walkways and cycleway to encourage NMT options, thereby making urban accessibility and mobility improvements an integral part of the BRT urban redevelopment. The consideration of the time and distance to the nearest bus stop or BRT station and walking and cycle access (and safety) is an important factor.

Alongside expansions in the BRT network, the SGR train will cover the Tanzania Railway Corporation (TRC) train from the central railway station to Pugu Station. The SGR is designed to use electricity, and Tanzania Electric Supply Company Limited (TANESCO) is preparing substations for power provision.

A

Climate strategy

Transport mode shift

Type of Action

Plan

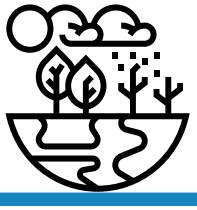
B

C

Climate impact

Mode shift to transit =

- 2.5 Mt CO2e reduction per year by 2050



Lead agency

DUTA

D

E

Collaborating agency(s) or stakeholder(s)

MOID, TANROADS, DCC, TRC, TANESCO & DART Agency

Resourcing plan (funding & financing)

City and National Government, NGOs & Donors

F

G

Level of city control

Predominantly a city level action (but rail will go beyond city level)

Alignment with Policies & Plans

- Tanzania Nationally Determined Contribution
- National Climate Change Strategy (NCCS) 2012
- National Climate Change Response Strategy (NCCRS) 2021
- DSM Transport Master Plan

H

I

Co-benefit

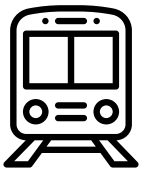
- Community benefit (improved public transport)
- Environment (e.g. air quality improvements – reduction in pollutant concentrations)
- Mobility & accessibility (e.g. reduction in journey times, improved connectivity)

Sub-actions

20.1 Undertake a programme to expand the existing BRT in Dar

20.2 Invest in an electric SGR train which will cover one line of TRG train from the central rail station to Pugu station

20.3 Railway network improvement commuter bus/train



J

Supporting Action	Brief Description	Alignment with Policies/National Objective	Climate Impact	Lead Agency	Co-benefits
20. Improvements to the feeder bus systems.	Reduce commuter journey time, especially for routes travelling into Dar es Salaam and to meet the high demand for adequate transport. Enhance these networks and to expand the BRT catchment area this also includes remote areas. Park and ride (P&R) stations are to be built around the BRT terminals. A total of 305 buses are planned for full-service coverage. Feeder routes will also consider bus lanes to reduce journey times and exposure to traffic congestion.	DSM Transport Master Plan Dar es Salaam Transport Policy	Mode shift to transit = 2.5 Mt CO2e reduction per year by 2050	DUTA MOID, TANROADS, DCC, TRC, TANESCO & DART Agency	Community benefit (improved public transport and inclusion of citizens outside of the city hub) Environment (e.g. air quality improvements – reduction in pollutant concentrations) Mobility & accessibility (e.g. reduction in journey times, improved connectivity)
21. Promote and improve the efficiency of existing city railway networks and to construct more lines by 2040.	Reduce the use of personal motor vehicles (PMV) with measures to manage vehicle use and to improve the attractiveness of more sustainable modes.	DSM Transport Master Plan Dar es Salaam Transport Policy	Mode shift to transit = 2.5 Mt CO2e reduction per year by 2050	DUTA, MOID, TANROADS, DCC, TRC, TANESCO & DART Agency	Community benefit (improved public transport and inclusion of citizens outside of the city hub) Environment (e.g. air quality improvements – reduction in pollutant concentrations) Mobility & accessibility (e.g. reduction in journey times, improved connectivity).
22. Construct Public Transportation Terminal.	Remove the high number of interstate buses on Dar es Salaam's inner-city roads. Support car sharing and park & ride schemes for interstate car journeys to reduce interstate journeys on Dar es Salaam's roads.	DSM Transport Master Plan Dar es Salaam Transport Policy	Mode shift to transit = 2.5 Mt CO2e reduction per year by 2050	DUTA, MOID, TANROADS, DCC, TRC, TANESCO & DART Agency	Community benefit (improved public transport) Environment (e.g. air quality improvements – reduction in pollutant concentrations) Mobility & accessibility (e.g. reduction in journey times, improved connectivity across the city and outside the city)

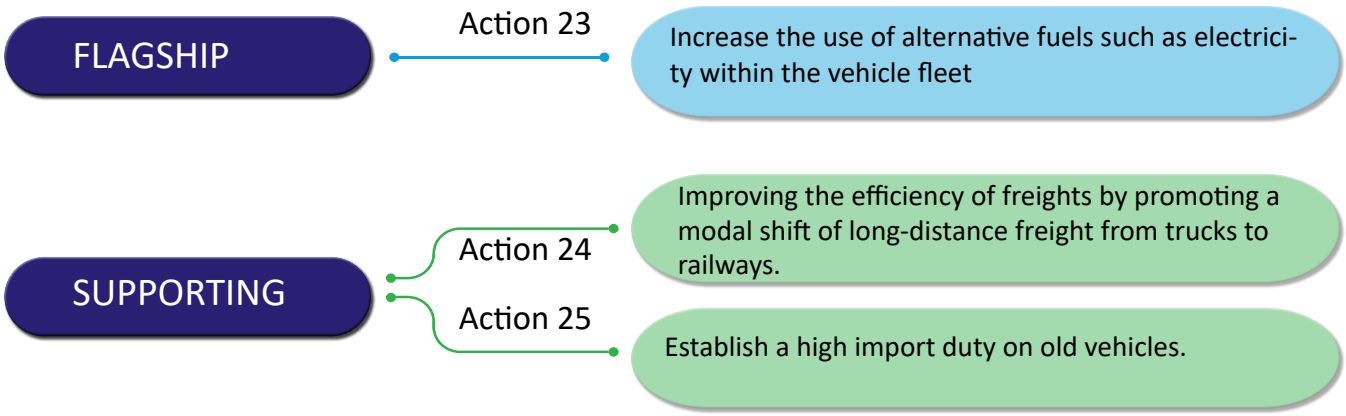
4.2.5 Adopting Ultra-Low Emission Vehicles

Dar es Salaam needs to address the growth in emissions from the transport sector. Sustainable mobility should be coupled with ultra-low emissions vehicles and transport solutions. Currently, minibuses and private cars dominate Dar es Salaam's roads. Diesel oil is the main fuel consumed alongside petrol which is driven by private shared automobiles. To tackle these growing issues, the city has prioritised the following actions to shift Dar es Salaam's on-road fleet to alternative fuels, promote a modal shift from on-road freight to railways, and establish a tax on imported older vehicles. These actions positively align with Dar es Salaam's ambition to become a net-zero city by 2050.

The shift to ultra-low emissions transport also comes with the need for new infrastructure and services to support the use and end-of-life stages. This includes charging facilities and systems for recycling and disposal of batteries from electric vehicles. Unsafe disposal of batteries can lead to toxic waste contamination of city spaces and natural capital, increasing the city's sensitivity to climate change, and therefore vulnerability. The development of the ultra-low emissions transport sector must facilitate the development of proper electric vehicle battery reuse and recycling schemes to prevent an unintended increase in vulnerability.

Existing Policies and Plans

- **DART:** In addition to building the BRT, the DART project is in the process of converting bus engines to EURO-3 engines, which reduce the carbon emissions associated with the vehicles. The replacement of older vehicles travelling along Dar es Salaam's roads will reduce GHG emissions.
- **NDC implementation plan:** promotes the use of alternative energy in transportation.
- **NCCRS:** Encourages the cities to use efficient and low emission transport. . For example, strategies include promoting importation and manufacturing of new transportation technologies such as electrical transport facilities in urban areas



Flagship action

Action 23: Increase the use of alternative fuels, such electricity, within the vehicle fleet.

This action will introduce a package of measures in Dar es Salaam which aim to encourage alternative fuels and increase the number of low emission vehicles such as electric cars, motorcycles, and freight vehicles. The package of measures would be expected to combine incentives and grants for the uptake of EVs, investment for infrastructure to support EVs, greater restrictions on the use of high polluting vehicles and the promotion of catalytic converters. The package of measures would be designed to achieve improvements in local air quality and reductions in GHG emissions.

A

Climate strategy

Fuel switching

B

Type of Action

Programme

C

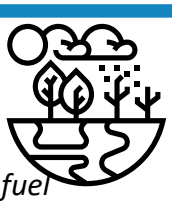
Climate impact

Fuel switching and efficiency in passenger and private vehicles =

- Mt CO2e reduction per year by 2050

Maladaptation:

Potential increase in toxic waste from improper disposal of alternative fuel cells



D

Lead agency

TPDC

E

Collaborating agency(s) or stakeholder(s)

TEMESA, EWURA, DIT, UDSM, VETA, NIT, & TBS

F

Resourcing plan (funding & financing)

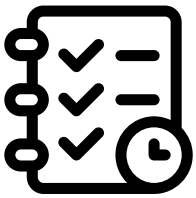
Private and Government funding

G

Level of city control

City Level control but relies on acceptance from businesses and individuals

H



Alignment with Policies & Plans

National Climate Change Strategy (NCCS) 2012

National Climate Change Response Strategy (NCCRS) 2021

DSM Transport Master Plan

I

Co-benefit

- Environment (e.g. air quality improvements – reduction in pollutant concentrations)
- Mobility & accessibility (e.g. reduction in journey times, improved connectivity)
- Reduction in road congestions (e.g improved city living, reduction in car accidents)

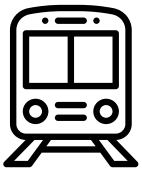
J

Sub-actions

20.1 Undertake a programme to expand the existing BRT in Dar

20.2 Invest in an electric SGR train which will cover one line of TRG train from the central rail station to Pugu station

20.3 Railway network improvement commuter bus/train



Supporting Action	Brief Description	Alignment with Policies/National Objective	Climate Impact	Lead Agency	Co-benefits
24. Improving the efficiency of freights by promoting a modal shift of long-distance freight from trucks to railways.	Invest in rail links to ports, industrial centres and airports to allow freight to be moved by rail.	DSM Transport Master Plan Dar es Salaam Transport Policy Non-Motorized Transport Policy	Not currently estimated	MOT, TANROADS & DCC	Environment benefits (e.g. air quality improvements – reduction in pollutant concentrations) Mobility & accessibility (e.g. reduction in journey times, improved connectivity) Reduction in road congestions (e.g. improved city living, reduction in car accidents)
25. Establish a high import duty on old vehicles and improve new vehicle standards.	The import of older cars will also be limited by establishing high tax rates on old vehicles imported out with Dar es Salaam to discourage importing high emitting older cars.	Transport Master Plan Non-Motorized Transport Policy	Not currently estimated	MOT, TANROADS & DCC	Environment benefits (e.g. air quality improvements – reduction in pollutant concentrations)

4.2.6 Delivering a Cleaner City

Dar es Salaam is the third fastest-growing city in Africa. As such there is extraordinary pressure on the existing infrastructure to collect, manage and dispose of the city's waste. It is estimated that approximately 40% of the city's waste ends up in the only dumpsite, Pugu Kinyamwezi, while the remainder is burned, buried in open pits or disposed of in streets, streams, and drainage systems. Only a small fraction of waste is recycled or reused and is mainly undertaken informally. This contributes to water and air pollution, annual flooding, and the spread of diseases. The pollution of soil and water bodies through unsafe disposal is not only a risk to health but also increases the sensitivity of Dar es Salaam to climate change. Many areas of the city also currently have limited or no wastewater services, which creates further environmental and public health issues.

The waste sector (solid waste and wastewater treatment together) is responsible for 25% of total GHG emissions within the city. About half of these emissions are from solid waste.

Currently, 60% of waste in Dar es Salaam is uncollected and not treated. The rate of collection within each municipality varies within Dar es Salaam (Temeke 27%, Ilala 39% and Kinondoni 41%) the city-wide total average rate of collection is approximately 37%.

