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CITY OF CAPE TOWN CLIMATE CHANGE ACTION PLAN

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LET'S ACT

FOR A STRONGER CAPE TOWN

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CONTENTS

Acknowledgements	6
Forewords	8
A message from the Executive Mayor	8
A message from the C40 Executive Director	9

1 INTRODUCTION - WHY MORE AMBITIOUS CLIMATE ACTION? 10

1.1 From global climate crisis to local urban innovation	10
1.2 Cape Town - A context snapshot	10
1.3 Cape Town's climate change response journey	11
1.4 Building back better in the Covid-19 pandemic	13
1.5 Climate action as a means to greater equity, inclusivity and a just transition	14
1.6 A vision for a new level of ambition - Cape Town's Climate Change Strategy	15

2 THE CAPE TOWN EVIDENCE BASE FOR CLIMATE ACTION 16

2.1 Climate change risk in Cape Town	16
2.2 Cape Town's greenhouse gas inventory and carbon-neutral 2050 scenarios	18

3 FRAMING THE CITY OF CAPE TOWN CLIMATE ACTION PLAN 22

3.1 Cape Town's climate change action planning process	22
3.2 Scope of this Climate Change Action Plan	24
3.3 Challenges for implementation	25

4 ACHIEVING A VISION OF A CLIMATE-RESILIENT, RESOURCE-EFFICIENT AND CARBON-NEUTRAL CITY 27

4.1 Cape Town's vision	27
4.2 Reaching the vision: Pathways, work areas and a framework for action	27

5 UNDERSTANDING THE ACTIONS 31

5.1 Selection of actions	31
5.2 A guide to reading the actions	32

6 STRATEGIC FOCUS AREAS - A PATH FOR ACTION 34

6.1 SFA 1: Urban cooling and heat responsiveness	35
6.2 SFA 2: Water security and drought readiness	39
6.3 SFA 3: Water sensitivity, flood readiness and storm management	43
6.4 SFA 4: Coastal management and resilience	47
6.5 SFA 5: Managing fire risk and responsiveness	52
6.6 SFA 6: Spatial and resource inclusivity	55
6.7 SFA 7: Carbon-neutral energy for work creation and economic development	61
6.8 SFA 8: Zero-emission buildings and precincts	69
6.9 SFA 9: Mobility for quality of life and livelihoods	76
6.10 SFA 10: Circular waste economy	85

7 CROSS-CUTTING WORK AREAS - ENABLING LEVERS FOR ACTION 93

7.1 CCWA 1: Mainstreaming governance, research and knowledge management	93
7.2 CCWA 2: Economic impacts and green economy opportunities	98
7.3 CCWA 3: Business models, revenue and financing climate change response	103
7.4 CCWA 4: Communication, collaboration and skills development	108
7.5 CCWA 5: Promote, protect and enhance human and ecosystem health	114



8	MONITORING, EVALUATION, LEARNING AND REPORTING: A LIVING PLAN	122
8.1	Conceptual approach to developing a monitoring, evaluation, learning and reporting framework	122
8.2	Reporting on progress of this action plan	123
8.3	Ensuring the plan remains relevant and up to date	123
8.4	Learning	123
9	STRATEGIC ALIGNMENT	124

10	GLOSSARY	125
10.1	Definitions	125
10.2	Abbreviations and acronyms	127
11	REFERENCES	128
12	ANNEXURES	130
Annexure A: Hazard, resilience and risk maps		130
Annexure B: Carbon-neutral interim target detail		132
Annexure C: Actions overview table		134

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Accelerating ambitious climate change action requires a collective effort across the city; collaboration therefore forms the foundation of this plan. This spirit of partnership has been a key element in the development of the Climate Change Action Plan and is essential to support its implementation into the future. The climate change action planning process required, and relied on, active engagement and cooperation of many stakeholders within the City, across Cape Town and beyond.

The drafting team of the Climate Change Action Plan would therefore like to acknowledge and thank the following key stakeholders for their role in the development of the plan:

- **The Mayor, councillors and administrative leadership** for their support of an ambitious Climate Change Strategy and Action Plan.
- **C40 Cities Climate Leadership Group** for the wide-ranging support they have extended to the City under the Deadline 2020 programme and for their invaluable contribution to the work (in particular the Cape Town C40 city advisor).
- **Deadline 2020 partner organisations, including Sustainable Energy Africa and Ricardo Energy and Environment**, for bringing high-quality technical expertise to the process and supporting the climate change planning team in the conceptual design and review of the plan.
- **Agence Française de Développement** for generously funding the Climate Change Hazard, Vulnerability and Risk Assessment study, and **OneWorld** for carrying out the study.
- **The Western Cape Economic Development Partnership** for facilitating many of the engagement sessions with stakeholders and supporting the City in the role of intermediary, which brought stakeholder engagement expertise to the process and enhanced transparency and accountability.

- **The many stakeholders across the city**, including civil society and NGOs, the private sector, academia, other spheres of government and especially residents, for participating and providing input into the public participation process of the Climate Change Strategy and other engagement sessions, interviews and discussions, which all helped to shape the strategic direction of the plan.
- **Finally, and most importantly, a wide range of City departments** for actively participating in the visioning and action development process and helping to guide alignment with key sector priorities. It is only through the commitment and collaboration of these City departments that this publication can be put into action.

Going forward, the City aims to deepen and expand collaboration in order to deliver the transformational change required to achieve a carbon-neutral and climate-resilient Cape Town. This action plan is an important step forward to realising that future.

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FOREWORDS

A MESSAGE FROM THE EXECUTIVE MAYOR

Changes to the world's climate are a global concern and have already resulted in significant economic, social and environmental impacts. Cape Town has first-hand experience of the severe negative effects on people, the environment and the economy that can be brought about through severe climate shocks such as our recent drought. However, our city also has great experience in how a large urban environment can pull together to overcome adversity.

Our current experience of the Covid-19 pandemic is further evidence that global shocks and stressors have an enormous impact on a major city and its future. Ultimately, our most vulnerable communities will be negatively affected the most by climate change if one looks at inadequate food security and poor human health conditions. Addressing these challenges also presents the opportunity to take actions that transform our city and become more equitable and resilient.

We have reached a defining moment in time: The climate actions we carry out now, collectively as a global community, will determine whether we will successfully avoid the most serious consequences of global warming. These actions will shape the lives of generations to come.

Recognising our important role in the global community and the necessity to take action at the local level, Cape Town joined leading climate action cities across the world under the C40 Deadline 2020 programme in 2018 and committed to developing a new Climate Change Action Plan to achieve carbon neutrality and climate resilience. This serves as the implementation plan for the City's new Climate Change Strategy and aligns with our Resilience Strategy. We are proud to be standing on the frontline of climate action alongside a network of global cities that share the same ambitious objectives.

Our plan aims to enable and support local innovative opportunities for environmentally sustainable economic and social development.

For instance, reducing citywide carbon emissions provides a suite of benefits, from improved air quality and human health to new opportunities for developing green economy programmes. Similarly, actions to increase climate change resilience will reduce risks to residents and businesses, and create a greener and more liveable city. These actions will support both the City's Covid-19 recovery plan and its climate change response. This will reposition Cape Town as an inclusive, resilient and connected smart city that can enable investment in new or existing sectors, leading to job creation.

Let's ACT. For a stronger Cape Town. The way forward is clear: We need to deliver an ambitious Climate Change Action Plan and support improved livelihoods for residents. Our plan recognises and values the importance of meaningful engagement with all our stakeholders, and the collective effort and ownership of the plan from all spheres of government, residents, businesses and organisations.

We are thus calling on all Capetonians to join our climate action journey. Let's act together, for a stronger Cape Town.

Alderman Dan Plato
Executive Mayor, City of Cape Town



A MESSAGE FROM THE C40 EXECUTIVE DIRECTOR

The City of Cape Town has a long history of progressively and technically responding to the climate crisis. In 2017, Cape Town demonstrated its continued commitment to climate change action by aligning its climate targets with the Paris Agreement and joining the C40 Deadline 2020 programme. Deadline 2020 supports cities in developing plans that translate the aspirations of the Paris Agreement - to limit global heating to 1,5 °C - into city-level action.

I would like to congratulate Cape Town on this important milestone in their climate change response journey, as you join other leading African cities by publishing an ambitious, inclusive, evidence-based Climate Change Action Plan. The plan serves as the implementation roadmap for Cape Town's new Climate Change Strategy, and addresses the urgent need to reduce greenhouse gas emissions and adapt to the impacts of climate change. This action plan reflects the City's commitment to climate justice, poverty eradication and social equality by ensuring that the transition towards a carbon-neutral and resilient city prioritises the city's most vulnerable communities and results in an equitable distribution of benefits.

The completion of Cape Town's Climate Change Action Plan is timely as the city, together with the global community, looks towards recovering from the tragic loss of human lives and the associated socio-economic impacts of the Covid-19 pandemic. In these trying times, this plan

seeks to build back better and looks towards the opportunities of transitioning to a green economy with the potential to attract investment, create jobs and build resilience.

Finally, I would like to recognise Mayor Dan Plato's leadership and the contributions his city has made to C40 as an organisation over the years - sharing Cape Town's experiences with other cities and gaining insights from fellow mayors' best practices in reducing emissions and increasing resilience. We look forward to continuing to work with and learn from Cape Town as you continue your journey of implementing the actions needed to ensure a climate-safe future for all.

Mark Watts
C40 Executive Director



1. INTRODUCTION - WHY MORE AMBITIOUS CLIMATE ACTION?

1.1. FROM GLOBAL CLIMATE CRISIS TO LOCAL URBAN INNOVATION

Globally, countries, cities and a broad base of civil society organisations, including youth movements, are increasingly calling for ramped-up climate change action. This is in recognition of the urgent nature of the climate change threat and its risks to socio-economic development, environmental sustainability, and human health and well-being. This urgency is based on an established evidence base - various reports by the Intergovernmental Panel on Climate Change (IPCC), including the IPCC Fifth Assessment Report (2014) and the IPCC Special Report on Global Warming of 1,5 °C (2018), state that the warming of the climate system is now undeniable. The IPCC Sixth Assessment Report (2021) states that evidence of observed changes in extreme events has already strengthened since the 2014 report and has elevated the urgency by warning that “global warming of 1,5 °C and 2 °C will be exceeded during the 21st century unless deep reductions in carbon dioxide (CO₂) and other greenhouse gas emissions occur in the coming decades.”