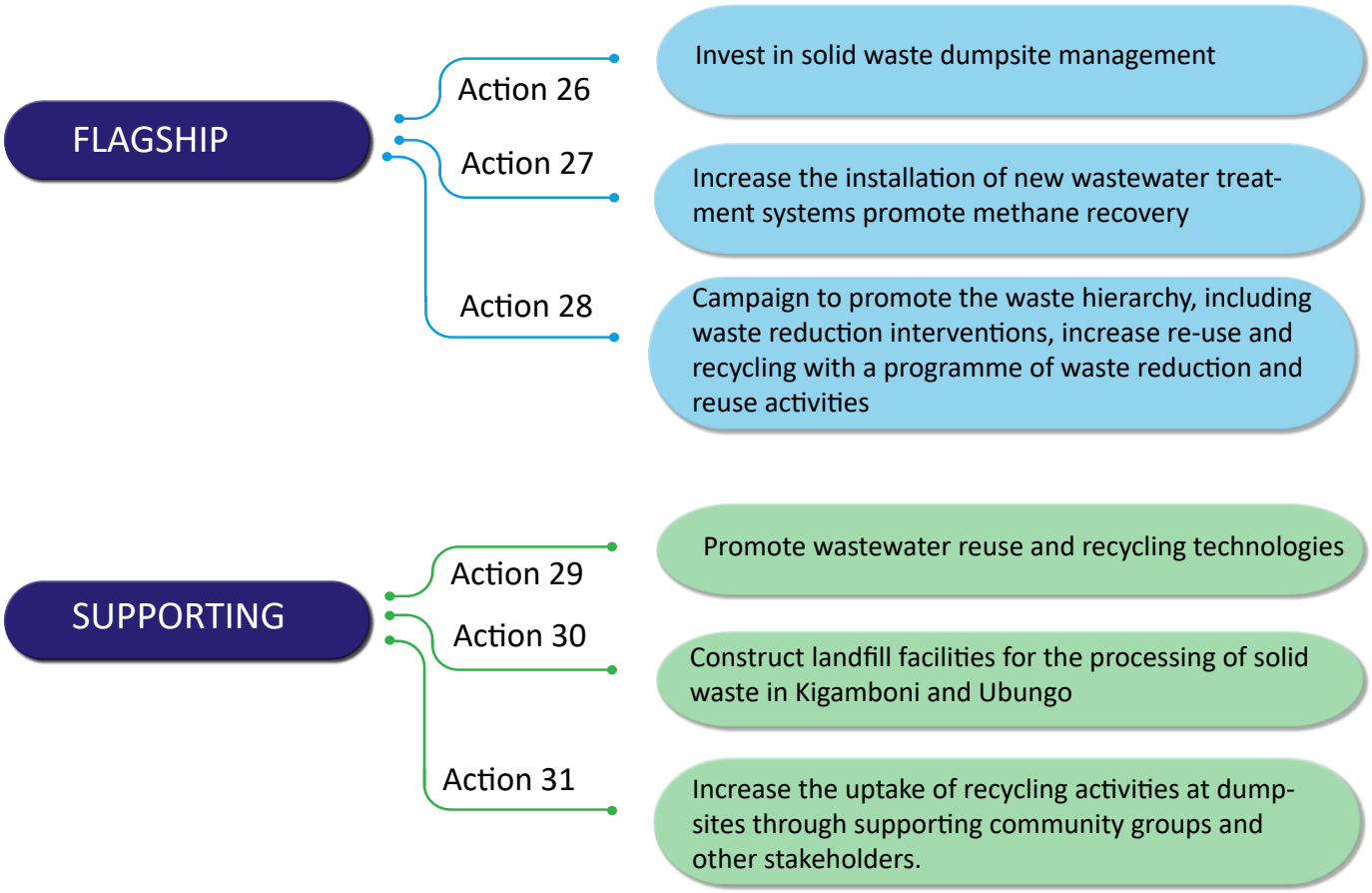
Currently, around 5,600 tonnes of waste are generated daily, but based on population projections, Dar es Salaam could be generating over 12,000 tons per day by 2025. To address the current pressures and growing future strains on the waste infrastructure in Dar es Salaam, the city aims to improve current landfilling practices at Pugu and establish new transfer stations within the city to improve waste collection. The city also aims to install new wastewater treatment systems and enhance methane recovery from both existing and new facilities. Dar es Salaam City Council is responsible for operating the Pugu dumpsite and is the only authority permitted to build new (sanitary) landfills. Although there is a need for additional waste management facilities, the construction of new landfills incurs high costs and requires significant planning and finance to support the allocation and purchasing of land for construction. Any changes in waste management practices would also have implications for local employment: the dumpsite employs approximately 420 people, and there are many other informal waste pickers within the city, although there is no reliable data on their numbers.

In conjunction with the construction of new landfill sites, the city is also seeking to reduce waste at the source by promoting the waste hierarchy, both through raising awareness and by enforcing penalties for unlawful dumping and open burning. Around 50% of waste generated originates from households, so challenging household behaviour is a key area of focus. However, the main reasons for a failure to collect 60% of waste generated are due to the lack of equipment, inadequate financial resources, lack of space for transfer stations in informal areas, lack of small-scale industrial sector market for processing waste material (recycling) and the lack of national policy and legislation on recycling

Existing Polices and Plans

- **2016 Dar es Salaam City Council Recycling Policy:** conducted a feasibility study to identify all recycling points in the city in order to encourage the recycling rate from households and businesses.
- **Organic Waste Management Strategy (2016 -2020):** outlines plans to facilitate the construction of a compost plant in 2019/2020. The aim of the proposed plant is to capture 50% of organic waste generated daily from residential and market waste.
- **NDC implementation plan:** Prioritises the enhanced use of engineered/sanitary landfills, and waste reduction activities such as composting plants, reuse, recycle and incineration of commercial waste.
- **NCCRS:** this includes ambitious targets, by 2026: effective recycling and compost systems in all cities and municipal councils; improved solid waste minimization, collection, transportation and disposal systems in all cities and municipalities; 60% of Cities and Municipal councils to have effective wastewater management systems; and promotion of non-incineration technologies.

The actions detailed below follow a two-fold approach, as some actions address the issue on-site by increasing investment to expand physical waste infrastructure, thus, improving solid waste management. Other actions aim to alleviate waste generation from the source by limiting the amount of waste generated through waste prevention and reduction campaigns. These campaigns aim to promote the waste hierarchy and to increase re-use and recycling. Furthermore, this could create incentives for local communities to expand their practices of recycling and reuse by adopting circular practices to generate an income.



Flagship action

Action 26: Invest in Solid Waste Dumpsite Management.

This action is focused on the purchase of new equipment and machines as well as undertaking periodical maintenance of the new equipment and machines at dumpsites in order to manage these sites more effectively. The proposed improvements to solid waste management practices are in line with current plans and policies in the city. However, specific policies and plans related to waste collection, waste separation, waste minimization, transfer stations, dumpsite improvements may be necessary. The city is in the process of establishing a new dumpsite in Kigamboni and the Environmental Impact Assessment for the site is ongoing. This action will benefit local communities, including improved air quality, the reduction of open fires, and reduced contamination of water bodies. This action also includes upgrading the landfill sites to increase methane capture to achieve 15% by 2030 and 45% by 2050.

A

Climate strategy

Landfill Management

B

Type of Action

Project

C

Climate impact

Landfill gas capture

- 1.2 Mt CO2e reduction per year by 2050

Indirect:

- Prevent landslides and gas explosions at sites
- Combat the challenges and hazards of increasing waste and inappropriate disposal methods

D

Lead agency

DCC

E

Collaborating agency(s) or stakeholder(s)

PPPs, mmunicipalities and, DAWASA

F

Resourcing plan (funding & financing)

DCC, Netherland's Government and other donor agencies and NGOs

G

Level of city control

City Level control but led by National Government

H

Alignment with Policies & Plans

National Climate Change Strategy (NCCS) 2012

National Climate Change Response Strategy (NCCRS) 2021

Organic Waste Management 2016 -2020

Recycling Policy 2016

I

Co-benefit

- Reduced pollution (e.g. leachate from open dumps and air pollutants from uncontrolled burning)
- Increased public health (e.g. less waste dumped in communities with associated health issues – vermin, disease, contamination)
- Job creation and economy (e.g. from new employment opportunities around collection and management)
- Reversing and reducing the impact of climate change

J

Sub-actions

26.1 25 % of transfer points across the city for waste segregation and sorting established by 2025, 50% by 2030 and 75% by 2040.
26.2 50% of existing by-laws for waste collection enforced by 2025 and 75% by 2030
26.3 Identify and establish 2 new landfill site locations for the city and begin planning and procurement by 2025 and construction completed by 2030
26.4 A campaign at the household level on the perception of waste as a resource and encourage recycling and reuse launched by 2025 and 50% of households reached by 2030
26.5 Establish 50% of needed repair and upgrade waste collection facilities by 2025, 75% by 2030 and 95% by 2040
26.6 Establish 50% of treatment centres needs for recycled waste by 2030 and 75% by 2040
26.8 Install landfill methane gas capture technology in one landfill by 2030 and two landfills by 2040

Flagship action

Action 27: Increase the installation of new wastewater treatment systems and promote methane recovery from existing and new wastewater treatment systems.

Installation of new wastewater treatment systems and enhancing methane recovery from existing and new wastewater treatment systems will occur after the completion of a feasibility study. This action aligns with existing plans and policies and is expected to receive support from political groups and local communities. The city has some of the technical skills, capacity and budget to implement this action, however additional support will likely be required to achieve a widescale rollout. This action will offer several benefits for local communities, including improvements to sanitation and a renewable energy source.

A

Climate strategy
Wastewater treatment

Type of Action
Programme / Project

B

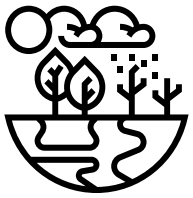
C

Climate impact

Wastewater treatment =

- 2.89 Mt CO2e reductions per year by 2050
- Nearly 10% of the city's emission reductions in 2050

This action will also protect the city against sanitation hazards



D

Lead agency

DAWASA

E

Collaborating agency(s) or stakeholder(s)

PPPs, municipalities and DCC

F

Resourcing plan (funding & financing)

DAWASA, DCC and Municipal council budgets, NGOs and Bilateral Multilateral donor agencies

G

Level of city control

City scale primarily but may require some support from national institutions.

H

Alignment with Policies & Plans

National Climate Change Response Strategy (NCCRS) 2021

Municipal Wastewater Management in Tanzania

I

Co-benefit

Community health (sanitation)

J

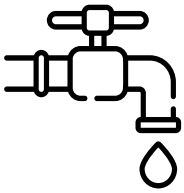
Sub-actions

27.1 Revise existing wastewater treatment related regulations by 2025 and enforce new policy regulations by 2030

27.2 Review capacity and technical skill needs within the waste management organisations/departments by 2025 and undertake capacity building programmes to address identified needs and technical skill 2030

27.3 Construct one additional new wastewater treatment facility by 2025 and two by 2030

27.4 Undertake compliance monitoring to new wastewater regulations by 2030



Flagship action

Action 28: Campaign to promote the waste hierarchy, including waste reduction interventions, increase re-use and recycling with a programme of waste reduction and reuse activities

This action will include the reduction of waste generation, increase re-use and recycling and improve waste management processes. The action will be supplemented by improvements to the City's capacity to plan and manage waste streams. The DCC has plans to increase awareness on two levels firstly, at an institutional level to upskill key actors on the handling and disposing of waste and secondly, at a community level to promote waste reduction interventions. Additionally, the DCC will aim to enforce policies on zero-waste management by setting penalties for unlawful dumping and open burning. In the short term, the DCC aim to achieve a zero-waste (ZW) hierarchy, while in the long term, ZW strategy will move away from traditional waste management to ZW based on a circular economy concept.

A

Climate strategy
Waste Reduction

Type of Action
Programme / Policy

B

C

Climate impact
Increased recycling =

- 1.1 MtCO2e reduction per year by 2050 .

Lead agency
DAWASA

D

E

Collaborating agency(s) or stakeholder(s)
PPPs, municipalities and DCC

Resourcing plan (funding & financing)
DCC and Municipal council budgets, NGOs and Bilateral Multilateral donor agencies

F

G

Level of city control
Waste management is undertaken at a city level; therefore, this action has a high level of city control and authority to implement

Alignment with Policies & Plans
National Climate Change Strategy (NCCS) 2012
National Climate Change Response Strategy (NCCRS) 2021
Organic Waste Management 2016 -2020
Recycling Policy 2016

H

I

Co-benefit
Reduced pollution (e.g. leachate from open dumps and air pollutants from uncontrolled burning)
Increased public health (e.g. less waste dumped in communities with associated health issues – vermin, disease, contamination)
Job creation and economy (e.g. from new employment opportunities around collection and management)

J

Sub-actions

28.1 Establishment waste agency or unit by 2025 and operationalize by 2030

28.2 Launch a public education and awareness campaign on waste reduction and segregation by 2025

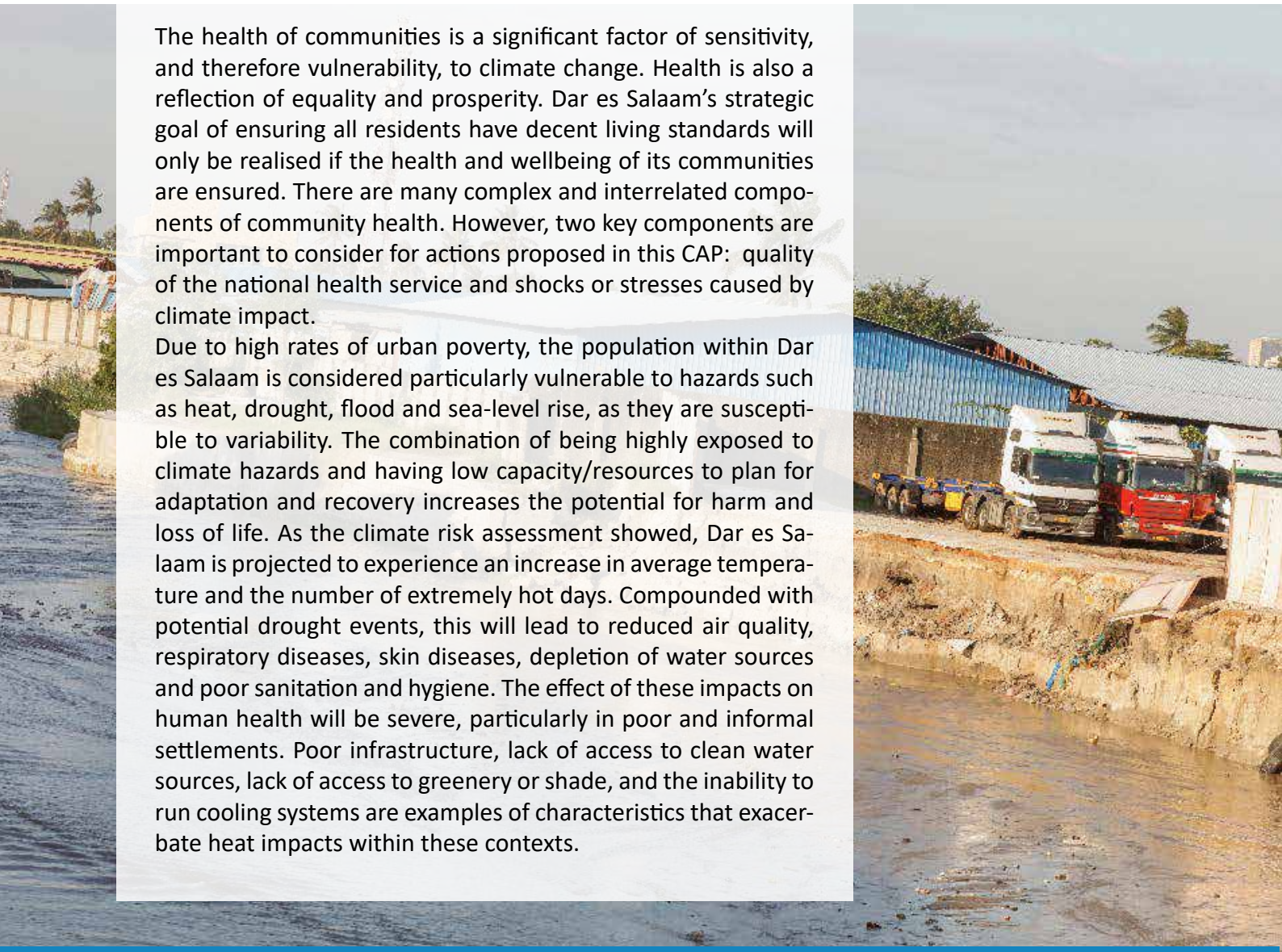
28.3 Actual waste segregation of 25% of household-level by 2030 and 50% by 2050

28.4 Public and private recycling companies have expanded their services, including upgrading/procuring/recruiting necessary equipment and staff by 2025

28.5 25% improvement of recycling capacity in the city by 2025 and 50% by 2030

Supporting Action	Brief Description	Alignment with Policies/National Objective	Climate Impact	Lead Agency	Co-benefits
29. Promote wastewater reuse and recycling technologies	Improve the efficiency of water use through reuse and recycling technologies (in residential, public, commercial and industrial facilities)	Tanzania NCCS (2012) National Objective: Freshwater Resources To ensure sustainable management and resilience of water resources under changing climate Water-Food-Energy Nexus Project (Kinondoni Municipal Council) DCC	Decreases sensitivity of water resources to drought and heat-related hazards by improving management and increasing availability Reduces stress on freshwater resources Reduces pollution from poorly managed waste	Ministry of Water and Irrigation	Reduced pollution (e.g. reduced waste pollution in public spaces or water resources) Increased public health (e.g. reduced shocks to health from disease outbreaks occurring from poor sanitation) Environment benefits (e.g. ecosystem health)
30. Construct landfill facilities for the processing of solid waste in Kigamboni and Ubungo.	The action will require an initial injection of investment to support the allocation or purchasing of land and for constructing the facilities, and also includes the development of transfer stations and recycling facilities.	DCC funding in collaboration with PPPs. External donor funding will be required	Not currently estimated	DCC, PPPs, municipalities and DAWASA	Reduced pollution (e.g. leachate from open dumps, and air pollutants from uncontrolled burning) Increased public health (e.g. less waste dumped in communities with associated health issues – vermin, disease, contamination) Job creation and economy (e.g. from new employment opportunities around collection and management)
31. Increase the uptake of recycling activities at dumpsites through supporting community groups and other stakeholders.	Support recycling and waste reduction initiatives through community and stakeholder empowerment to provide wider co-benefits.	National Climate Change Strategy (NCCS) 2012 Organic Waste Management 2016 -2020 Recycling Policy 2016	Increased recycling = 1.1 MtCO2e reduction per year by 2050	DCC and NGOs	Reduced pollution (e.g. leachate from open dumps and air pollutants from uncontrolled burning) Increased public health (e.g. less waste dumped in communities with associated health issues – vermin, disease, contamination) Job creation and economy (e.g. from new employment opportunities around collection and management)

4.2.7 Building Healthy Communities



The health of communities is a significant factor of sensitivity, and therefore vulnerability, to climate change. Health is also a reflection of equality and prosperity. Dar es Salaam's strategic goal of ensuring all residents have decent living standards will only be realised if the health and wellbeing of its communities are ensured. There are many complex and interrelated components of community health. However, two key components are important to consider for actions proposed in this CAP: quality of the national health service and shocks or stresses caused by climate impact.

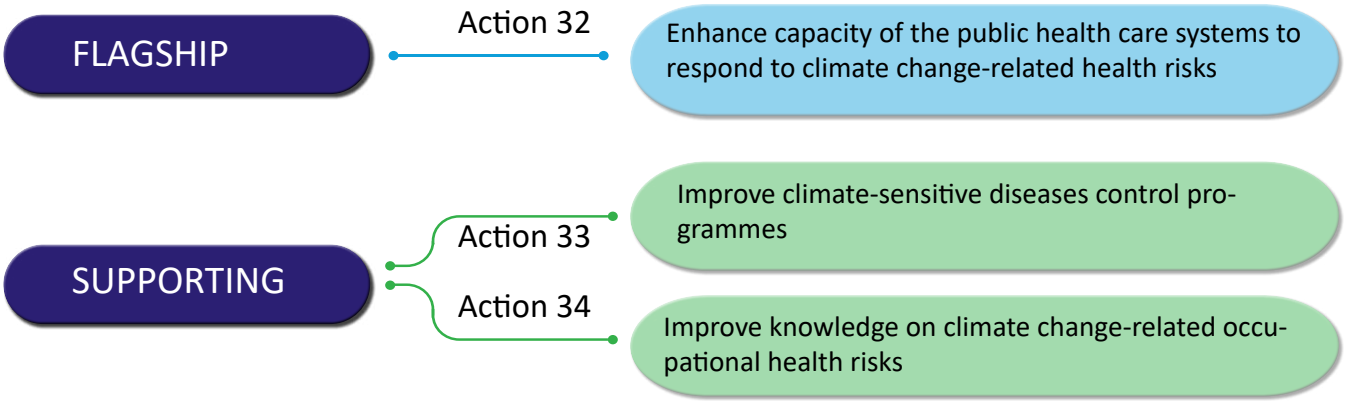
Due to high rates of urban poverty, the population within Dar es Salaam is considered particularly vulnerable to hazards such as heat, drought, flood and sea-level rise, as they are susceptible to variability. The combination of being highly exposed to climate hazards and having low capacity/resources to plan for adaptation and recovery increases the potential for harm and loss of life. As the climate risk assessment showed, Dar es Salaam is projected to experience an increase in average temperature and the number of extremely hot days. Compounded with potential drought events, this will lead to reduced air quality, respiratory diseases, skin diseases, depletion of water sources and poor sanitation and hygiene. The effect of these impacts on human health will be severe, particularly in poor and informal settlements. Poor infrastructure, lack of access to clean water sources, lack of access to greenery or shade, and the inability to run cooling systems are examples of characteristics that exacerbate heat impacts within these contexts.

Existing Policies and Plans

- **National Climate Change and Health Adaptation Plan 2018 – 2023:** aims to build a foundation for a climate-resilient health system and to mainstream climate change into existing health policies, strategies, plans and programmes rather than the implementation of specific interventions that address only an aspect of health and climate change. The plan's objectives and adaptation actions are organized around the ten components of the World Health Organization's operational framework for building a climate-resilient health system, which provides a systematic and comprehensive approach to addressing the health effects of climate change.
- **NCCRS:** promotes mainstreaming of climate change into health policies, programmes and strategies with at least 90% of health regulations climate informed by 2026 and strengthen capacity for health sector practitioners.
- **NDC implementation plan:** includes promoting sustainable and climate-sensitive health and sanitation infrastructure; reducing vulnerability by building adaptive capacity and resilience in the health sector; facilitating integration of climate change adaptation into health policies, programmes and activities; and guiding health practitioners in developing and operationalizing a climate sensitive early warning system for disease outbreaks.

The frequency and intensity of flooding events are also increasing. The region is characterised by lakes, rivers and catchments, which fluctuate according to climate variables. Dar es Salaam is positioned along the Indian Ocean, resulting in a heightened risk of sea-level rise. Flooding events associated with local water systems pose a significant risk to health. Damage to infrastructure, displacement, and inundation will directly impact community health through cascading impacts such as the increase of water-borne diseases from pollution, poor hygiene and sanitation, and water shortages. This can lead to a lack of access to fresh water, further compounding risks to health.

To prevent loss of life, loss of GDP and instability, action is needed to reduce the sensitivity of settlements by improving health, institutional capacity and resilience through strengthened health care infrastructure and planning.



Flagship action

Action 32: Enhance capacity of the public health care systems to respond to climate change-related health risks

Climate change will exacerbate community health concerns through shock events and systemic stressors. Shock events include disease outbreaks which result from i) change in climate variables leading to an increase in vector-borne diseases such as malaria ii) damage to sanitation infrastructure from extreme events leading to pollution, and an increase in water-borne diseases such as cholera. Disease outbreaks have become more prevalent in Dar es Salaam throughout the 21st century, particularly in poor or unplanned settlements where access to resources, health care and nutrition is low. The city has experienced a growing rate of malaria infection associated with a high topographic wetness index or in lower elevation geographies. Predictions show that following an increase in average temperature and precipitation, there will be between 10-50% increase in infection rates.

Systemic stressors to health driven by climate hazards include an increase in unfavourable living and working conditions, food insecurity and resource insecurity. Extreme heat days, which exceed 34.6oC, are projected to increase within the city, leading to occupational health and safety concerns from extreme heat stress. Furthermore, unplanned settlements are characterised by their lack of infrastructure, including cooling systems, resulting in extreme heat stress within poor communities. Children and the elderly are more likely to suffer at a greater extent from heat stress, with a heightened probability of death as a result. These groups are also more likely to suffer from a lack of nutrition, which will be exacerbated by impacts to local agriculture activities.

Sustained health stressors and an increase in health shocks will increase pressure on public health care systems. Poor community health will also lead to a reduction in productivity, loss in GDP and potentially forced migration. Dar es Salaam acknowledges that capacity building of public health care systems is vital to building community resilience to climate change. Their ability to prepare for, respond to and recover from climate change related health impacts will determine the future and prosperity of the city and its population.

A

Climate strategy
Build capacity to manage stress and shocks

Type of Action
Programme

B

C

Target
Decrease number of water-borne diseases by 60% in 2030 and 90% in 2050
Reduce number of workers who fail to work due to heat stress by 30% in 2030 and 65% in 2050

Lead agency
Ministry of Health and Social Welfare

D

E

Resourcing plan (funding & financing)
Ministry of Health and Social Welfare, DCC and Municipal council budgets, NGOs and Bilateral Multilateral donor agencies

Level of city control
City-level control to enforce regulation policy with the endorsement from National Government

F

G

Alignment with Policies & Plans
National Climate Change Response Strategy (NCCRS) 2021

Co-benefits
Increased public health (e.g. improves the capacity of the health care system to manage stresses and shocks from climate change and extreme events)

H

Supporting Action	Brief Description	Alignment with Policies/National Objective	Climate Impact	Lead Agency	Co-benefits
33. Improve climate-sensitive diseases control programmes	Improved disease control programmes will increase their institutional capacity to manage disease risk by identifying spatial and social characteristics that highlight who and where is most vulnerable	Tanzania NCCS (2012) National Objective: Human Health To protect public health from climate change and climate variability	Not applicable	Ministry of Health and Social Welfare	Increased public health (e.g. reduced disease outbreak) Economic benefit (e.g. improved productivity from disease reduction)
34. Improve knowledge on climate change-related occupational health risks	Conducting an assessment to determine climate-related occupational health risks.	Tanzania NCCS (2012) National Objective: Human Settlement To have human settlements that are resilient to climate change	Not applicable	Ministry of Health and Social Welfare	Increased public health Economic benefit (e.g. improved productivity)

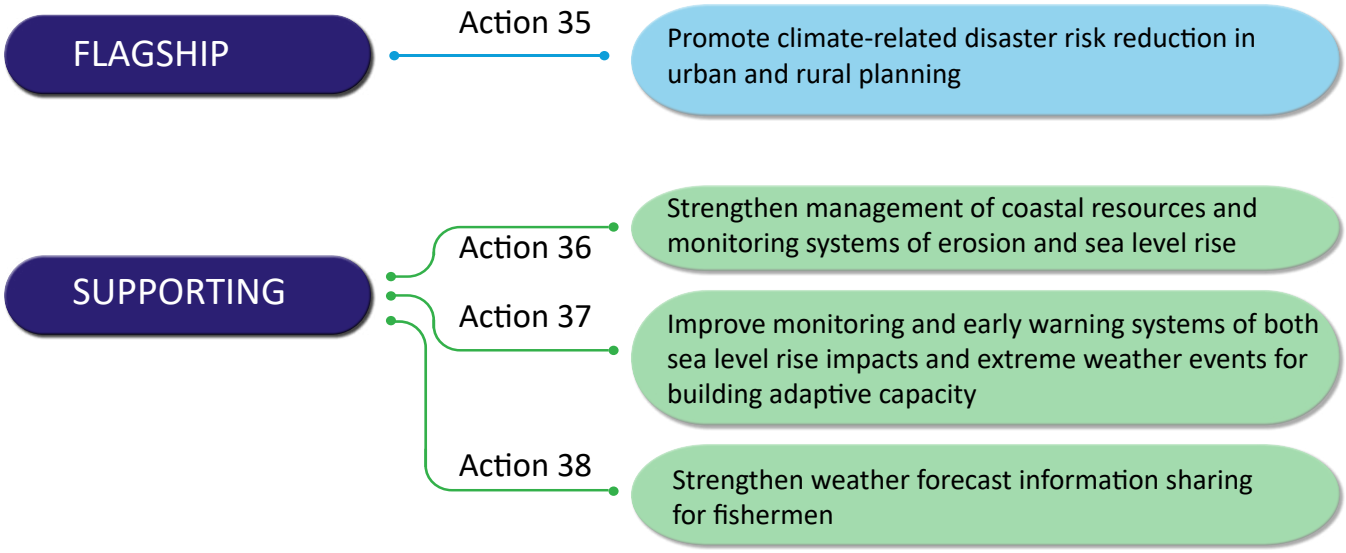
4.2.8 Managing Disasters and Risks

With extreme events known to increase as a direct consequence of climate change, Dar es Salaam must prepare by improving and operationalising institutional capacity to conduct disaster risk reduction and management. Flooding, extreme heat, drought and storms have the potential to cause catastrophic events where social, natural and economic capital will be weakened, leading to cascading impacts, including further reduced ability to recover and respond from future events. The Strategic Appraisal for Dar el Salaam's Climate Action Plan identified disaster preparedness, risk reduction and management of catastrophic events as key objectives that should be considered within city and national agendas.