Cities have a role to play at the forefront of climate action through civic leadership, the provision of utilities and services, regulatory powers and planning functions. Their climate actions need to both reduce emissions and minimise the negative impacts of climate change on their people, the natural and built environment, and the local economy. The costs of early and proactive action to address anticipated climate impacts have been shown to be far less than delayed action or inaction.¹ At the same time, delayed action creates the risk of being left behind by the pace of change at which the world is moving towards carbon neutrality and a green economy.

The City of Cape Town ('the City'), while recognising the seriousness of the climate crisis, sees opportunities for local urban innovation and collaboration in heightening the ambition of climate change action. New approaches and

partnerships can help to increase social, economic and ecosystem resilience, drive transition to a competitive and efficient green economy, achieve a healthier urban environment and deliver more inclusive, cost-effective and sustainable essential services. However, the citywide scope of a Climate Change Action Plan means in many cases that the goals of the plan are only partly within the control or mandate of local government, or face regulatory barriers or the need for comprehensive sector reform. The City acknowledges that, in order for its Climate Change Action Plan to be effective, it must work closely in partnership with Cape Town's residents, businesses, organisations such as NGOs, faith-based organisations, academia, other spheres of government and international partners.

Furthermore, addressing climate change in any city, but especially a city of high inequality like Cape Town, is as much political and economic as it is technical. Therefore, the City recognises its responsibility to show civic leadership through visioning, planning, engagement, regulatory and technical innovation, infrastructure development, service delivery, and the running of its utilities and internal operations.

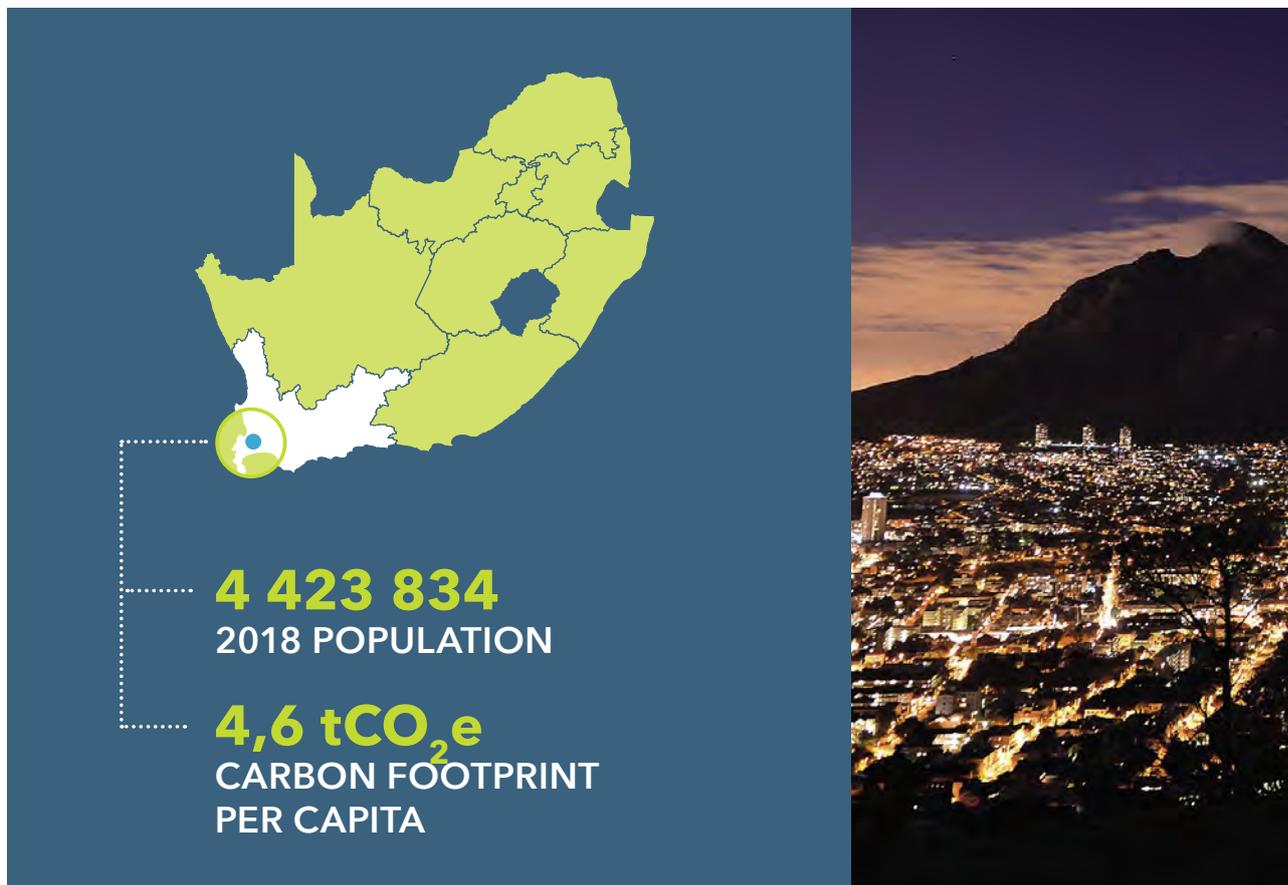
1.2. CAPE TOWN - A CONTEXT SNAPSHOT

Cape Town is a coastal city situated in South Africa's Western Cape province on the south-westerly tip of Africa. One of the most-visited tourist destinations in Africa, it is also the country's legislative capital. At over 4 million people, Cape Town is South Africa's second-most populous metropolitan municipality and is expected to grow to approximately 5,1 million people by 2030.²

Cape Town exists in a unique environmental context that makes the city particularly vulnerable to a number of challenges related to climate change. The city encircles the iconic Table Mountain National Park, is surrounded by 307 km of coastline and is home to the Cape Floristic Region - a global biodiversity hotspot. It is also home to

¹ Department of Environmental Affairs (2011).

² City of Cape Town IDP Annual Report (2018).



a large number of seasonal wetlands, freshwater bodies and watercourses. The climate of the region is classified as “warm-summer Mediterranean climate”; a rare climate type characterised by cold, wet winters and warm, dry summers.

Cape Town’s economy has progressively shifted towards a predominantly service-driven economy. A Gini coefficient of 0,62 reflects a large disparity of income, with high levels of unemployment and poverty. In this context, rapid urbanisation from the region gives rise to many challenges, including informality, urban sprawl, associated ecosystem degradation, and a burden of both communicable and non-communicable disease. All of these factors combine to create high levels of vulnerability in the city. Furthermore, the city has a relatively high carbon footprint (4,6 tCO₂e per capita)³ mainly due to its dependence on coal-intensive grid electricity and fossil fuel-based transport. Despite these challenges, and a period of low business confidence, Cape Town is highly marketable and hosts a skilled workforce and strong institutions, with many sectors (including food and beverage, tourism, financial services and information technology), having performed well in adverse economic conditions.

³ BASIC emissions (scope 1 and 2) based on the City’s most recent GHG inventory (2018 data year).

⁴ C40 Cities (2021). *Deadline 2020 - How cities will meet the Paris Agreement*. Available at: https://www.c40.org/other/deadline_2020

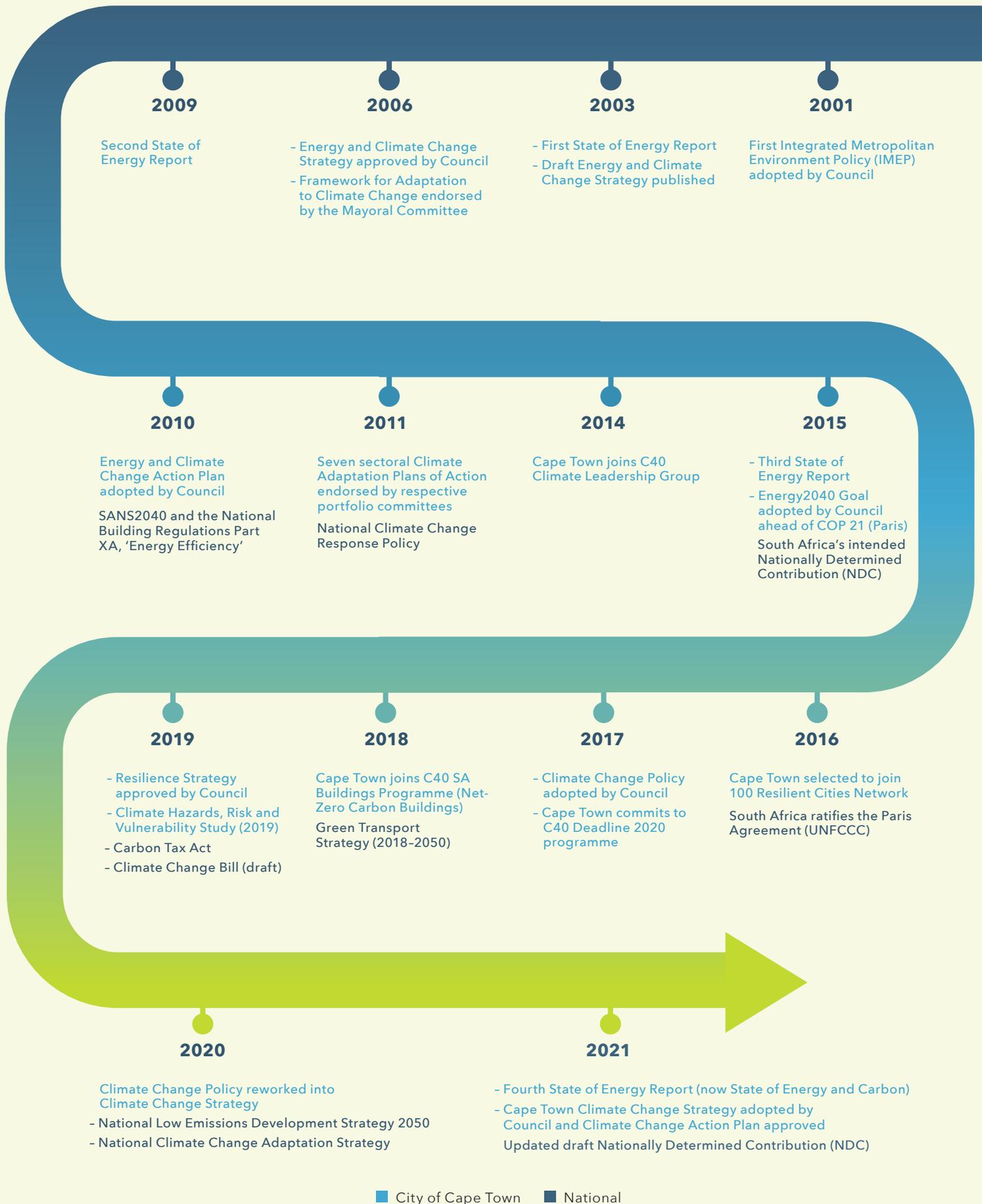
1.3. CAPE TOWN’S CLIMATE CHANGE RESPONSE JOURNEY

The City of Cape Town is building on a 20-year history of climate change response through strategy, policy and planning, in addition to programme and project implementation. An overview of strategic milestones is shown in Figure 1 in relation to key national climate-related strategies and legislation, and international commitments.