Existing Policies and Plans

- **Tanzania Vision 2025:** Forces for the realisation of the vision include development of the capacity to anticipate and respond to external changes.
- **NDC implementation plan:** adaptation commitment includes promotion of integrated disaster risk management in line with the Sendai Framework for Disaster Risk Reduction and disaster policy of 2004; establishment and/or improvement of early warning systems for extreme weather events and other climate-related hazards; and enhancing emergency response capacities in line with climate risk profiles.
- **NCCRS:** this integrates disaster management in various sectors, such as improving monitoring and early warning systems for coasting and marine environments, with at least 2 monitoring and surveillance systems installed by 2026, and at least 70% of coastal communities with timely access to accurate and reliable climate information services by 2026.

The actions detailed below propose that institutional mechanisms, such as planning and monitoring, be operationalised to conduct disaster risk reduction. Coastal disasters or extreme events have been shown to be a priority from the Rapid CRA due to the exposure and sensitivity of coastal assets. Dar es Salaam's intrinsic reliance on coastal features, assets and industries create heightened risk from sea-level rise, storms and coastal flooding. These hazards may manifest in impacts such as displacement of people, damage to homes, damage to coastal infrastructure, loss of GDP and loss of life. The fishing and tourism industry is particularly vulnerable due to high exposure and reliance on coastal assets. It is important to consider sea-level rise, flooding and storms as a priority concern for the city due to its potential to cause catastrophic harm.



Flagship action

Action 35: Promote climate-related disaster risk reduction in urban and rural planning.

This action aims to embed climate disaster risk reduction into all planning activities with a specific focus on reducing risk from extreme climate events. To ensure urban development does not exacerbate vulnerabilities, disaster risk reduction must be considered in the management of settlements and land. There is also potential to reduce existing vulnerability by allocating settlement development for the relocation of flood-exposed communities and implementing nature based flood control approaches. This is a priority for Dar es Salaam as 15% of it's total area lies within a flood plain.

A

Climate strategy

Build capacity to manage stress and shocks

Type of Action

Programme

B

C

Target

50% of City, Municipal and Ward planning in Dar es Salaam to include climate-related disaster risk reduction by 2030 and 100% to include by 2050

Reduce the number of houses exposed to flash floods by 50% in 2030 and 90% by 2050

Lead agency

Ministry of Lands, Housing and Human Settlements and Municipal Councils in Dar es Salaam

D

E

Resourcing plan (funding & financing)

TBD. For this particular action it has been a challenge for the city to determine the financing plan. Part of this action development/implementation will be to further build and define the resourcing plan. DCC and Municipal council budgets, NGOs and Bilateral Multilateral donor agencies

Level of city control

City-level control to enforce regulation policy with the endorsement from National Government

F

G

Alignment with Policies & Plans

National Climate Change Response Strategy (NCCRS) 2021

Co-benefits

Increased public health (e.g. improves the capacity of the health care system to manage stresses and shocks from climate change and extreme events)

H

Supporting Action	Brief Description	Alignment with Policies/National Objective	Climate Impact	Lead Agency	Co-benefits
36. Strengthen the management of coastal resources and monitoring systems of erosion and sea-level rise	Increase institutional and knowledge capacity to make evidence-based decisions regarding sea-level rise and coastal economies.	Tanzania NCCS (2012) National Objective: Coastal and Marine Environment To sustain the availability of coastal and marine ecosystem goods and services Beach Management Plan DCC Flood Resilience Project DCC	Promotes the conservation of coastal features and ecosystems	Ministry of Livestock and Fisheries	Capacity building (e.g. facilitate evidence-based decision-making) Community benefits (e.g. coastal communities better prepared for coastal hazards)
37. Improve monitoring and early warning systems of both sea-level rise impacts and extreme weather events for building adaptive capacity	Implement monitoring and early warning systems for extreme weather events which have a particular effect on coastal livelihoods and communities	Tanzania NCCS (2012) National Objective: Coastal and Marine Environment To sustain the availability of coastal and marine ecosystem goods and services	Not applicable	Ministry of Livestock and Fisheries-	Capacity building (e.g. facilitate evidence-based decision-making) Community benefits (e.g. coastal communities better prepared for coastal hazards) Economic benefits (e.g. improved fishing productivity, reduced damage to industry)
38. Strengthen weather forecast information sharing for fishermen	Increase institutional capacity to provide weather forecast data, making this available to coastal communities, particularly fishermen.	Tanzania NCCS (2012) National Objective: Coastal and Marine Environment To sustain the availability of coastal and marine ecosystem goods and services	Not applicable	Ministry of Livestock and Fisheries	Capacity building (e.g. facilitate evidence-based decision-making) Economic benefits (e.g. improved fishing productivity, reduced damage to industry)

4.2.9 Creating Resilient Communities and Economies

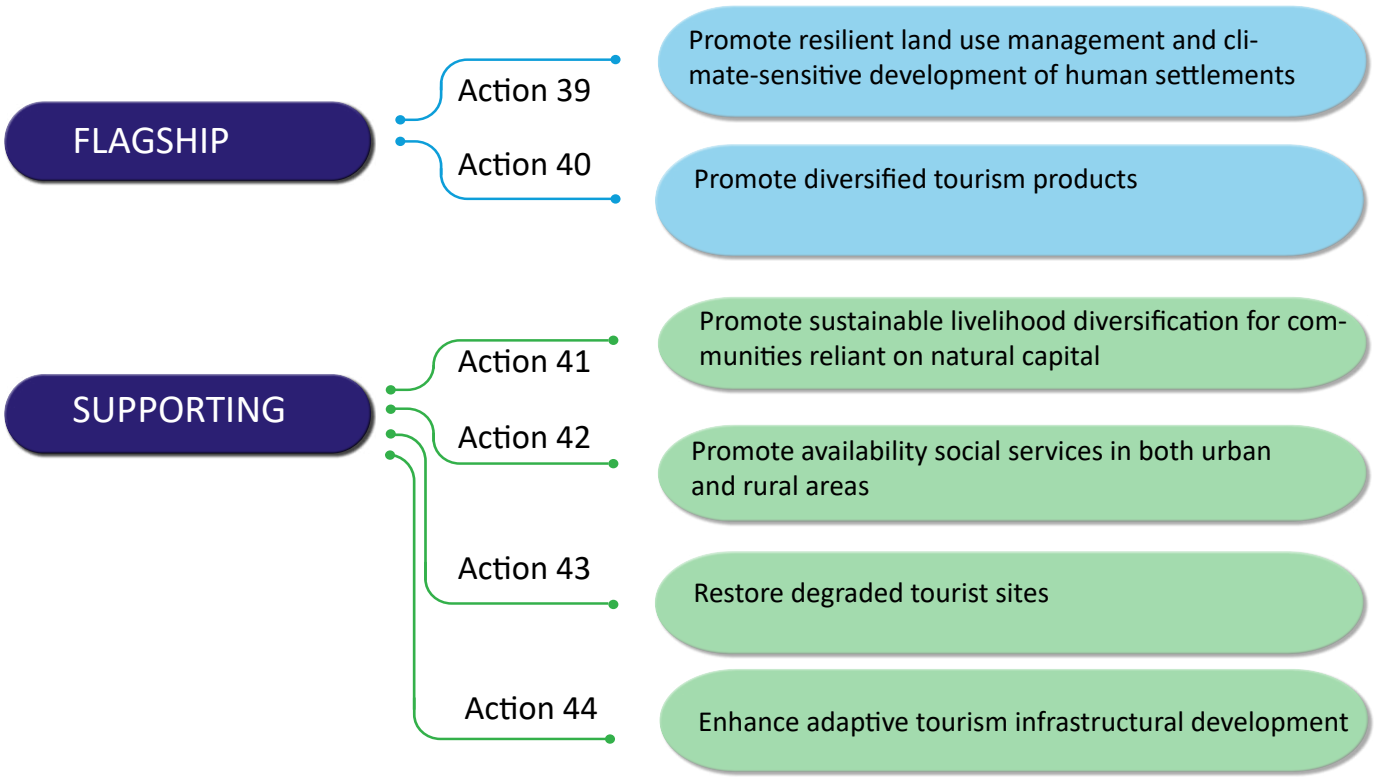
Social resilience is equally as important as physical or infrastructural resilience to mitigate economic impacts from climate change. The ability of communities to prepare for, respond to and recover from climate impacts is vital for economic strength and growth; however, it is also intrinsically tied to internal economic capacity. Due to the high rate of urban poverty, social and economic resilience is low within Dar es Salaam, characterised by a weak capacity for change and high sensitivity to climate variability. Unmitigated, the lack of adaptive capacity could lead to social and economic collapse within poor areas. Furthermore,

70% of the population within Dar es Salaam lives in unplanned settlements

impacts such as damage to infrastructure, displacement of people, biodiversity loss, land loss, submergence and reduced GDP will threaten community livelihoods and economic prosperity. The actions identified below highlight the importance of economic diversification, particularly in agriculture, fisheries, livestock and tourism; these sectors are considered high risk under a changing climate.

Existing Policies and Plans

- **Tanzania Vision 2025:** A high quality livelihood for all Tanzanian sis one of the targets of the Vision. The effective ownership of the development agenda coupled with the spirit of self-reliance, at all societal levels, are major driving forces for the realization of the Vision. The mobilization and effective utilization of domestic resources (natural, financial and human) is the foundation on which the realization of the Vision rests. These resources should be utilized to build adaptive capacity for promoting economic activities that enjoy comparative and competitive advantages with a view to minimize the impact of external economic shifts and shocks
- **NDC implementation plan:** Priorities include promoting sustainable livelihood diversification for coastal communities, and enhancing awareness on the impacts of climate change in the context of human settlements.
- **NCCRS:** targets at least 3 to 4 sustainable livelihood options introduced to coastal communities by 2026; and at least 50% of the fishing and farming communities practicing climate smart agricultural land/fisheries management by 2026; and nature-based tourism/new innovative tourism products contributing to at least 30% of tourism sector revenue by 2026.



Flagship action

Action 39: Promote resilient land use management and climate-sensitive development of human settlements.

Community resilience is intrinsically tied to the strength and sensitivity of settlements. This action aims to build resilience by embedding climate risk into development, ensuring communities are able to live in spaces that will withstand the impacts of climate change. This may include sustainable resource supply, increase capacity for residential renewable energy production, development of cooling infrastructure or strengthened building structure against extreme events – all of which are not currently characteristic of informal settlements. The city has committed to reducing the number of informal settlements through conversion to formal settlements.

A

Climate strategy

Resilient infrastructure

Type of Action

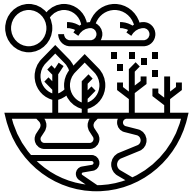
Programme

B

C

Climate impact

Not applicable



Target

Change informal settlement to formal settlement by 45% in 2015 and 100% by 2050

D

E

Lead agency

Ministry of Lands, Housing and Human Settlements and Municipal Councils in dar es Salaam

F

Resourcing plan (funding & financing)

TBD for this particular action it has been a challenge for the city to determine the financing plan. Part of this action development/implementation will be to further build and define the resourcing plan. DCC and Municipal council budgets, NGOs and Bilateral Multilateral donor agencies

G

Level of city control

City-level control to enforce regulation policy with the endorsement from National Government

Alignment with Policies & Plans

National Climate Change Strategy (NCCS) 2012, National Climate Change Response Strategy (NCCRS) 2021

H

I

Co-benefits

Community benefits (e.g. increased resilience of settlements, increased availability of affordable housing, reduction of poverty)

Flagship action

Action 40: Promote diversified tourism products.

Tourism within Tanzania is largely reliant on natural assets and biodiversity. While Dar es Salaam is committed to the protection and conservation of ecosystems and wildlife, diversification of tourism products will reduce economic risk embedded in the sector and will ensure the resilience of community livelihoods.

A

Climate strategy

Resilient livelihoods

B

Type of Action

Programme

C

Climate impact

Not applicable

D

Target

Establish City wide physical and online tourism information management systems by 2030

Increase on the tourism products by 20% in 2030 and 50% by 2050

E

Lead agency

Ministry of Natural Resources and Tourism

F

Resourcing plan (funding & financing)

TBD

Ministry of Natural Resources and Tourism (MNRT), Tanzania Tourism Board (TTB), DCC and Municipal Council budgets.