The City of Cape Town, along with other major South African cities, committed to the C40 Deadline 2020 programme⁴ in 2017; in so doing, it joined a global coalition of cities committed to high ambition and accelerated climate change action. This programme includes a commitment to develop a climate action plan that is consistent with the requirements of the Paris Agreement, which requires the world’s nations to become carbon neutral and climate resilient by 2050.

The adoption of the Climate Change Policy in 2017 was another important milestone, marking the point at which it was formally recognised that climate change is a significant threat to Cape Town and therefore required a dedicated policy and strategy approach.

Figure 1: The City's climate change response planning journey over the past 20 years and relevant national policy and strategy highlights.



■ City of Cape Town ■ National

1.4. BUILDING BACK BETTER IN THE COVID-19 PANDEMIC

At the time of publication, Cape Town and South Africa were in the process of responding to the challenges posed by the Covid-19 pandemic. At the core of any economy is trade – the exchange of goods and services. Fragile subsistence livelihoods and sectors dependent on normal social interactions and the movement of people were severely disrupted, and in some cases, devastated. However, as vaccines are becoming increasingly available and the end of the immediate health crisis is in sight, the focus of planning is shifting to economic recovery.

Many leaders have urged for economic recovery programmes to focus on a “green recovery as a bridge to a more resilient future”⁵ or a programme to “build back better”;⁶ there is an opportunity in crisis to do things differently regarding sustainability and equity. In planning a future beyond Covid-19, it is also critical, however, to recognise that climate change poses a similar future risk to economic development, lives and livelihoods.

Global commitments to climate resilience and carbon neutrality (rather than just low emissions) will continue to strengthen at a country, regional and local level. Corporations increasingly report their emissions across their greater supply chain and set targets for emissions reduction and adaptation implementation. Environmental, social and governance investment is growing, as are calls for an end to fossil fuel subsidies and new fossil fuel-based electricity generation. The world is changing technologically and politically, and the residents of Cape Town need to build prosperity in that world. A plan for adapting to the effects of climate change and achieving carbon neutrality is therefore an essential requirement for Cape Town’s enterprises to recover and trade competitively, whether it be construction, technology, food, film, tourism, manufacturing or any of the activities that sustain the city’s economy.

CAPE TOWN'S C40 COMMITMENTS:

For quite some time, the City has followed a partnership approach to meeting its climate change responsibilities. One such partnership is with the C40 cities network of over 95 affiliated cities representing approximately 700 million inhabitants and about a quarter of the global GDP. Through its membership, the City has volunteered to commit to climate action outcomes and timeframes as follows:

1. DEADLINE 2020 PROGRAMME

- i. Improve both the current climate resilience of the city and climate resilience to future climate impacts while inclusively addressing social needs.
- ii. Mitigate at least 80% of 2016 total emissions by 2050 in absolute terms. Interim targets are required that ensure emissions peak before 2030 at no higher than 2016 emissions plus 5%.

2. NET-ZERO CARBON BUILDINGS COMMITMENT

- i. Citywide: Net-zero carbon for new buildings by 2030 and all buildings to be net-zero carbon by 2050.
- ii. City-owned: Net-zero carbon for existing and new buildings by 2030.

3. GREEN AND HEALTHY STREETS DECLARATION (FORMERLY THE FOSSIL FUEL STREETS DECLARATION)

- i. Procure, with partners, only zero-emission buses from 2025, and ensure a major area of the city is zero emission by 2030.



5 World Economic Forum (2020). *IMF leader says pandemic stimulus must focus on battling climate crisis*. Available at: <https://www.weforum.org/agenda/2020/04/imf-pandemic-coronavirus-covid19-response-battle-climate-crisis/>

6 Mohammed, A.J. (2020). *After COVID-19, Africa can build back better*. Available at: <https://sacoronavirus.co.za/2020/05/28/after-Covid-19-africa-can-build-back-better>



1.5. CLIMATE ACTION AS A MEANS TO GREATER EQUITY, INCLUSIVITY AND A JUST TRANSITION

The concept of ‘just transition’ is founded in the labour movement, and in South Africa this has manifested as a media and political focus on the livelihoods of workers in the coal value chain. However, the 2018 National Planning Commission Social Partner Dialogue’s⁷ exploration of the concept of a just transition noted that “it has been broadened beyond a focus on protecting workers only, but also encompasses wider society, especially the most vulnerable, poor and working-class communities”. A recommendation of this process is for climate action (mitigation) plans to be in place in all metros by 2025 as these plans offer an opportunity to help manage the transition.

Climate action may seem to compete with a range of social and economic priorities, however,

the greatest impacts will be borne by residents with the lowest levels of adaptive capacity and resilience, and by workers in fossil fuel-intensive industries. Given the high local inequality, greater equity, inclusivity and a just transition need to be at the heart of Cape Town’s Climate Change Action Plan.

The following just transition aspirations have informed the development of the City’s Climate Change Strategy and actions:

- Job creation in a green economy and the transition of polluting industries
- Sustainable and equitable land use and management within the city
- Health, well-being, and access to a healthy and clean environment for all residents
- Accessible and affordable essential services and economic opportunities.

⁷ South Africa National Planning Council (2019).

1.6. A VISION FOR A NEW LEVEL OF AMBITION - CAPE TOWN'S CLIMATE CHANGE STRATEGY

In 2019, the City's Climate Change Policy (2017) was reviewed and substantively amended to form a strategy in the City's new policy framework, which positions strategies at the highest level in the organisation, with policies, by-laws and action plans as subsidiary instruments. The new [Climate Change Strategy](#) builds on the lessons of previous policies and plans and, within the realities of the local context and the need for a just transition, aligns with the ambition of the new global commitments.

This heightened level of climate change response ambition is embedded in the vision of the City's new Climate Change Strategy:

TO BECOME A CLIMATE-RESILIENT, RESOURCE-EFFICIENT AND CARBON-NEUTRAL CITY THAT ENABLES INCLUSIVE ECONOMIC DEVELOPMENT AND HEALTHY, THRIVING COMMUNITIES AND ECOSYSTEMS.

The City's vision of climate change response is supported by 10 principles underpinning the Climate Change Strategy:

- Resilience
- Economic inclusiveness
- Embedded sustainability
- Carbon neutrality
- Health and well-being
- Collaboration and integration
- Climate-responsive urban development
- Equitable service delivery
- Precautionary principle
- Innovation and transformational planning.

These principles inform the development of goals and actions in this plan.



The purpose of this Climate Change Action Plan is to detail the actions required to fulfil this strategic vision. Both the strategy and action development required building an evidence base of climate change risks and the sources and quantities of emissions, as well as exploring the current and planned climate change-related projects and initiatives across the City. This required data collection, analysis and extensive stakeholder engagement (both formal and informal), so that context-appropriate actions could be developed and linked to an implementing entity. This process is briefly described in sections 2 and 3 to support the action detail that forms the main body of the plan.

2. THE CAPE TOWN EVIDENCE BASE FOR CLIMATE ACTION

2.1. CLIMATE CHANGE RISK IN CAPE TOWN

In 2018/19, a Climate Change Hazard, Vulnerability and Risk Assessment was conducted for the City of Cape Town.⁸ This assessment included the following components:

- Mapping of climate hazards
- Identification of areas of vulnerability (both spatially and across sectors)
- An economic risk analysis
- Identification of key risk areas (both spatially and across sectors) based on the combination of hazards and vulnerability
- A set of recommended adaptation options.

The analysis was based on the Assessment Report Five (AR5) of the IPCC, and complemented by the IPCC Special Report on Global Warming at 1,5 °C. A spatial analysis of high-impact climate events was based on the most spatially detailed projections of climate change over southern Africa developed to date. This was done through the Centre for High Performance Computing (CHPC) of the Meraka Institute of the Council for Scientific and Industrial Research (CSIR) in South Africa. The study was based on a low climate change mitigation scenario (RCP 8,59),⁹ in line with current global trends in emissions. The study found that the projected impacts remain valid under lower emissions scenarios, although the magnitude of the impacts would be reduced accordingly.

The maps in Annexure A represent high-level summaries of hazards, vulnerability and risks, and are supported by a large number of more detailed and specific maps that are not included in this action plan. These maps indicate the interaction of climate hazards with vulnerability, thus affecting the overall risk profile of various areas of the city. Areas with high levels of resilience and low vulnerability are better able to adapt to climate hazards and therefore have a lower risk. Conversely, areas with high vulnerability are disproportionately likely to be severely affected by climate hazards such as heat, storms and fire.

2.1.1. CLIMATE HAZARDS

The results of the assessment showed that the following climate hazards are likely to occur in Cape Town, and have already started to occur to some degree:

- A decrease in annual average rainfall
- Changed seasonality of rainfall
- An increase in mean annual average, maximum, and minimum temperatures
- An increase in the number of very hot days (35+ °C) and the frequency and intensity of heatwaves (three days or more of 32+ °C)
- An increase in both average wind strength and maximum wind strength
- Sea-level rise and increased coastal erosion.

Table 1 provides more detail of these projected climatic changes. Figures 15 and 16 (Annexure A) provide a spatial overview of the exposure to all climate hazards (i.e. the likelihood of a particular hazard occurring in a given area) for the greater Cape Town region, for the mid-future period (2021-2050) and the far-future period (2070-2099).

2.1.2. VULNERABILITY

A set of 35 indicators was used to assess resilience and vulnerability (see Figure 17 in Annexure A) in the following broad categories:

- Health
- Income, employment and education
- Social cohesion and equality
- Level of service
- Access to services
- Ecosystem services.

The study found that high vulnerability to climate risk can be caused by a number of factors which vary widely across different areas of the city. Generally, vulnerability is correlated with low adaptive capacity, which translates into a lowered ability or an inability for people to adapt to or protect themselves from negative climate impacts. This can be due to a lack of resources because

⁸ OneWorld Sustainable Investment (2019).

of poverty or unemployment, a lack of access to basic services, exposure to chronic stresses such as high levels of crime, a lack of education on adaptation, or high levels of pre-existing health challenges. Ecosystem services also play an important role in reducing vulnerability in terms of buffering adjacent areas from the impacts of climate change. Because of this, it is important to acknowledge that Figure 17 provides only a summary overview of vulnerability and that drivers of vulnerability differ from area to area.

2.1.3. CLIMATE RISK

Climate risk is a function of both exposure to a hazard and the vulnerability of the people or infrastructure exposed to that hazard. For example, a severe storm that occurs in an unpopulated area would be a significant hazard but create low risk, as no people or infrastructure would be affected by the storm. Conversely, a moderate rainfall event that occurs in a highly populated area, with residents living in substandard housing and without adequate stormwater drainage, would create high risk as a large number of people are likely to be

significantly negatively impacted.

The hazard and vulnerability assessments were overlaid to identify key risk areas. Figures 18 and 19 show those areas that are most at risk due to a combination of exposure to climate hazards, and high levels of vulnerability/low levels of resilience for the mid-future period (2021-2050) and the far-future period (2070-2099).

Consequently, the following key climate risks were identified based on both the likelihood of a hazard occurring, the magnitude of the hazard, and the likely impact of the hazard on vulnerable people and infrastructure. These risks can be summarised as follows:

- Drought and associated water shortages
- Flooding and associated impact on people and infrastructure
- Heat stress and associated health impacts on vulnerable people
- Coastal erosion and sea-level rise, and associated impacts on coastal infrastructure

Climate variable	Projected impact on Cape Town	
	Mid-future period (2021-2050)	Far-future period (2070-2099)
Average, maximum, and minimum temperature	1-3 °C increase	3-4 °C increase
Very hot days (35+ °C)	0-20 days increase	0-50 days increase
Heatwave days (32+ °C for three consecutive days)	0-10 days increase	0-20 days increase
High fire-danger days	0-20 days increase	0-60 days increase
Rainfall (annual average)	60-120 mm decrease	80-160+ mm decrease
Extreme rainfall (> 20 mm)	0-3 days decrease	0-5 days decrease
Average wind speed	0-0,3 m/s increase	0,6-0,9 m/s increase

Table 1: Changes that are projected to occur in the mid-future and far-future periods

⁹ RCP is an abbreviation of Representative Concentration Pathway, which is a GHG concentration (not emission) trajectory adopted by the IPCC as part of the Fifth Assessment Report. RCP 8.5 describes a worst-case scenario for GHG concentrations based on a continued rise in emissions throughout the 21st century.

- Damage to infrastructure and property due to severe storms and strong winds
- Increased risk of fire, affecting both the natural environment and urban areas.

2.2. CAPE TOWN'S GREENHOUSE GAS INVENTORY AND CARBON-NEUTRAL 2050 SCENARIOS

2.2.1. BASELINE AND HISTORICAL EMISSIONS PROFILE

The City of Cape Town has a well-established, sector-based greenhouse gas (GHG) inventory, which is updated annually and reported to national and international reporting platforms, including the global Carbon Disclosure Project.¹⁰ This inventory complies with the international best practice Global Protocol for Community-scale (GPC) GHG inventories. In addition to tracking emissions, the data offer valuable insights into energy supply and consumption, waste and transportation in the city.

The inventory conforms to the BASIC¹¹ reporting level that includes the main contributors to the city's inventory (energy consumption, road transportation, organic waste and wastewater), but excludes emissions from the non-energy emitting sectors, i.e. Industrial Process and Product Use (IPPU) and Agriculture, Forestry and Other Land Use (AFOLU). High-level estimates support the assumption that these sources make a relatively small contribution to Cape Town's GHG emissions.

The use of a methodology based on fuel sales to estimate road transport emissions means that in

practice a large share of transboundary emissions from freight and long-distance passenger trips arising in the city - usually not included in BASIC inventories - are accounted for. Most aviation emissions are transboundary; they are not required to be reported against targets under BASIC standards but are still accounted for in the Cape Town inventory. However, given the historical growth of this sector and the local importance of tourism, the mitigation of aviation emissions is a strategic priority along with other transport emissions. Emissions occurring outside the city's boundary from marine fuel bunkers taken on in the city's port are estimated, but not currently reported against targets.¹² The local marine bunker industry has, however, diminished considerably in recent years due to high port charges and regional competition and is no longer a significant emissions source associated with the city.

A historical view of Cape Town's GHG inventory is presented in Figure 2. The best available data indicate that total emissions are stable. This stabilisation seems to be a combination of energy efficiency (especially evident in residential electricity demand) and subdued activity due to a period of low economic growth and dropping per capita incomes.

Figure 3 (on the following page) provides a sectoral breakdown of emissions for 2018, the latest year for which comprehensive information is available at the time of publishing. Although liquid fuels consumed by transport account for more energy in total, over half of the city's emissions arise from electricity use. This is due to the high carbon intensity of South Africa's coal-based grid electricity as compared to the relatively lower

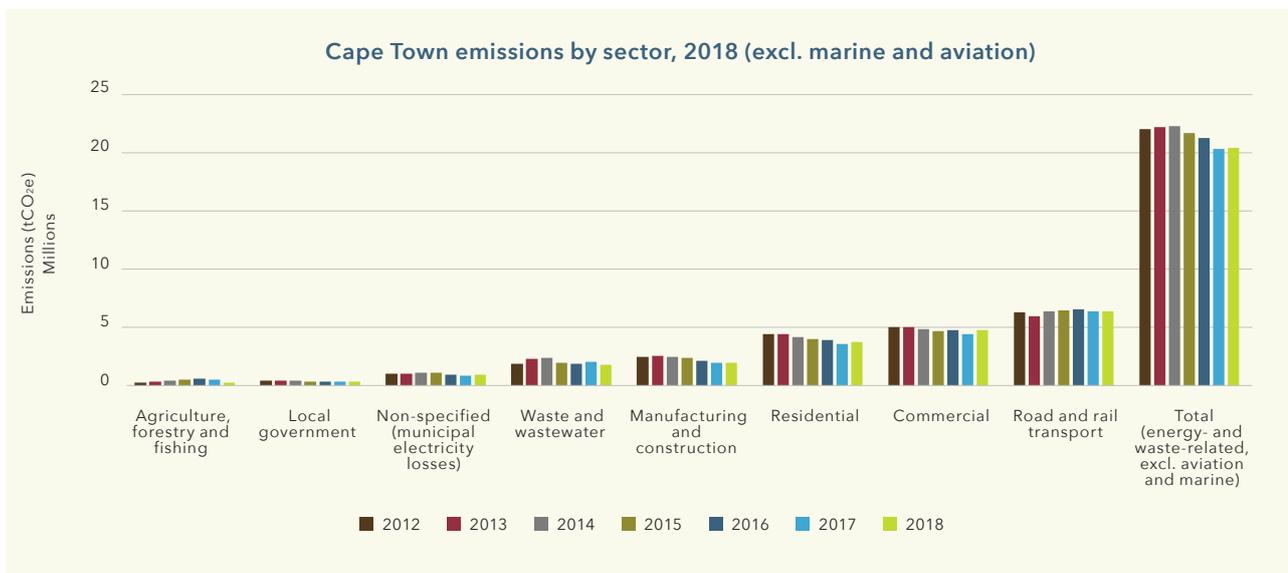


Figure 2: Historical sectoral GHG emissions for Cape Town

carbon intensity of transport fuels such as petrol and diesel.

The transport system is the second-largest contributor to emissions, but Cape Town, like all South African cities, does not have the densities and spatial organisation to support economically efficient mass transit over much of its area. Its well-located rail system is the backbone of integrated public transport plans, but its operator (the state-owned enterprise PRASA) and the system itself has been in crisis since about 2013. The City operates the scheduled bus utility MyCiTi, which offers a high-quality service, but in mode share terms remains small. Transport is dominated by private cars and minibus taxis¹³ that operate licensed routes, but in an unscheduled fashion on a cash basis.

Solid and liquid waste and industrial heating fuels account for smaller but still significant shares of the city's GHG emissions, together accounting for over a fifth of emissions. The waste sector offers some of the more short-term mitigation opportunities through aerobic composting and treatment. However, industrial heating fuels are, at this time, difficult to substitute.

2.2.2. CARBON-NEUTRAL SCENARIOS AND TARGETS

The C40 Deadline 2020 commitment classifies member cities according to their stage of economic development. Cities at different stages of development are expected to decarbonise at different rates. Cape Town is categorised as an early peak developing city and therefore needs to peak its emissions by 2030 with a modest increase. Then, leveraging technology scaled in developed markets, it needs to decarbonise rapidly to a 45% reduction by 2040 and to a minimum of 80% lower emissions than 2016 levels by 2050.

The tool employed for the City's carbon-neutral scenario modelling is the Pathways Tool developed by C40. Pathways is a forward-looking simulation model that builds on the City's GHG inventory. The tool makes projections for future emissions according to a set of context-specific growth assumptions and intervention possibilities for each of the emissions-producing sectors in the city. The emissions modelling for the various scenarios builds on the previous energy and emissions modelling carried out by the City for the Energy2040 Goal adopted by Council in 2015.

There is a high degree of uncertainty in Cape Town's long-term future emissions trajectory

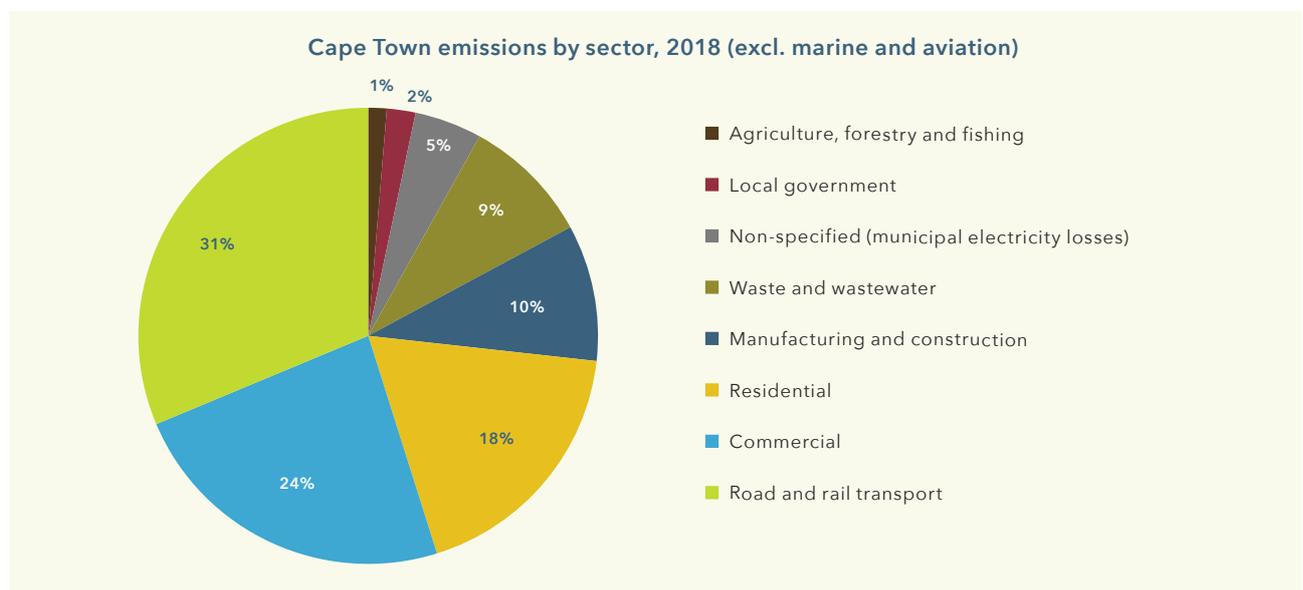


Figure 3: Sectoral GHG emissions contributions for Cape Town (2018)

10 Carbon Disclosure Project (CDP). Available at: <https://www.cdp.net>

11 The BASIC reporting level for cities covers scope 1 and scope 2 emissions from stationary energy and transportation, and scope 1 and scope 3 emissions from waste. Cities can select between BASIC and BASIC+ (more advanced) levels of reporting. In future, cities will be further required to report on their consumption-based emissions, which reflect the indirect emissions resulting from the consumption of goods and services in the city.