G

Level of city control

City level control to enforce regulation policy with the endorsement from National Government

H

Alignment with Policies & Plans

National Climate Change Strategy (NCCS) 2012, National Climate Change Response Strategy (NCCRS) 2021

I

Co-benefits

Community benefits (e.g. strengthen economic capital within communities, increased ability to sustain livelihoods through shocks and stresses)

Supporting Action	Brief Description	Alignment with Policies/National Objective	Climate Impact	Lead Agency	Co-benefits
41.Promote sustainable livelihood diversification for communities reliant on natural capital	Promote livelihood diversification within communities that rely on climate-sensitive industries or rely on natural resources that are sensitive or exposed to climate change.	Tanzania NCCS (2012) National Objective: Coastal and Marine Environment To sustain the availability of coastal and marine ecosystem goods and services Fisheries To enhance the resilience of fisheries resources Livestock To enhance the resilience of livestock sector development to climate change impacts	Not applicable	Cross-sectoral leadership from appropriate Ministries, including agriculture and fisheries	Community benefits (e.g. resilient livelihoods) Economic benefits (e.g. sustained GDP contribution)
42. Promote availability of social services in both urban and rural areas	Provide social services, including community support networks, to help reduce poverty in urban and rural areas.	Tanzania NCCS (2012) National Objective: Human Settlement To have human settlements that are resilient to climate change	Not applicable	Ministry of Lands, Housing and Human Settlements	Poverty reduction Community benefits (e.g. improved social and support networks)
43. Restore degraded tourist sites	Restore degraded tourist sites to increase the attractiveness of tourism assets which are not reliant on resources, biodiversity or ecosystems.	Tanzania NCCS (2012) National Objective: Tourism To build resilience and adaptive capacity of the tourism industry to climate change	Not applicable	Ministry of Natural Resources and Tourism	Economic benefits (e.g. strengthened tourism assets) Community benefits (e.g. resilient livelihoods)
44. Enhance adaptive tourism infrastructural development	Embed climate risk into the development of tourism infrastructure.	Tanzania NCCS (2012) National Objective: Tourism To build resilience and adaptive capacity of the tourism industry to climate change	Not applicable	Ministry of Natural Resources and Tourism	Economic benefits (e.g. strengthened tourism assets, resilient infrastructure) Community benefits (e.g. resilient livelihoods)

4.3 Action Summary

Figure 27 Overview of all mitigation and adaptation actions

Promoting Clean and Secure Energy	Action 1: Enhance energy security and resilience of energy systems. Action 2: Promote Public Private Partnerships to invest in modern and renewable energy services and projects. Action 3: Increase the resilience of the energy system to climate change impact. Action 4: Develop bylaws to encourage uptake of residential scale renewables. Action 5: A programme to encourage improvements in industrial facilities, including fuel switching. Action 6: A programme to promote energy efficiency improvements in industrial facilities, including fuel switching
Ensuring Sustainable Resource Management	Action 7: Establish a regulation policy for charcoal production and use. Action 8: Invest in protection and conservation of water basins and catchments including flood control and rainwater harvesting structures. Action 9: Promote integrated water resources management and development plans Action 10: Develop a strategy and regulations to ensure sustainable extraction of ground water resources. Action 11: Promote appropriate agricultural practices that increase resilience to climate change. Action 12: Promote conservation of aquatic ecosystems and sustainable aquaculture initiatives.
Encouraging a Green and Resilient Urban Environment	Action 13: Develop vibrant and resilient nature-based green spaces and improve accessibility, governed by city bylaws. Action 14: Mainstream climate change issues into infrastructure designing and development planning; enhance compliance of land use plans at all levels. Action 15: Promote use of climate adaptive technologies in infrastructure designing and development. Action 16: Mainstream climate change issues into urban and rural planning Action 17: The installation of solar light on all public roads and in public places. Action 18: Introduce real-time traffic.
Promoting a Shift towards Sustainable Transport Modes	Action 19: Establish a Public Transport Masterplan Action 20: Improvements to the feeder bus systems. Action 21: Promote and improve the efficiency of existing city railway networks and to construct more lines by 2040. Action 22: Construct Public Transportation Terminal.
Adopting Ultra- Low Emission Vehicles	Action 23: Increase the use of alternative fuels, such as electricity, within the vehicle fleet Action 24: Improving the efficiency of freights by promoting a modal shift of long-distance freight from trucks to railways Action 25: Establish a high import duty on old vehicles.
Delivering a Cleaner City	Action 26: Invest in solid waste dumpsite management. Action 27: Increase the installation of new wastewater treatment systems promote methane recovery. Action 28: Campaign to promote the waste hierarchy, including waste reduction interventions, increase re-use and recycling. Action 29: Promote wastewater reuse and recycling technologies Action 30:Construct landfill facilities for the processing of solid waste in Kigamboni and Ubungo Action 31: Increase the uptake of recycling activities at dumpsites through supporting community groups and other stakeholders.
Building Healthy Communities	Action 32: Enhance capacity of the public health care systems to respond to climate change-related health risks. Action 33: Improve climate-sensitive diseases control programmes. Action 34: Improve knowledge on climate change-related occupational health risks.
Manging Disasters and Risks	Action 35: Promote climate-related disaster risk reduction in urban and rural planning. Action 36: Strengthen management of coastal resources and monitoring systems of erosion and sea level rise. Action 37: Improve monitoring and early warning systems of both sea level rise impacts and extreme weather events for building adaptive capacity . Action 38: Strengthen weather forecast information sharing for fishermen.
Creating Resilient Communities and Economies	Action 39: Promote resilient land use management and climate-sensitive development of human settlements Action 40: Promote diversified tourism products Action 41: Promote sustainable livelihood diversification for communities reliant on natural capital within the city Action 42: Promote availability of social services in both city and municipal areas Action 43: Restore degraded tourist sites Action 44: Enhance adaptive tourism infrastructural development

4.4 Climate Action Delivery Plan

	2 Years	2-5 years	5 years	Beyond 5 years
Clean and Secure Energy				
Action 1: Enhance energy security and resilience of energy systems.		✓		
Action 2: Promote Public Private Partnerships to invest in modern and renewable energy services and projects.		✓		
Action 3: Increase the resilience of the energy system to climate change impact.		✓		
Action 4: Develop bylaws to encourage uptake of residential-scale renewables		✓		
Action 5: Programme to increase energy efficiency in commercial and residential buildings and encourage the uptake of small-scale renewables and energy efficiency improvements in existing buildings.		✓		
Action 6: A programme to promote energy efficiency improvements in industrial facilities, including fuel switching.		✓		
Sustainable Resource Management				
Action 7: Establish a regulation policy for charcoal production and use.	✓			
Action 8: Invest in the protection and conservation of water basins and catchments, including flood control and rainwater harvesting structures		✓		
Action 9: Promote integrated water resources management and development plans.		✓		
Action 10: Develop a strategy and regulations to ensure sustainable extraction of groundwater resources		✓		
Action 11: Promote appropriate agricultural practices that increase resilience to climate change		✓		
Action 12: Promote conservation of aquatic ecosystems and sustainable aquaculture initiatives		✓		
Green and Resilient Urban Environment				
Action 13: Develop vibrant and resilient nature-based green spaces governed by city bylaws.				✓
Action 14. Mainstream climate change issues into infrastructure design and development planning; enhance compliance of land use plans at all levels.		✓		
Action 15: Promote use of climate adaptive technologies in infrastructure designing and development		✓		
Action 16: Mainstream climate change issues into urban and rural planning		✓		
Action 17: The installation of solar lights on all public roads and in public places.	✓			
Action 18: Introduce a real-time traffic information system	✓			
Sustainable Mobility				
Action 19: Establish a Public Transport Master Plan by 2021.				✓
Action 20: Improvements to the feeder bus systems.				✓
Action 21: Promote and improve the efficiency of existing city railway networks and to construct more lines by 2040.				✓
Action 22: Construct Public Transportation Terminal.	✓			

	2 Years	2-5 years	5 years	Beyond 5 years
Low Emissions Transport Solutions				
Action 23: Increase the use of alternative fuels such as electricity within the vehicle fleet		✓		
Action 24: Improving the efficiency of freights by promoting a modal shift of long-distance freight from trucks to railways.				✓
Action 25: Establish a high import duty on old vehicles.	✓			
Clean City				
Action 26: Invest in solid waste dumpsite management.		✓		
Action 27: Increase the installation of new wastewater treatment systems to promote methane recovery		✓		
Action 28: Campaign to promote the waste hierarchy, including waste reduction interventions, increase re-use and recycling with a programme of waste reduction and reuse activities		✓		
Action 29: Promote wastewater reuse and recycling technologies		✓		
Action 30: Construct landfill facilities for the processing of solid waste in Kigamboni and Ubungo		✓		
Action 31: Increase the uptake of (waste-to-energy) and recycling activities at dumpsites through supporting community groups and other stakeholders.		✓		
Building Healthy Communities				
Action 32: Enhance capacity of the public health care systems to respond to climate change-related health risks		✓		
Action 33: Improve climate-sensitive diseases control programmes		✓		
Action 34: Improve knowledge on climate change-related occupational health risks		✓		
Managing Disasters and Risks				
Action 35: Promote climate-related disaster risk reduction in urban planning			✓	
Action 36: Strengthen management of coastal resources and monitoring systems of erosion and sea level rise			✓	
Action 37: Improve monitoring and early warning systems of both sea-level rise impacts and extreme weather events for building adaptive capacity			✓	
Action 38: Strengthen weather forecast information sharing for fishermen			✓	
Creating Resilient Economies and Communities				
Action 39: Promote resilient land use management and climate-sensitive development of human settlements		✓		
Action 40: Promote diversified tourism products		✓		
Action 41: Promote sustainable livelihood diversification for communities reliant on natural capital within the city		✓		
Action 42: Promote the availability of social services in both city and municipal areas		✓		
Action 43: Restore degraded tourist sites		✓		
Action 44: Enhance adaptive tourism infrastructural development		✓		

4.5 Barriers to enhanced levels of action implementation

Dar es Salaam CAP implementation is expected to face several challenges. Below are important barriers grouped by theme.

Administrative control and coordination

Dar es Salaam was previously under one political administration, Dar es Salaam City Council (DCC), when the CAP process started. The DCC was managed by the city director and politically under the Lord Mayor coordinating the five municipalities of Ilala, Kinondoni, Temeke, Ubungo and Kigamboni. In February this year, the government decided to dissolve DCC and promoted Ilala Municipal council to become the city. Although the new city administration will oversee the dissolved DCC's coordination functions, including climate issues, it will focus on implementing actions that fall within its boundaries. The absence of a Lord Mayor who represents other municipalities will present a challenge to coordinate initiatives covering more than one municipality. The presence of Regional Administrative Secretary (RAS) office for Dar es Salaam, an executive arm of the central government, will provide additional support of coordinating implemention of actions that cover more than one municipality and cannot be addressed by the new city administration.

Aside from changes in the city administration, the city and municipalities have limited control of most actions proposed. Major projects derived from proposed actions and sub-actions under energy, waste, and transport have national and municipal level implementers.

Solution:

The city administration should involve RAS office in the coordination of municipalities and in enhancing vertical/horizontal integration among sectors and stakeholders who are involved in CAP implementation. There will be a need to improve information sharing and effective communication between and among these stakeholders. The department of Solid Waste Management and Environmental Conservation will work directly with counterpart departments in the four municipalities and the RAS office.

Access to funding and other resources

The implementation of Dar es Salaam's CAP may face challenges associated with securing needed financial and human resources to develop and implement proposed projects. Some actions may rely on technologies or techniques that incur prohibitive capital or operational costs. Actions related to renewable power generation, modern cookstoves, new waste collection systems and flood control will require technology advancements that are not available; thus, there is a need to import. Such technologies and techniques will lead project implementers to face prohibitive capital and operational costs.

Solution : The city should strengthen its relationship with the national government and cooperation with international organisations and agencies. The city should target a particular partnership with National Carbon Monitoring Centre (NCMC) on GHG data management from climate actions and vice president's office (VPO) on policy and coordination. When developing proposals for funding climate actions, the City should involve municipalities where these projects will be implemented.
The new city administration and RAS office should allocate some of its officers to lead important thematic areas under the climate agenda regarding human resources. Selected officers should be encouraged to participate in training, especially those conducted virtually to build the competencies needed to develop, monitor, and report on projects from CAP implementation. As well as training on completing funding applications, how to build a portfolio and business case and continually search for any new upcoming funding opportunities.

Knowledge, awareness, and commitment

Adequate commitment from officials, political leaders, partners and stakeholders is necessary to implement CAP actions. Lack of this commitment may be caused by limited knowledge, awareness and expertise. The city should continuously support knowledge and awareness creation on climate issues among its own RAS office team. Other players from municipalities and national level stakeholders should also be included.

Solution: The city should popularize technical climate information through infographics and storytelling to enhance understanding by intended users. The city should engage with national agencies and international organizations to solicit technical support in areas where it lacks expertise. For example, the city should actively engage with the NCMC to build an open line of communication. Subsequently, the NCMC can upskill city leaders and hold capacity building session on technical topics such as, GHG accounting and reporting. Not only will this improve knowledge and expertise within the city this transfer of knowledge will encourage a relationship between the city and national level.

Jurisdictional arrangements

Implementation of projects in Dar es Salaam related to transport, energy and waste management will require collaboration between the city and other local and national administrations, businesses, the private sector and communities. The challenges can arise when competing priorities and ambitions are related to livelihoods, land use, or development opportunities. Consequently, this may impact the design of projects and climate actions. For example, in Dar es Salaam, the national government permits vendors to do business in the streets, leading to blocking walkways.

Other external challenges:

Finally, Dar es Salaam acknowledges that there could be challenges associated with external events to the current mandate and situations, such as natural disasters, civil unrest and pandemics.
Dar es Salaam city considers CAP implementation a priority and will address barriers as and when they arise. Responses will vary depending on the type of barrier, when it happens and the circumstances. The city will be prepared by supporting initiatives aimed at capacity-building among city staff. The city will build capacity to address knowledge and awareness issues, improve communication and coordination, closer engagement with the national government or other local administrations and other stakeholders. Lessons and experiences gained from addressing barriers will be applied when reviewing the Dar CAP.

05
Implementation approach

5 Implementation approach

Dar es Salaam City Council's capacity to deliver climate action is dependent on the structure, functions, and powers of the city departments and agencies to control or influence assets or services and access to adequate resources (both human and financial). Although each of the actions in Section 4 identified a lead agency and collaborating agency(s) or stakeholder(s) to help identify opportunities for accelerating efficient and effective delivery, Dar es Salaam recognises the need to identify cross-cutting governance and resourcing needs. Therefore, this section summarises the anticipated CAP governance arrangements, available human resources and potential financing strategy to manage and deliver the CAP actions, mainstream climate change, and ensure a solid foundation for future climate change work in the city. The main co-ordinating unit for CAP implementation is DCC in collaboration with leading agencies and departments. DCC will invite leading agencies during its annual reporting and planning to present when CAP implementation is presented.
Please see the CAP governance below for more detail on the frequency of reporting and communication.