12 "IPCC guidelines allow for exclusion of international waterborne navigation and air travel, but these journeys and their associated emissions can be useful for a city to understand the full impact of the transit connecting through the city. The GPC requires water transportation wholly occurring within a city to be reported in scope 1 for BASIC, while emissions from all departing ships for inter-city/national/international trips shall be reported in scope 3 under BASIC+" (WRI, 2014).

13 Fleet of approximately 8 000.

and therefore the main value of the model is not predictive. Rather, it seeks to support the identification of actions and the setting of long-term and interim targets for the commitment to carbon neutrality. A scenario development approach was adopted as described in the sections that follow. A business-as-usual scenario and two pathways of ambitious action under optimistic (green economy) and pessimistic (ambition under limited mandate and opportunity) conditions were modelled. These scenarios were developed iteratively over two years, from June 2018 to June 2020. Both of the modelled pathways are more than adequate at the interim target year of 2030, but the pessimistic scenario reduces emissions only by approximately 50% by 2050.

2.2.2.1. BUSINESS-AS-USUAL SCENARIO

From a base year of 2016, Cape Town emissions are forecast to increase by 68% by 2050 in the business-as-usual (BAU) scenario (Figure 4), led by emissions from electricity consumption in commercial, residential and industrial subsectors, on-road transport, and waste. The emissions forecasts in this scenario are sensitive to a broad range of economic, technical and policy uncertainties. For example, a number of countries, including Hungary, Ukraine and Slovakia,¹⁴ show historical emissions strongly decoupled from GDP growth as a driver. Cape Town already has a long-term trend of electricity demand having decoupled from economic growth, which has kept emissions stable since 2012.

2.2.2.2. GREEN ECONOMY AND AMBITION UNDER LIMITED MANDATE AND OPPORTUNITY SCENARIOS

The green economy scenario is an optimistic pathway to meeting the City’s carbon-neutral commitment and would see emissions decrease by 90% between 2016 and 2050. This pathway is presented in Figure 5, which shows the

contribution of sectors to decarbonisation over time, relative to the BAU baseline. Electricity generation is a dominant feature, and building efficiency is important in the medium term. Transport-related emission reductions are slow to start with, but become more important in later years.

The premise of the limited mandate and opportunity scenario is that the current institutional and regulatory barriers to driving decarbonisation through metropolitan governments remain, but the City is ambitious within these limits. This scenario is therefore pessimistic on external factors but optimistic on internal factors. In this scenario, ambitious actions would achieve emission reductions of 54% from 2016 to 2050. This pathway is shown in Figure 6.

2.2.2.3. TARGET SETTING - INTERPRETING THE SCENARIOS THROUGH THE LENS OF UNCERTAINTY

The scenarios highlight the fact that the majority of emission reductions depend on the combination of cleaner electricity supply, reduced energy needs in buildings, and a move away from single-occupant motor vehicles to public and non-motorised transport. The transport transition is enabled (in part) by spatial transformation that supports densification and transit-oriented development (TOD) approaches. The diversion of organic waste, preferably for productive uses, is an important mitigation measure early on.

Any constraints imposed on the potential for cleaner electricity supply strengthen the importance of energy efficiency in buildings and the role of small-scale embedded generation. The implications are similar in relation to a cleaner electricity supply in both the transport and industrial sectors. From an emissions perspective, a cleaner grid permits a greater switch to public and private electric vehicles and fuel switching to

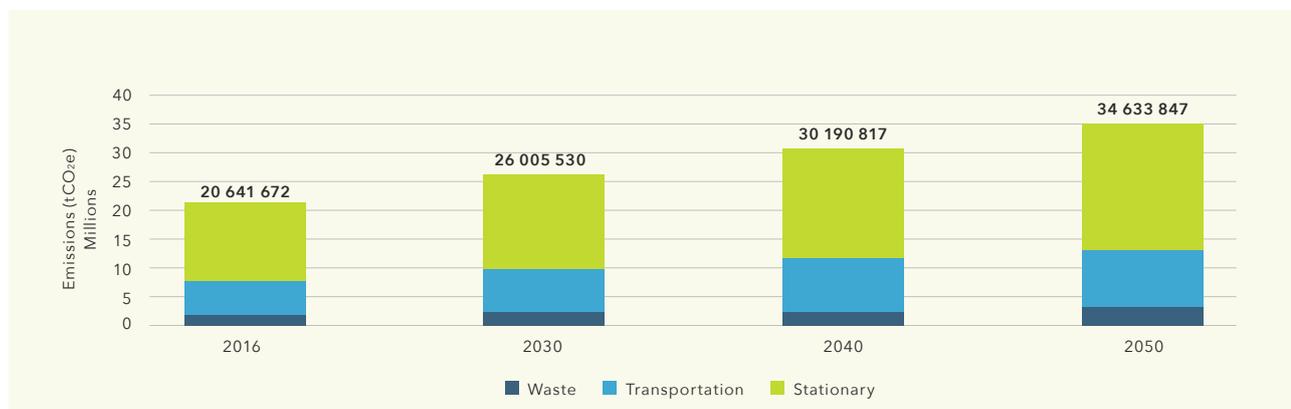


Figure 4: Business-as-usual emissions pathway

electricity in industry. In the case of transport, trip avoidance and public transit should be the first priority.

The detail of the City’s interim target, the approach to determining the target, the quantification of residual emissions, and the implications of all of these details are described in Annexure B.

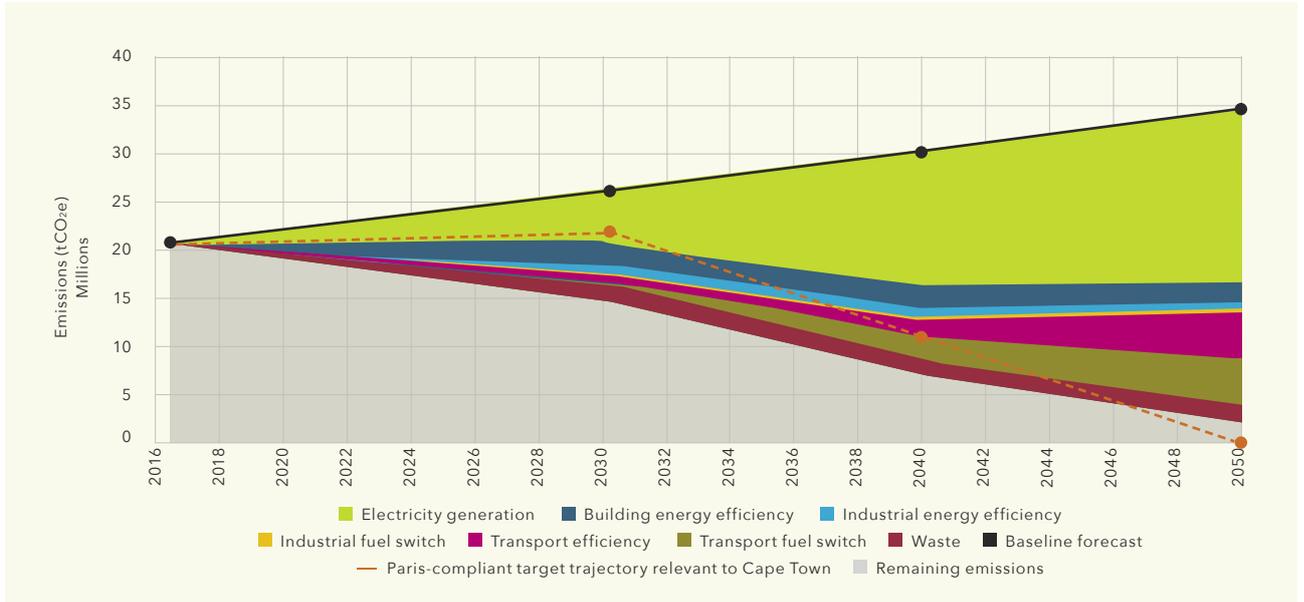


Figure 5: Emission reductions: Green economy scenario

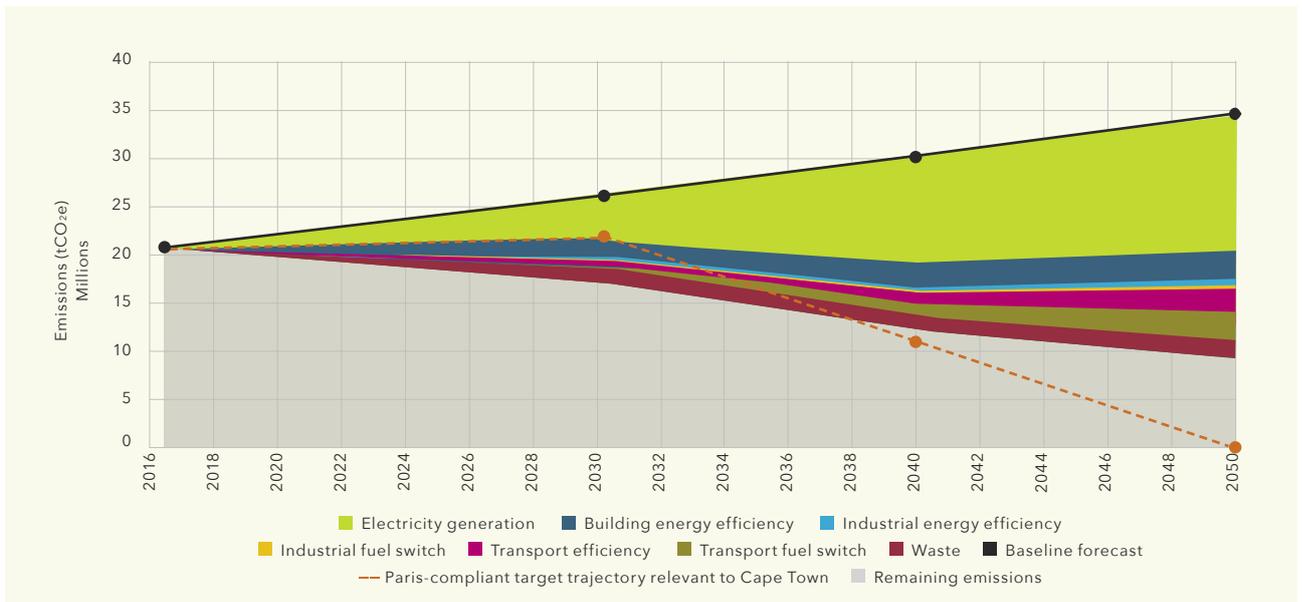


Figure 6: Emissions reductions: Ambition under limited mandate and opportunity scenario

14 World Resource Institute (2016). *The roads to decoupling: 21 countries are reducing carbon emissions while growing GDP*. Available at: <https://www.wri.org/insights/roads-decoupling-21-countries-are-reducing-carbon-emissions-while-growing-gdp>

3. FRAMING THE CITY OF CAPE TOWN CLIMATE ACTION PLAN

3.1. CAPE TOWN'S CLIMATE CHANGE ACTION PLANNING PROCESS

While the Climate Change Strategy lays out the City's vision for responding to climate change, this action plan details the actions and their context in each work area required to achieve the desired outcomes and goals of that vision. Many actions are held in common with the City's Resilience Strategy, as well as other key strategies, policies and plans of the City. Where an action has been derived directly from an existing City strategy, policy or plan, this is noted in the action description. The City's existing programmes have therefore been combined with new actions yet to be developed into projects and programmes.

It is important to note that this action plan contains actions that are at different stages of development. These include new areas of work that are either in the early conceptual stages or detailed planning, existing work areas that are in implementation but may require more explicit alignment to climate change objectives, or to be expanded or scaled up, and actions which are at an advanced stage at the time of drafting. As such, these actions are at various stages of maturity in terms of buy-in, planning detail, cost estimation and feasibility assessment. As shown in the action planning cycle in Figure 7, this plan is not intended to substitute the detailed planning of sector experts but rather initiate new, and support existing, ambitious climate change programmes.

This action plan is intended to be flexible and iterative in nature; as the City's approach to climate change evolves over time, the plan will

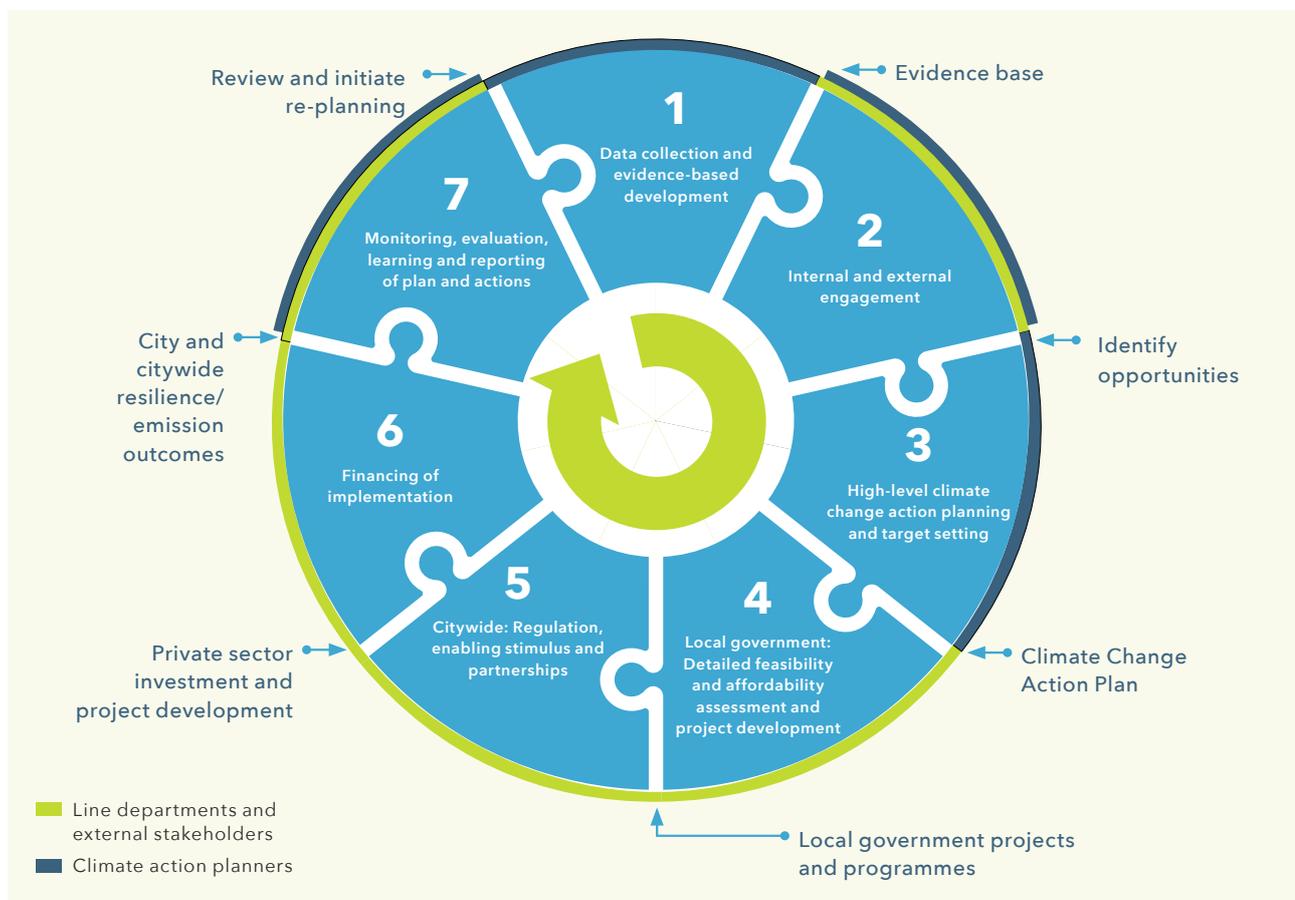


Figure 7: The climate change action planning cycle showing stakeholder roles

also change. It also intends to take account of the future lessons learned, from the implementation process, continued engagement, and monitoring and evaluation to technology change and the need for new actions as priorities shift. Systemic change requires constant engagement through a cycle of planning, doing, evaluating and re-planning.¹⁵ This is critical to keep the plan dynamic and continuously allow for reflection and adaptive learning. This cycle has been adapted to a local government context (see Figure 7).

The City recognises that engaging stakeholders is an ongoing process and that this is a starting point of a new level of ambition that includes growing partnerships and establishing a relationship of trust with City stakeholders and residents.

3.1.1. ENGAGING STAKEHOLDERS TO DEVELOP A VISION AND TURN IT INTO ACTION

Stakeholder engagement and consultation are essential for securing widespread support and buy-in for the vision while broadening its perspective, obtaining diverse input to actions, gathering the most appropriate and comprehensive data and information to inform those actions, and establishing partnerships that will be necessary for delivery. It can also generate ownership, encourage cross-sectoral collaboration, spark complementary action, increase awareness and build capacity.

The City undertook a series of stakeholder engagements between 2018 and 2020 as part of the development of both its new Climate Change Strategy and this action plan:

Climate Change Strategy and Action Plan consultation		Adaptation-specific consultation	Mitigation-specific consultation
<p>2020: Climate Change Strategy public participation</p> <ul style="list-style-type: none"> Public comments Online public meeting Councillor and Portfolio Committee workshops UCT convened workshop with academic partners 	<p>2020: Two facilitated civil society engagements</p>	<p>2018: Preliminary resilience assessment and Resilience Strategy engagements</p>	<p>2018: C40 Deadline 2020 launch and mitigation action development workshop</p>
<p>2021: Facilitated City Transversal Workshop</p> <ul style="list-style-type: none"> Transversal and research colleagues Review of cross-cutting areas and actions Complex systems problems in the action plan 	<p>2020: Climate Change Perception Study and focus groups</p>	<p>2018-2019: Hazard, Vulnerability and Risk Assessment reference group</p>	<p>2019-2020: Facilitated internal engagements on carbon neutral goal</p> <ul style="list-style-type: none"> Interactive and poster-driven Online 'story maps' made from posters
<p>2021: Subcouncil Climate Change Action Plan workshop</p>	<p>2020: City Policy Coordinating Committee workshop</p>	<p>2018-2019: Three Hazard, Vulnerability and Risk Assessment focus groups</p>	<p>2020: Sector expert interviews and Future Energy Conversations</p>
	<p>2020-2021: Green economy partners workshop (including City, GreenCape, Wesgro, etc.)</p>		<p>2021: Net-Zero Carbon Buildings engagements and workshops</p>
<p>Many rounds of formal and informal engagements with departments and colleagues to refine actions and ownership</p>			

15 University of Oxford (2014).

3.1.2. CAPE TOWN'S CLIMATE CHANGE GOVERNANCE CONTEXT

Metropolitan governments are large but regionally bound organisations with a clear service delivery function. This function devolves from legislated mandates and conditional grants in the case of public infrastructure, housing and a minority share of public transport delivery. Local government also has a mandate for municipal-level planning, including both large-scale spatial planning and local-scale land-use management and building approval.

However, external actors – particularly state enterprises and private interests in the built environment, energy, waste and transport value chains – are key to the implementation of this plan, particularly in regard to mitigation actions.¹⁶ It is therefore important for the City to play a role in driving change in those sectors through leadership, planning, partnerships and engagement, appropriate regulation and creating an enabling environment for action that is supported by effective communication and education. Strong City leadership and sustained political will are needed for the plan to translate into implementation across the many functions of the metropolitan government and its partners to ensure the high degree of collaboration required to implement the actions.

The City's Energy and Climate Change Directorate is the custodian of the Climate Change Strategy and Action Plan. Officials in the Climate Change and Integration Platforms Branch of the Sustainable Energy Markets (SEM) Department are responsible for the drafting, coordination and monitoring of the strategy and action plan, as well as the implementation of some of the actions of the plan.