5.1 CAP Governance

Good climate governance includes three main dimensions: the policy framework, government structure and processes, and enabling conditions. Enabling conditions include leadership and commitment, which underpin this plan. To manage and implement the CAP, Dar es Salaam intends to utilise existing structures and functions. The CAP identifies the key governance elements and associated responsibilities to support a successful implementation, outlined in Table 8 below.

Table 8: CAP governance

Good Governance Element	Governance Objective	Responsibility
Policy framework – Mainstreaming policy; Legal framework	Setting and reviewing policy direction	The City Director will be responsible for the final approval of the CAP and setting and reviewing overall policy direction
Government structures & processes - Cross-departmental arrangements and actions	Accountability for delivering the vision of the Plan	Head of Environment and Waste Management unit, Urban Planning, and Environmental Conservation departments have overall responsibility for climate change Departments and officers are responsible for managing climate change-related areas and will therefore play a key role in the implementation of climate actions and policy objectives Regional Administrative Secretary (RAS) Office

Good Governance Element	Governance Objective	Responsibility
Policy framework – Vertical integration; Legal framework	Ensuring alignment and coordination with national environmental objectives	The City Director will be responsible aligning with national plans The RAS office is the official link between central government and local authorities in relation to the implementation of climate change initiatives
Government structures & processes - Capacity and resource	Providing or coordinating technical and professional guidance	The City Director will be responsible for approving capacity building on climate issues National Carbon Monitoring Centre (NCMC) to provide technical assistance
Government structures & processes - Capacity and resource; Institutional structures, roles and responsibilities	Providing oversight to ensure resources are used efficiently	City Director is responsible for ensuring the efficiency of resources Internal Audit Unit Planning, Monitoring and Statistics department
Government structures & processes - External engagement; Communication & engagement	Coordinating stakeholders	The City Director will be responsible for approving coordination with other stakeholders Information Technology and Communication Unit
Government structures & processes - Capacity and resource; budgetary mainstreaming	Facilitating resource mobilization (finance, technical, human)	The City Director will be responsible for representing the city in Resource Mobilization Finance and Trade Department
Government structures & processes - Monitoring & reporting	Monitoring and reporting progress	Solid waste management and Environmental Conservation Department
Government structures & processes - Institutional structures, roles and responsibilities	Updating the CAP	Solid Waste Management and Environmental Conservation Department Planning, Monitoring and Statistics department

5.2 Human resources

To implement Dar es Salaam's CAP, several key individuals and departments will be required to coordinate resources and mobilise finances to facilitate the implementation of actions.
At the National level, laws and policies, including Environmental Management Act (EMA), National Climate Change Strategy (NCCS) and National Determined Contribution (NDC), have guided how climate issues should be coordinated and implemented at a local level. Overall local authorities are required to allocate human resources from environment-related units to implement climate-related initiatives. Implementation of Dar es Salaam CAP will therefore draw human resources from the following authorities, departments and units:

Office of the Dar es Salaam City Director

The office is headed by the City Director, responsible for all the technical and administrative matters within the jurisdiction. The office has the power to directly implement measures related to climate change mitigation and adaptation in government-owned buildings and housing, public transport, solid waste management, wastewater, disaster management, agriculture and ecological sites. Therefore, the City Director will approve the CAP, provide overall guidance, support its implementation, and appoint a focal person from the Department of Waste Management, Environment and Urban planning.

Office of the Dar City Mayor

The political Head of the Dar es Salaam City Council. Councillors who represent citizens sit under the Mayor. The city councillors approve decisions for the city, such as setting the city budget and developing city plans. The office will be responsible for advocating CAP implementation politically and mobilising support from Dar es Salaam communities. The Mayor and one assistant will follow up on CAP implementation.

Office of the Regional Commissioner

The direct representative of the executive in the region. Although not directly involved in the CAP process, the office has been informed about the process and will support CAP implementation. The Office of the Regional Administrative Secretary (RAS) Office is the main link between the city, the central government (President Office – Regional Administration and Local Government) and the four municipalities. The CAP process will feed into the national climate actions such as IND/NDCs through this office. The office will appoint one focal person to follow up on the CAP implementation.

Municipalities

Directors from the four Municipalities of Kinondoni, Temeke, Ubungo and Kigamboni will translate CAP implementation within their areas of jurisdiction. Tasked with implementing plans and actions, municipal councils are also responsible for providing basic social services, economic and environmental infrastructure. The Directors will appoint focal persons to follow up CAP implementation from the Department of Environment, Waste Management and Urban Planning.

5.3 Finance strategy

A common barrier to the implementation of climate actions is a lack of finance. Addressing climate change in Dar es Salaam will need financial support from the international community, such as the Global Environment Facility (GEF), banks and bilateral funds, alongside domestic funding from the national government budget and the private sector. This CAP sets out a detailed plan for financing each action, in the details included in section 4.2.

Dar es Salaam City Council will aim to access funding within its internal budgets and achieve budgetary mainstreaming. The goals and targets of the CAP are aligned with the city budget. Dar es Salaam City Council will also aim to ensure future planning and allocation of the city budget is, wherever possible, mainstreamed and aligned with the CAP actions and goals to ensure that budget decisions support resilient and lower carbon solutions. Furthermore, Dar es Salaam City Council aims to adopt an integrated approach to ensure that funding streams are accessed to achieve the actions presented in this CAP most effectively – for example, identifying synergies and linkages between actions as well as striking a balance between financing both adaptation and mitigation. Such a balance is also important in financing other areas such as capacity building, technology development and spreading awareness.

This CAP has identified several sources of finance available to explore further as the city moves into the implementation phase. Potential funding routes available to support the CAP are presented in the table below, identified during the 'Ready to Implement workshop'. Stakeholders worked in groups to identify new funding opportunities within each sector and map out existing funding structures within the city and any potential barriers. These barriers are significant and will need to be overcome by the city through capacity building and technical assistance (for example, on project preparation and accessing international support) and advocacy and engagement with key internal and external stakeholders.

Table 9: Potential funding to support CAP implementation

Funding route	Sources of funding	Barriers to access
International	• Embassies (Holland, Germany, Sweden, Denmark, China etc.) • C40 (CFF) • International Monetary Funding Institutions and Banks (World Bank, IMF, AfDB) • International Donors (EU, UK Aid) • International Development Agencies (GIZ, KOICA, USAID, JICA, DANIDA) • Regional Communities (Commonwealth, SADC, EAC, AU) • GEF •CDM / REDD •ICLEI •SIDA •UN Agencies (UNDP, UNIDO, UNEP, UN Habitat)	• Proposal preparation – practical and capacity constraints • Technical expertise required to access • Pandemic re-prioritisation of donors • High-interest rates of loans • Terms and Conditions may be prohibitive • Different perspectives and priorities (Donor vs beneficiary) •Limited policies

Public sector	•City Budget sources from fines/penalties •Loans •Shares (UTT, DCB, Darbrew) •REA •Voluntary contributors from local companies & well-wishers	• Inadequate budgets available • Inflation rate • Priorities and concerns differ • Political will • Limited capacity • Lack of expertise • Bureaucracy • Outdated Masterplan •Lack of supporting policies
Private sectors	•City Budget sources from fines/penalties •Loans •Shares (UTT, DCB, Darbrew) •REA •Voluntary contributors from local companies & well-wishers	• Inadequate budgets available • Inflation rate • Priorities and concerns differ • Political will • Limited capacity • Lack of expertise • Bureaucracy • Outdated Masterplan •Lack of supporting policies
Private sectors	•Sectoral sources of funding •Private Banks (CRDB) •SEI (Stockholm environmental institute) •LEAT (Lawyer environmental action team) •Private Companies •TPSF	• Polices (National) • Limited information • Differences between priorities and interests • Readiness / Willingness • Trust • Economic instability • High interest and Tax

06
Ensuring impact and delivering the plan

6 Ensuring impact and delivering the plan

This CAP concludes a two-year journey of Dar es Salaam City Council and stakeholders, working to agree on the actions needed to address climate change. These actions result from the initial appraisal, a comprehensive city-wide GHG inventory, a rapid Climate Risk Assessment, development of emission reduction pathways, and identifying a long list and then a shortlist of prioritised actions to deliver the climate goals. Each action has corresponding responsible implementors, a timeline and other details to support its implementation. Dar es Salaam City Council is committing to not only implement its agreed actions but also follow and encourage other partners to effectuate theirs.

Dar es Salaam's CAP is also intended to align with and support the delivery of existing strategic plans and policies in the city. As such, the CAP has been designed to work with the Dar es Salaam Strategic Plan, for example, through pilot projects (as outlined in Appendix 3) and through linking to existing priorities and actions, as shown below in Figure 28. The pilot projects will support fast-track implementation of CAP actions and delivery of goals

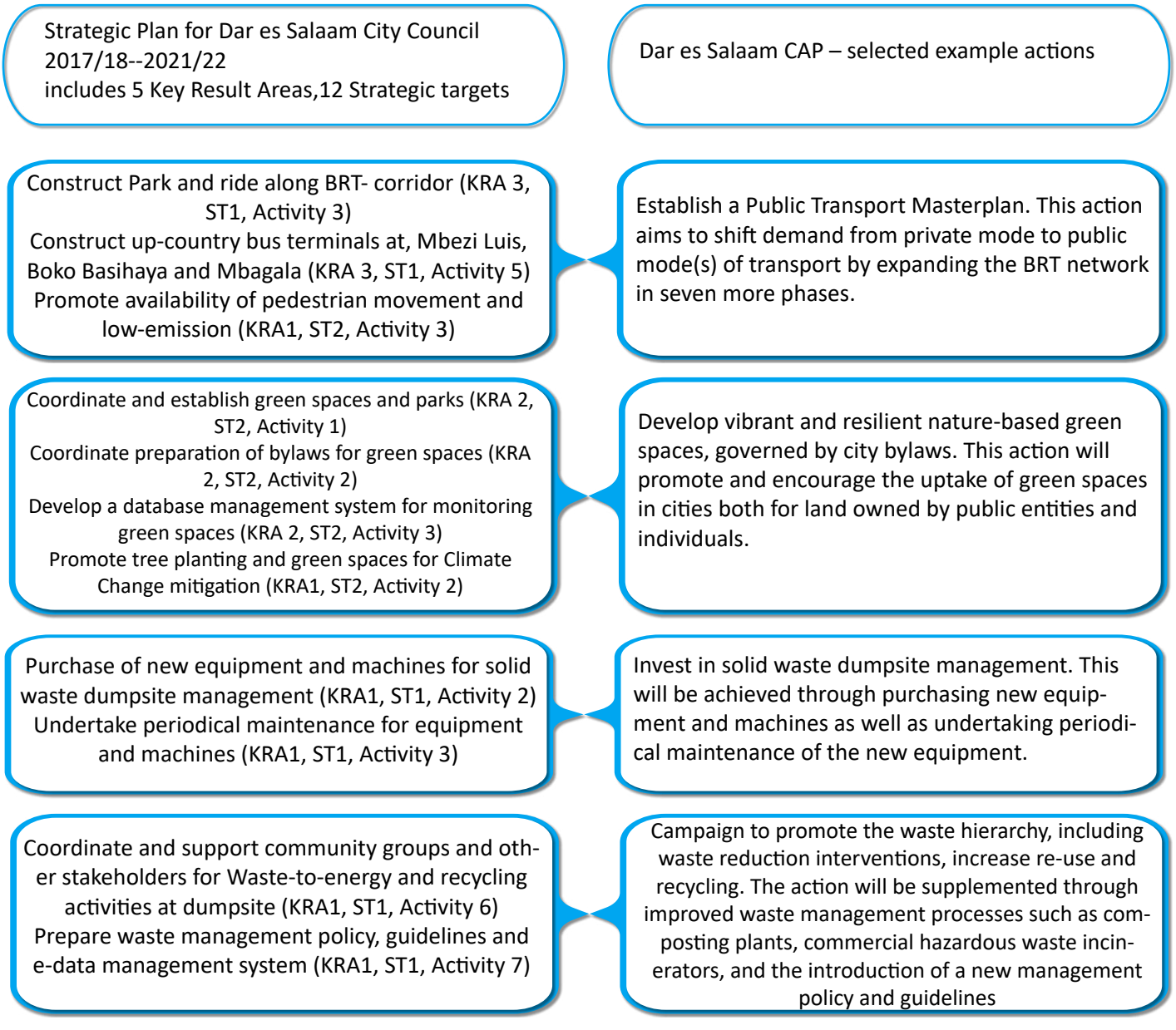


Figure 28: Connecting CAP actions to the Dar es Salaam Strategic Plan – selected examples

6.1 Monitoring, evaluation, reporting and revision

Dar es Salaam's CAP encompasses a series of ambitious actions to ensure Dar es Salaam is a climate-resilient city and achieves net-zero emissions by 2050. A key component in successfully reaching these actions is to monitor the city's progress towards CAP implementation. Therefore, establishing a monitoring and evaluation (M&E) system will allow the city to track the performance of climate actions throughout the lifespan of the CAP. This is a fundamental pillar of the CAP process because it enables transparent tracking and reporting of the activities and, more importantly, their impacts.

Robust institutional structures support effective M&E systems. The M&E systems for the CAP will build on existing city structures and will link to the National Climate Change Strategy (NCCS) framework. It is important to define the specific roles and responsibilities of all parties included. As such, the actions in this plan all designate a lead agency, who will be responsible for monitoring and reporting on the implementation of the action. It is also important to promote regular communication between all parties and ensure robust methods and data are identified for tracking actions. This will ensure both vertical and horizontal integration and smooth implementation of all actions.

Dar es Salaam City Council will lead the monitoring of CAP implementation, both existing and ongoing actions, as well as progress made to implement new actions. This will ensure the CAP is delivering against the city's goals and is responsive to new opportunities and challenges.