At a political level, oversight of the climate change function is provided by the Energy and Climate Change Portfolio Committee, which is an oversight committee of the Council of the City of Cape Town. In addition, the Mayoral Committee member for Energy and Climate Change plays a role as a special advisor to the Executive Mayor on matters related to climate change.

As climate change is a cross-cutting issue, this plan requires the creation of a transversal working group that will play an oversight role to ensure the mainstreaming of climate change response and the coordination of actions across departments. This transversal working group will provide regular reports to the City's senior management (Executive Management team) and relevant portfolio committees.

3.2. SCOPE OF THIS CLIMATE CHANGE ACTION PLAN

This Climate Change Action Plan:

- defines a role for local government to respond ambitiously to climate impacts while moving the city to a carbon-neutral economy
- provides additional impetus to existing projects and programmes that require continuing support by demonstrating its contribution to the City's climate change adaptation and mitigation goals
- defines work areas, programmes and projects that have undergone transversal consultation and that show the potential to fulfil the goals of the Climate Change Strategy
- defines a leadership role for the City in addition to the actions realised through the implementation of municipal services by:
 - acting as planner for the citywide climate commitments made by civic leaders
 - defining enabling roles for the City
 - identifying, at a high level, roles for citywide and national stakeholders and opportunities for partnership
 - using the City's convening power to establish and maintain networks of stakeholders that contribute to the implementation of climate change response
 - communications, raising awareness, education, training and skills development
 - pioneering new areas or work for local government
 - regulatory reform (e.g. innovative and enabling policies and regulation, and the development of by-laws).
- provides decision makers with details of the type of action that needs to be taken and the scale at which this needs to take place
- develops, along with the Climate Change Strategy, a vision for residents and institutions to strive for in the face of the challenge of climate change.

This Climate Change Action Plan does not:

- fully express the future costs of climate change or the benefits and avoided costs of actions within the city boundary. This will

¹⁶ The City's own operational carbon footprint comprises only 2% of Cape Town's overall carbon footprint (2018 inventory). However, its utilities (electricity, waste and transport) have an impact on some 60% – 65% of the citywide carbon footprint, but have varying influence on the sources and drivers of emissions.

happen progressively over future iterations as programmes move to implementation, and cannot be meaningfully calculated upfront

- offer fully developed mechanisms for implementation by external stakeholders. For example, the far-reaching changes to the built environment required both spatially and in terms of building design and specifications are in the context of a property market influenced only partially through City and national regulation
- represent the end of the stakeholder engagement process on actions. Extensive engagement has gone into this substantive revision of previous plans, aiming for a higher level of ambition. The stakeholder group is, however, so large that continuous engagement will be required, internally and externally, to initiate and drive implementation, refinement where required and cycles of re-planning
- define subsidies for certain industries or activities.

3.3. CHALLENGES FOR IMPLEMENTATION

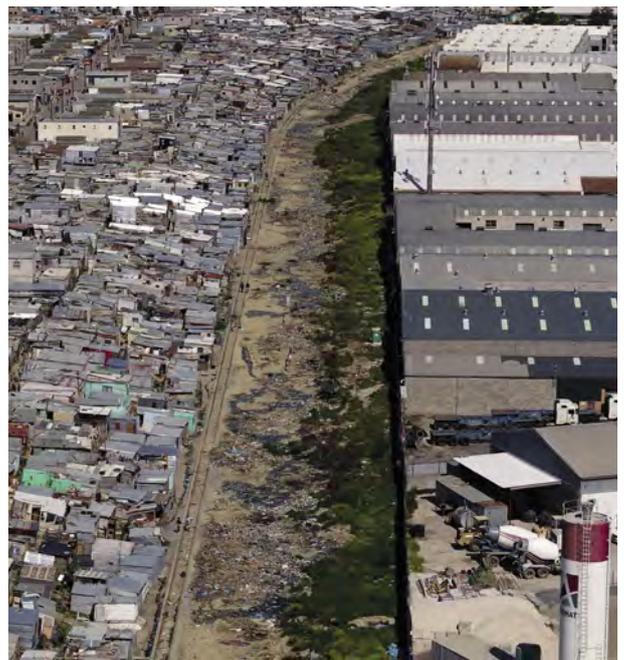
The City is ambitious in showing regional and global leadership in responding to climate change, but it is important to understand the inherent contingencies and challenges that frame the plan. These are noted both for the purposes of transparency and to ensure that these challenges are taken into account in the formulation and monitoring of implementation actions.

The challenges of implementation can be summarised as follows:

Mitigation challenges:

- Governance and financial crises have significantly and negatively impacted the functioning of state-owned electricity and rail transport utilities,¹⁷ on which the City remains dependent. Achieving the ambitious mitigation goals in the energy and transport sectors therefore requires stakeholders in state utilities and their regulators to forge collaborative networks and sound institutions to secure public assets in well-run systems.

- While the current national electricity plan (the Integrated Resource Plan - IRP) does involve decarbonising the grid, this may not happen fast enough for Cape Town to achieve its goals for carbon neutrality. Meeting these goals is therefore highly contingent on the City of Cape Town being able to timeously procure or generate its own renewable electricity with supply that is enabled by a functional framework involving regulatory, transmission and system operating stakeholders.
- Attaining the carbon-neutral goal is highly contingent on businesses and local industry taking up the opportunities presented by the global trend towards the electrification of transport.
- The City only has a partial mandate in public transport and a considerable amount of spatial transformation of the city is required to make mass public transit economically viable for the entire city.
- National and provincial waste management targets require a large-scale diversion of solid waste, particularly organic waste, from landfill in a very short timeframe. City pilots and roll-outs are under way in a number of the required work areas, however, scaling up is an immense challenge in the context of a struggling economy and a large and rapidly urbanising, developing city. Furthermore, the private sector collects around 50% of the city's waste. These targets therefore require a new partnership model and a regulatory role for the City.



17 Eskom and PRASA.

Adaptation challenges:

- The uncertainty regarding the timing and magnitude of climatic changes affecting Cape Town makes forward planning complex.
- Adaptation interventions, especially those where significant infrastructure development or upgrading is required, can have significant upfront costs even where long-term savings are possible due to risk reduction.
- Adaptation actions may have unforeseen negative outcomes or increase local carbon emissions, leading to maladaptation.

Governance-related and cross-cutting challenges:

- Implementing the important inclusionary actions of this plan requires social compacts and expanded capacity for community facilitation, especially where incidents of vandalism, destructive protests, and intimidation of and attacks on City staff and contractors create significant challenges for service delivery in some of the city's most vulnerable and underserved areas.
- Some actions require regulatory interventions that go beyond existing national legislative requirements, necessitating both increased cooperation and collaboration with National Government, as well as potentially introducing new regulations at the local level.

- The City operates with a relatively small budget, funded largely by property rates and tariffs for services, both of which need to remain affordable for low- and middle-income households. This poses a challenge for the implementation of large-scale and high-cost projects. At the same time, increased tariffs for services, as well as the impacts of load-shedding and drought, are driving high-income households to consider off-grid solutions for both their electricity and water needs, in the process reducing City revenue.
- Procurement regulations at the local government level are complex, making it complicated to enter into public-private partnerships and long-term contracts.
- Success depends on a response to climate change coming to be seen as a social and economic problem, not just an environmental problem, across government and business. In this context, clear social and economic co-benefits of actions are essential.

4. ACHIEVING A VISION OF A CLIMATE-RESILIENT, RESOURCE-EFFICIENT AND CARBON-NEUTRAL CITY

4.1. CAPE TOWN'S VISION

The City of Cape Town [Climate Change Strategy](#) envisions a climate-resilient, resource-efficient and carbon-neutral city that enables inclusive economic development and healthy, thriving communities and ecosystems.

In Cape Town's context, fulfilling this vision equates to becoming a city with a compact and efficient urban form, well-located development, growth that respects environmental limits, and development that enables social and economic inclusivity. In such a city, all infrastructure and the built environment must be designed and built to be carbon neutral and resilient to the impacts of climate change. The city's natural ecosystems must be protected, resilient, and able to act as buffers to climate change impacts. In this vision of the future city, economic competitiveness is maximised through clean energy, embracing efficient technologies, resource efficiency and circularity, while passenger and freight mobility is provided by a safe electric-powered and economically viable public transport system that is complemented by appealing active-mobility options such as walking and cycling.

4.2. REACHING THE VISION: PATHWAYS, WORK AREAS AND A FRAMEWORK FOR ACTION

4.2.1. OVERVIEW

The vision outlined above, together with the principles and desired outcomes of the Climate Change Strategy, define a clear set of strategic work areas and goals. The sections that follow provide an overview of how the Climate Change Action Plan aims to move Cape Town towards achieving its vision and goals.

The strategy has developed ambitious principles for action and desired outcomes. However,

implementation has to happen in a very dynamic and challenging local context. This is in common with other developing cities that have also committed to supporting the strong ambition of the Paris Agreement. Although these cities cannot always leverage the resources and influence of the larger developed cities to enact rapid wholesale change, climate resilience and carbon neutrality can be incrementally built one resident, one institution, one product or service, one firm and one value chain at a time.

The urgency of the City's climate change response requires elevation within the City, as well as expansion through collaboration. At the same time, it can only work through existing structures and approaches. To address this, the strategy combines new, more narrative-based approaches with traditional managerial approaches. Figure 8 visually depicts how these approaches work together.

- Pathways have been developed to provide a conceptual direction for taking action in navigating a highly complex endeavour for a metropolitan government. These pathways provide high-level direction to the actions required and act as a roadmap towards a carbon-neutral and climate-resilient city.
- The strategy then describes the work that needs to be done within the City through more traditional City management approaches, articulated in the strategic focus areas (SFAs) and cross-cutting work areas (CCWAs) framework. Each SFA and CCWA contributes to achieving different multiple pathways.
- Finally, the strategy describes a framework for action, which outlines the transition streams and action types that are required to deliver the strategy principles and outcomes. Each SFA and CCWA will include many different types of action in order to be realised.