6.1.1 Existing Structures for M&E

The National Carbon Monitoring Centre (NCMC) is mandated to manage data needed for the national M&E of climate action in Tanzania. The centre's main purpose is to build national capacity to measure, verify, and report adequately on carbon emissions at the national and international level. Dar es Salaam aims to build relations with the NCMC to promote information sharing on key issues such as GHG inventory and activity data, indicators, analysis of sectors and actions and making such data available. This will improve Dar es Salaam's understanding of their alignment on the city's contribution to national goals. Dar es Salaam aims to establish a technical working group to share knowledge and information with the NCMC regularly and build capacity on key technical issues. Not only will this support Dar es Salaam's CAP in developing robust M&E systems but, in the long term, there is an opportunity for the city data to feed into the NCMC to enhance national MRV activities.

Alongside the NCMC, Tanzania's Vice President's Office (VPO) monitors the implementation of the NDC, NCCS and Environmental Management Act through Sector Environmental Sections, the Regional Environmental Experts, and the Town/City/Municipal/District Environmental Management Officers. The Environmental Management Officers from the local government authorities (LGAs) report on the implementation status to the VPO Department of Environment. The information obtained is then compiled into various periodical monitoring reports and made available to stakeholders through quarterly and annual reports, budget speeches and relevant reports. The evaluation of action at the national level is undertaken throughout the whole intervention period (i.e. ex-ante, mid-term, and ex-post evaluation).

6.1.2 M&E Plan for the CAP

Dar es Salaam City Council will consider opportunities to build on the existing national MRV framework to support the CAP M&E system. This will need to be supplemented with city-specific data to provide a more detailed understanding of the impacts associated with the CAP actions. To design an effective system for evaluating the impacts of actions, it will be important to identify the purpose and scope of the evaluation, i.e. which interventions or policies are being assessed, over which timeframe, and geographic area. This will influence the approach to the monitoring system and will ensure the outputs

are robust and reliable. The main coordinating unit for monitoring Dar es Salaam's CAP is DCC in collaboration with several key stakeholders who will range from the local to city to National level. Please refer to the CAP governance structure in section 5.1 for more detail on the different entities who will be responsible for the M&E plan.

During the initial phases of implementation, the city will focus on priority actions to ensure that these actions are regularly monitored through the use of indicators. Suggested indicators for each action are outlined in Annex 1. Once Dar es Salaam has confirmed the set of indicators for its actions, a data collection plan will be developed. This will provide an overview of each indicator of what is being measured, the baseline, the targets, and data sources and align with existing systems for data collection. It will also specify the key parties for collecting data, how often and who will be responsible for reporting the data.

Dar es Salaam commits to update its GHG inventory on at least a 2-yearly basis, in order to track and report GHG emissions. The City aims to work together with the National Carbon Monitoring Centre (NCMC) to do this, and enhance the quality of both city and national GHG data. Dar es Salaam City Council aims to share this data via a public reporting platform to ensure the city's accountability and engage with public members in a transparent manner.

The City also commits to updating the CAP at least every 5 years, with the next update due in 2026 (which will also align with the end of the current NCCRS and FYDP).With regards to the Climate Change Risk Assessment (CCRA), the city will aim to update the Rapid CRA into a full CCRA report every 5 years based on availability of funding, to assess risk reduction on top assessing emissions reduction.

6.2 Supporting national climate action

Dar es Salaam's CAP has been developed as a contribution to the implementation of national-level climate processes, plans and strategies. The monitoring framework set out in the NCCS and NDC will be utilized for the CAP monitoring and reporting, and as such, monitoring of the Dar es Salaam CAP will be used to demonstrate the contribution of Dar es Salaam in the implementation of national climate policies. Dar es Salaam City Council will be required to oversee monitoring, reporting, and verification of emission reductions to track CAP implementation. This requires a high level of technical input. Hence, Dar es Salaam City Council will utilize the technical assistance from NCMC as a national Centre of excellence on MRV along with other regional and international institutions to facilitate the tracking of emissions.

6.3 Next steps

Climate actions presented are a result of broad discussions and engagement with stakeholders with high levels of influence on CAP implementation. Some agreed actions are being implemented and will be undertaken by the City itself, for example, on landfill and waste management. Others, such as electricity/energy, will be implemented by national agencies. It is, therefore, necessary that the capacity of Dar es Salaam City Council to coordinate information needed to enable stakeholders to implement CAP is considered.

Financial and technical resources are needed to implement this CAP. Luckily, there are existing global climate financing mechanisms. This CAP provides the city with a good reference and basis for attracting resources. The CAP is evidence of the city's readiness and commitment to address climate change.

Existing and new actions show the potential of Dar es Salaam and demonstrate the achievement possible. The city will develop joint project proposals with other players to harness the power of partnerships and collaboration. Success in developing pilot projects within the first five years of CAP implementation will form an important measure and step towards achieving the CAP's medium- and long-term implementation.

This Climate Action Plan is a living document. It sets out the priority actions for the next five years as well as longer-term goals. Dar es Salaam is committed to ensuring that the CAP stays current, identifies and prioritises the necessary new and emerging actions for the next delivery period, and can respond to new local and international technologies, opportunities and developments as well as challenges and pressures. When The CAP process started, for example, there was no COVID-19. This is now a reality that the world is living with, and its impacts are expected to remain for a long time. The CAP will therefore be updated to accommodate changes and emerging issues on a minimum of a 5-yearly basis, with the first update due in 2025.

Dar es Salaam's CAP will be communicated to all key stakeholders, the wider public and the international arena. In order to ensure the CAP is inclusive to the whole city including vulnerable groups the team will utilise several social platforms/routes to reach all key groups. In addition, the CAP will be translated into theSwahili languages, to prevent language barriers. DCC will use its city radio to reach out stakeholders within the city including communities. During the launch, media stations will be invited to cover the event and subsequent interviews with city administration, officers and stakeholder. Copies of CAP document will be shared with Directors and technical officers from the four municipalities as well as RAS office. Swahili CAP version will be shared with counsellors who will communicate the same to communities in their constituencies. CAP communication will utilize existing social media platforms to share sections as well as the entire CAP document.

Annexes

Annex 1 – Key performance indicators for climate actions

The following KPIs are examples of how the actions in this CAP could be will be measured monitored and reported annually by DCC. Further work will be needed to further refine these indicators and establish systems for collecting and tracking data. DCC will oversee the monitoring of all actions but will call on a diverse pool of responsible entities to gather the specific data needed for each KPI. The following list is an example of the key responsible entities who will work collaboratively with DCC. It is important to note that, this pool of stakeholders range from departments and agencies at a city and national level. List of key stakeholders who will be respsonsibile for collecting and report data on KPIs include: NCMC, DAWASA, MOID, NIT, TANESCO,TARURA,TAZARA, TURP, UDSM, and the four Municipalities. Key stakeholders will work with DCC to gather data for the CAP KPIs. The city will also work with these stakeholders to formalise these engagements and the process of identifying datasets and tracking them through a CAP governance structure that will detail how these stakeholders and various entities will communicate and report to each other.

	Actions	Example KPIs
1.	Enhance energy security and resilience of energy systems. This action will be achieved by reducing dependence on unsustainable energy resources by promoting renewable energy in the city.	• Reduction in GHG emissions (tCO2e per annum) • % of renewable energy within the city's energy mix • No. of renewable installations • No. of employment opportunities created in the sector
2.	Promote Public-Private Partnerships to invest in modern and renewable energy services and projects	• Solar PV installations (% buildings with technology installed) • Number of new RE units installed/year • Annual and cumulative capacity PV systems in kW
3.	Increase the resilience of the energy system to climate change impact	• Number of energy systems retrofitted to increase resilience • Number of resilient energy systems newly developed • Reduction in damage to energy infrastructure from extreme events
4.	Develop bylaws to encourage uptake of residential-scale renewables	• Solar PV installations (% buildings with technology installed; the number of new units installed/year)
5.	Programme to increase energy efficiency in commercial and residential buildings and encourage the uptake of small-scale renewables and energy efficiency improvements in existing buildings.	• High-efficiency appliances (% homes with high-efficiency appliances installed; number sold/year; number appliances • LED lighting (% homes with LED lighting installed; number of bulbs by type sold/year)
6.	A programme to promote energy efficiency improvements in industrial facilities, including fuel switching.	• Uptake of energy efficiency equipment (spend/sales per year) • Energy consumption in the industrial sector (MWh or litres fuel/year)
7.	Establish a regulation policy for charcoal production and use.	• The reduction of charcoal production (kg) • Uptake of efficient cookstoves (no. of cookstove) • Reduction of carbon emissions (tCO2e) • Improvements to air quality in the home and no. of mortalities due to poor air quality. • Rate of rural electrification (% of households) • Reduction of deforestation rates (per hectare)

	Actions	Example KPIs
8.	Invest in the protection and conservation of water basins and catchments, including flood control and rainwater harvesting structures.	• Assessment of the vulnerability of water sources (studies conducted) • Assessment rainwater harvesting potentials (studies conducted) • Water sources protected (hectares of catchment forests protected • Amount of rainwater harvested (Liters of m3)
9.	Promote integrated water resources management and development plans.	• Increase in the number of households with access to clean and safe water • Deep boreholes drilled (no of boreholes) • Assessment of the vulnerability of water distribution infrastructure
10.	Develop a strategy and regulations to ensure sustainable extraction of groundwater resources.	• Strategy or regulations developed
11.	Promote appropriate agricultural practices that increase resilience to climate change.	• Documented practices • Size of urban resilient farming areas in m3 • No of urban residents applying resilient farming practices
12.	Promote conservation of aquatic ecosystems and sustainable aquaculture initiatives.	• Damage to coastal ecosystems • Biodiversity loss • Reduced GDP
13.	Develop vibrant and resilient nature-based green spaces and improve accessibility, governed by city bylaws.	• Car ownership (% of private cars on roads, % of households owning cars) • Bike sales (no. of bike sales) • Area of urban green spaces (Hectares) • Increase in air quality in urban areas
14.	Mainstream climate change issues into infrastructure designing and development planning; enhance compliance of land use plans at all levels.	• Number of infrastructure plans that integrate/consider climate proofing measures. •Established processes which incorporate land use compliance.
15.	Promote the use of climate adaptive technologies in infrastructure designing and development.	• Designing and developing infrastructure using adaptive climate technologies (no of projects using the technologies)
16.	Mainstream climate change issues into urban and rural planning	• Damage to infrastructure • Damage to coastal infrastructure • Displacement of people • Land loss/decline
17.	The installation of solar lights on all public roads and in public places.	• No. of solar lighting installed
18.	Introduce real-time traffic information system	• Reduced journey times (minutes/journey)
19.	Establish a Public Transport Masterplan	• Personal motor vehicle (PMV) use (Vehicle Kilometers Travelled – VKT/year) •BRT use (no. of passengers/year; average journey length) • SGR Train use (no. of passengers/year; average journey length) • Number of cycle parking spaces per capita •The proportion of journeys made on foot, by cycle, or via public transport (%)

	Actions	Example KPIs
20.	Improvements to the feeder bus systems.	• Reduced journey times (minutes/journey) • Reduced waiting times (minutes waiting/journey) • BRT use (no. of passengers/year; average journey length) • The number of built P&R station
21.	Promote and improve the efficiency of existing city railway networks and to construct more lines by 2040.	• Reduced journey times (minutes/journey) • Reduced waiting times (minutes waiting/journey) • Railway users (no. of passengers/year; average journey length)
22.	Construct a Public Transportation Terminal.	• BRT use (no. of passengers/year; average journey length) • The number of built bus terminals
23.	Increase the use of alternative fuels, such as electricity, within the vehicle fleet	• No. of low emission vehicles (% of hybrid/electric / hydrogen vehicles) • Uptake of low emission vehicle grants (No. of grant applications) • Sales of petrol/diesel fuel (litres/ gallons of fuel in a time period) • Sales of catalytic converters
24.	Improving the efficiency of freights by promoting a modal shift of long-distance freight from trucks to railways.	• No. of freight vehicles on the road (% of vehicles) • Expansion of rail networks (km of railway lines, no. of rail ports, connections)
25.	Establish a high import duty on old vehicles.	• No. of private vehicles on the road (% of vehicles) • Money generated from a tax on imported cars ($)
26.	Invest in solid waste dumpsite management.	• Quantity of leachate generated and treated (m3) • Quantity of gas collected and utilized (m3)
27.	Increase the installation of new wastewater treatment systems promotes methane recovery.	• Volume of wastewater treated (m3/year) • No. of households connected to sewage network (households/year or % of households) • No. of misconnected sewers fixed (no. repairs/ year) •Proportion of sewage collected via formal wastewater network (%) •Quantity of gas collected and utilized (m3/year)
28.	Campaign to promote the waste hierarchy, including waste reduction interventions, increase re-use and recycling with a programme of waste reduction and reuse activities	• Waste production (tonnes/year) • Recycling rates (tonnes per type/year) • Amount of waste dumped and burned (tonnes/ year)
29	Promote wastewater reuse and recycling technologies	• Increased wastewater recycled • Decreased total final wastewater
30	Construct landfill facilities for the processing of solid waste in Kigamboni and Ubungo	• Waste production (tons/year) • Recycling rates (tons per type/year) • Amount of waste dumped and burned (tons/year) • No. of landfill sites been constructed

	Actions	Example KPIs
31	Increase the uptake of recycling activities at dumpsites through supporting community groups and other stakeholders.	• Waste production (tonnes/year) • Recycling rates (tonnes per type/year) • Amount of waste dumped and burned (tonnes/year)
32	Enhance capacity of the public health care systems to respond to climate change-related health risks	• Public health care systems with climate change-related health risks response plans • Improved response of public health care systems to climate-related health risks (No of causalities saved)
33	Improve climate-sensitive diseases control programmes	• Improvement of climate-sensitive diseases control programme • Decrease in climate-sensitive diseases (reduced no of sick people)
34	Improve knowledge on climate change-related occupational health risks	• Increased number of people in health occupation with climate knowledge
35.	Establish a high import duty on old vehicles.	• City planning to include climate-related disaster risk reduction (presence of climate-related risk reduction in the city planning)
36.	Strengthen the management of coastal resources and monitoring systems of erosion and sea-level rise	• Reduction of coastal erosion (m3) • Presence and strengthened of coastal resources monitoring systems (Monitoring repots)
37.	Improve monitoring and early warning systems of both sea-level rise impacts and extreme weather events for building adaptive capacity	• Timely delivery of monitoring reports and early warning systems
38.	Strengthen weather forecast information sharing for city residents and fishermen	• Timely delivery of weather forecast information
39	Promote resilient land use management and climate-sensitive development of human settlements	• Damage to infrastructure • Damage to coastal infrastructure • Reduced GDP • Displacement of people
40.	Promote diversified tourism products	• New tourism products established and promoted in the city (no of domestic and external tourists vising new products)
41	Promote sustainable livelihood diversification for communities reliant on natural capital within the city	• Number of new livelihood diversification introduced to communities
42	Promote the availability of social services in both city and municipal areas	• Improved health, education, water, electricity and transport services
43	Restore degraded tourist sites	• Number and size (m3) of tourist sites restored
44	Enhance adaptive tourism infrastructural development	• Number of infrastructure upgraded and established

Annex 2 – Pilot Projects

Dar es Salaam City Council wish to explore potential climate change pilot projects alongside the development of the Climate Action Plan, to speed up delivery of climate action, engage stakeholders and help identify opportunities for accelerating efficient and effective low carbon resilient delivery. The city's potential priority pilot climate change projects are identified in this section of the report.

A summary of all relevant priority/pilot projects are presented in the table below:

Key for benefits

Mitigation benefit / link	
Adaptation benefit / link	
Cross cutting benefits (both migtiation and adaptation)	

Table 10: List of Dar es Salaam's pilot projects

Pilot project	Status	Rationale for prioritisation	Alignment with Policy / Plans	Benefits
Supporting community groups and private companies to invest in recycling activities.	Being pursued	The project will improve waste management in the city, reduces emission from waste mismanagement and provides social, economic and environmental benefits.	DCC Strategic Plan (DCC-SP) NCCS, INDC and FYDP-II	
Preparation of waste management policy, guidelines and e-data management System	Identified	The project will increase compliance on Solid waste management; and Enhance information management for waste collection. Reduction in GHG emissions associated with waste.	DCC-SP Key Result 1, Strategic Target 1, Activity 7 NCCS, INDC and FYDP-II	
Awareness campaign on waste management	Being pursued	The project will increased compliance on Solid waste management; and enhance information management for waste collection. Reduction in GHG emissions associated with waste	DCC-SP NCCS and FYDP-II	
Promotion of tree planting and green spaces for Climate Change mitigation;	Being pursued by ICLEI	The project will increase compliance on Solid waste management; and Enhance information management for waste collection. Reduction in GHG emissions associated with waste.	DCC-SP Key Result 1, Strategic Target 2, Activity 2	

Pilot project	Status	Rationale for prioritisation	Alignment with Policy / Plans	Benefits
Promotion of modal shift to low emission transport solutions such as the increase of pedestrain movement.	Inital stages of planning. The indentifcation of sites and desgin planning.	This project will reduce GHG emisisons associated with from private cars.	DCC-SP Key Result 1, Strategic Target 2, Activity 3 NCCS and FYDP-II	
Coordination and supervision of Environmental Impact Assessment.	Being pursued by National Environmental Management Council (NEMC)	This project will increase the city's resilience via the integration of climate hazard planning with new city plans and projects for example flood protection.	DCC-SP Key Result 1, Strategic Target 2, Activity 4	
Collection and analysis of data on city Master plan.	Identified	Data collected as part of the CAP implementation will feed into the development of master plan and vice versa.	DCC-SP Key Result 2, Strategic Target 1, Activity 2 NCCS and FYDP-II	
Establishing and monitoring of green spaces and parks	Identified	This project will reduce exposure to air pollutants, noise and excess heat and reduced energy consumption for cooling. An addiitonal economic benifit will be an increase in the the tourism economy and leisure.	DCC-SP Key Result 2, Strategic Target 2, Activity 1	
Preparation of by laws for green spaces	Identified	This project will enhance compliance of by laws to ensure functioning and sustainability of green space	DCC-SP Key Result 2, Strategic Target 2, Activity 2	
Develop a database management system for monitoring green spacesI	Identified	This project will develop a data collection plan for mointoring green spaces and their associated impacts. This will include defining indicators, storing and collecting data.	DCC-SP Key Result 2, Strategic Target 2, Activity 3	
Coordinate implementation of flood control plan	Identified	The project will provide coordination and monitoring of ongoing and new initiatives to control floods in rivers in different parts of the city	DCC-SP Key Result 1, Strategic Target 2, Activity 3 NCCS and FYDP-II	
Establish a storm resilient infrastructure and develop a flood control plan and safe guarding flood infrastructure	Pursued	This project will improve the management of run off water and manage bank erosion from rivers and streams in communities adjacent to the rivers. Additionally, this project aims to reduce damage to assests and infrastructure. As a result reduce the costs associated with rehabilitaiton.	DCC-SP Key Result 2, Strategic Target 2, Activity 5 NCCS, INDC and FYDP-II	

Pilot project	Status	Rationale for prioritisation	Alignment with Policy / Plans	Benefits
Development of a Social economic profile for Public Private Investment (PPI) framework for climate resilient projects	Identified	The proposed framework will increased the avalbility of private and public investment for CAP implementation	DCC-SP Key Result 3, Strategic Target 1, Activity 1 NCCS, INDC and FYDP-II	
PPP-policy to address climate change challenges, as well as capcity building/training and M & E.	Identified	This project will increase investment from established PPP projects. It will increase revenue which can be used to support climate change challenges.	DCC-SP Key Result 3, Strategic Target 1, Activity 2	
Construction of Park and ride projects along BRT- corridor.	Identified	The project will increased use of public transport and reduced congestion, reduced emissions, air pollution and car usage.	DCC-SP Key Result 3, Strategic Target 1, Activity 3 NCCS, INDC and FYDP-II	
Development of a data collection plan on the impacts of improved bus terminals and connections.	Identified	This project will help to decongest traffic in the city, enhance revenue collection and increase employment opportunities.	DCC-SP Key Result 3, Strategic Target 1, Activity 5	
Strengthening relationships between DCC and the private sector to increase capacity within these sectors to address climate change.	Identified	The projects will increase social, environment and economic benefits within thesessectors. Additionally, this project aims to support vulnerable groups who are disproportionately affected by climate change.	DCC-SP Key Result 3, Strategic Target 1, Activity 6 NCCS, INDC and FYDP-II	
Introduction of support / services for vulnerable groups such as women and youth groups who are marginlized due to climate change.	Pursued	The projects will increase social, environment and economic benefits and aims to support vulnerable groups who are disproportionately affected by climate change.	DCC-SP Key Result 4, Strategic Target 2, Activity 1 NCCS, INDC and FYDP-II	

Reference List

1 Ahmad, Amisa Mwemezi (2015) Effects of Wastewater Discharge on Fresh Water Quality in Dar es Salaam: A Case of Msimbazi River. The Open University Of Tanzania.

2 Dar es Salaam City Environmental Outlook (2011), Vice President's Office, Dar es Salaam, Tanzania.

3 Dar es Salaam City Council Strategic Plan 2017/18 - 2021/22

4 EWURA (2010) Water Utilities Performance Report for 2009-10, Dar es Salaam, Tanzania

5 IPCC, (2014) Annex II: Glossary. In: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC, Geneva, Switzerland, pp. 117-130.

6 MOFP (Ministry of Finance and Planning) (2016) National Five-Year Development Plan 2016/17 - 2020/21. Dar es Salaam, Tanzania: Ministry of Finance and Planning

7 Noble, I.R., (2014) Adaptation needs and options. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 833-868.

8 The United Republic of Tanzania (2013), POPULATION AND HOUSING CENSUS, National Bureau of Statistics, Ministry of Finance, Dar es Salaam.

9 The United Republic of Tanzania (2014), Second National Communication (SNC) to the Conference of the Parties to the UNFCCC. Permanent Secretary, Dar es Salaam, Tanzania.

10 The United Republic of Tanzania (2016) NDC.

11 The United Republic of Tanzania (2021) NDC (Final Draft).

12 This information is available from the C40 GPC Dashboard at: https://www.c40knowledgehub.org/s/article/C40-cities-greenhouse-gas-emissions-interactive-dashboard?language=en_US.

13 UN-HABITAT (2008), City wide strategy for upgrading unplanned and un-serviced settlements in Dar es Salaam. Nairobi: United Nations Settlements Programme.

14 Word Bank, 2017 Tanzania Mainland Poverty Assessment Report, Tanzania.

15 World Bank (2018), Tanzania Urban Resilience Programme Annual Report. Tanzania.

16 World Bank (2019), Country Environmental Analysis, Tanzania, Environmental Trends and Threats, and Pathways to Improved Sustainability, Washington DC.

17 World Bank (2021), Tanzania Economic Update : Raising the Bar - Achieving Tanzania's Development Vision.

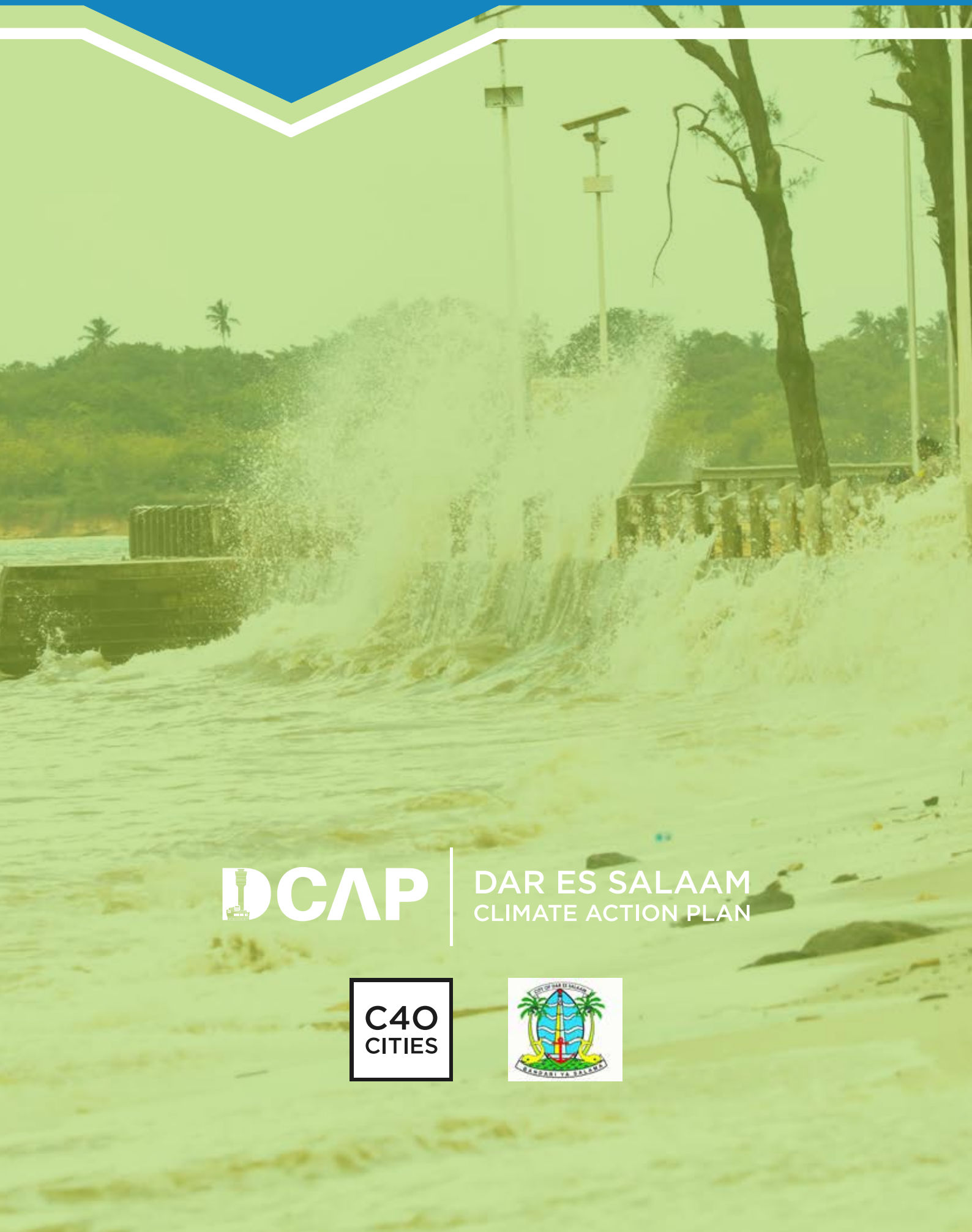
18 World Bank, (2016), Promoting Green Urban Development in African Cities DAR ES SALAAM, TANZANIA Urban Environmental Profile, Washington DC

19 World Bank, (2016), Promoting Green Urban Development in African Cities DAR ES SALAAM, TANZANIA Urban Environmental Profile, Washington DC

20 World Bank, (2016), Promoting Green Urban Development in African Cities DAR ES SALAAM, TANZANIA Urban Environmental Profile, Washington DC

21 World Bank, (2016), Promoting Green Urban Development in African Cities DAR ES SALAAM, TANZANIA Urban Environmental Profile, Washington DC.

22 WRI CAIT Climate Data Explore 4.0, 2018, FAOSTAT, 2018



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