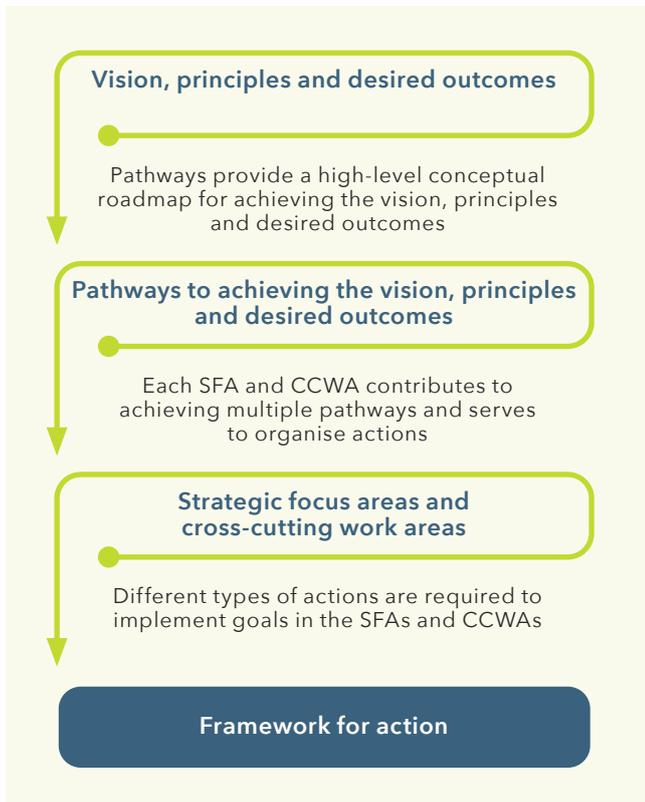


Figure 8: How the pathways, work areas and framework for action support achieving the vision, principles and desired outcomes

4.2.2. PATHWAYS TO DELIVERING ON THE VISION, PRINCIPLES AND DESIRED OUTCOMES

Pathway 1: Leadership and governance

Exercise leadership and governance through planning, regulation, open data development and the engagement of stakeholders. Decouple resource risk from revenue and ensure that all municipal governance processes promote climate change response, while ensuring that adequate municipal revenue is generated and available to meet climate change goals.

Pathway 2: Sustainable urbanisation

Promote sustainable densification through planned urbanisation that enables proximity to work, amenities, culture and transport corridors, therefore promoting a high degree of positive interaction between people and improving social cohesion.

Pathway 3: High-value ecosystems

Ensure that Cape Town’s ecosystems are sustainable and resilient, with increasing reliance on nature-based solutions and green infrastructure for supporting service delivery and

providing ecosystem services that support climate change response.

Pathway 4: Risk reduction

Reduce risk and losses associated with climate shocks and stresses for both the City and Cape Town’s residents and businesses through the implementation of risk-reduction interventions and anticipatory action.

Pathway 5: Leading by example in City operations and infrastructure

Lead by example and contribute to creating a market for climate-responsive products and services through greening the City’s own operations and services, achieving carbon neutrality in City facilities and making public infrastructure more resilient.

Pathway 6: Green economy and special economic zones

Build green economy partnerships around special economic zones (SEZs), which not only become markets for renewable energy, but also increase the share of the local economy in green value chains. Reduce the cost of green economy transition and maximise economic co-benefits through ongoing residential, commercial and industrial energy efficiency programmes with a focus on achieving net carbon-neutrality in new building stock from 2030.

Pathway 7: Carbon accounting, carbon-neutral quality assurance and carbon-neutral quality marks

Promote corporate carbon accounting and the concept of carbon neutrality as a service¹⁸ or similar approaches in the development of supply chains for carbon-neutral goods and services where this offers local business a global trade advantage. This will require carbon-neutral materials and transport services that become a value proposition through 1) global carbon prices, 2) corporate accounting and targets, and 3) compelling and attractive product labelling underwritten by credible verification agents.

Pathway 8: Drive energy supply-side change at scale by building local carbon-neutral markets

In addition to ongoing efforts to develop a renewable electricity supply, the City will work, through partnerships, to build demand from local carbon-neutral markets. Carbon neutrality will be achieved one product, one firm and one value chain at a time to drive change in the supply side. Carbon-neutral energy will be supplied to green economy business through the aggregation of

¹⁸ Many jurisdictions, for example Paris, are opting for consumption-based accounting, which requires an assessment of the carbon embedded in the materials and transport of imported goods. This trend does not currently favour South African goods, but offers an opportunity for commodifying the different sectoral components of carbon neutrality as services to an export product at industry or industrial park scale.

available supply at increasing scale, even if initial supply is very modest, starting with electricity and extending in time to molecular fuels.

Pathway 9: Promote climate-responsive individual and institutional choices and actions

Promote and empower climate-responsive individual and institutional choices and actions through communication, engagement, collaboration and enabling action, recognising that many small actions have the potential to create big changes.

Pathway 10: Greater equity, inclusivity and a just transition

Work towards greater equity, inclusivity and a just transition to a carbon-neutral and climate-resilient future that is centred on strong participation and engagement by all stakeholders. The aims will be to eliminate resource poverty, ensure sustainable and equitable land use, enable poverty reduction, and encourage and ensure well-being and a healthy environment.

4.2.3. MECHANISMS FOR ACTION: STRATEGIC FOCUS AREAS AND CROSS-CUTTING WORK AREAS

Ten SFAs and five CCWAs were developed to organise actions in alignment with the City’s organisational structures, and to group goals in a clear and logical way to enable the uptake of these by City departments responsible for implementation.

The SFAs contain goals specific to key areas of adaptation and/or mitigation, while the CCWAs house the enabling goals required to be implemented across sectors and activities. The SFAs and CCWAs, their associated goals and the actions that support them are described in more detail in sections 6 and 7 respectively. Figure 9 shows how these SFAs and CCWAs intersect.

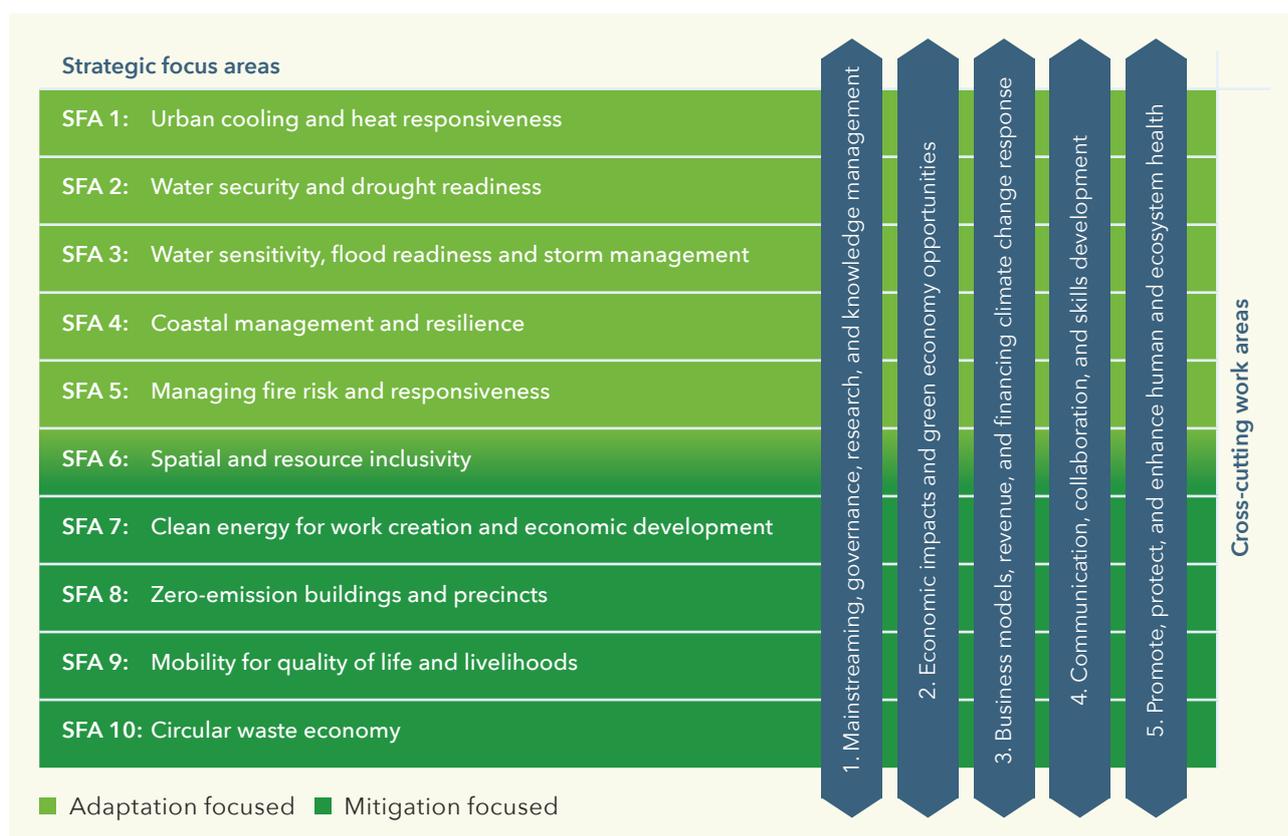


Figure 9: Strategic focus areas and cross-cutting work areas. SFAs 1-5 are focused on climate change adaptation, SFA 6 has elements of both climate change adaptation and mitigation, and SFAs 7-10 are focused on climate change mitigation.

4.2.4. FRAMEWORK FOR ACTION: TYPES OF ACTION

Figure 10 shows the types of action required to implement the SFAs and CCWAs. This framework for action includes an ongoing process of evaluation, assessment and learning to determine if actions being taken are having the desired effect and achieving the vision, desired outcomes and goals. This ongoing cycle of monitoring re-informs planning and implementation, leading to improved outcomes.

The actions that will be taken to implement the vision, desired outcomes and goals of the strategy can be summarised as follows:

- Governance and regulation:** Adapting leadership, policy, by-laws, strategies and institutional arrangements for mainstreaming climate change response, enhancing the enabling environment for climate resilient and carbon-neutral development, and fostering adaptive governance approaches that engender a wider societal response.
- Planning and visioning:** Climate-responsive and transformational planning, strategy development and incentives that are jointly conducted and integrated across relevant sectors, departments and external stakeholders to provide strategic direction for climate-resilient and carbon-neutral infrastructure development and behaviour change.
- Infrastructure and assets:** Integrated infrastructure development and maintenance actions, balancing green and grey infrastructure with nature-based solutions that limit the incidence of stranded economic assets and reduce or eradicate the impact of extreme climate events.
- Behaviour change and communications:** Changing behaviour for climate change response decision making, planning and management by all stakeholders and social partners (government, labour, industry and civil society) through education, mobilisation and sensitisation towards the realisation of a social contract for climate resilience and carbon neutrality.
- Training and skills development:** Providing targeted training and skills development to City staff and partner organisations to equip them to effectively respond to climate change in their work areas.
- Collaboration and partnerships:** Working with international, national and local climate change-focused partner organisations, as well as collaborating effectively with other spheres of government and the private sector to implement effective climate change responses.
- Research, data and knowledge management:** Programmes that ensure the City remains up to date with scientific progress and knowledge in the field, and that it is effectively managing and utilising data, information and knowledge products to support decision making.

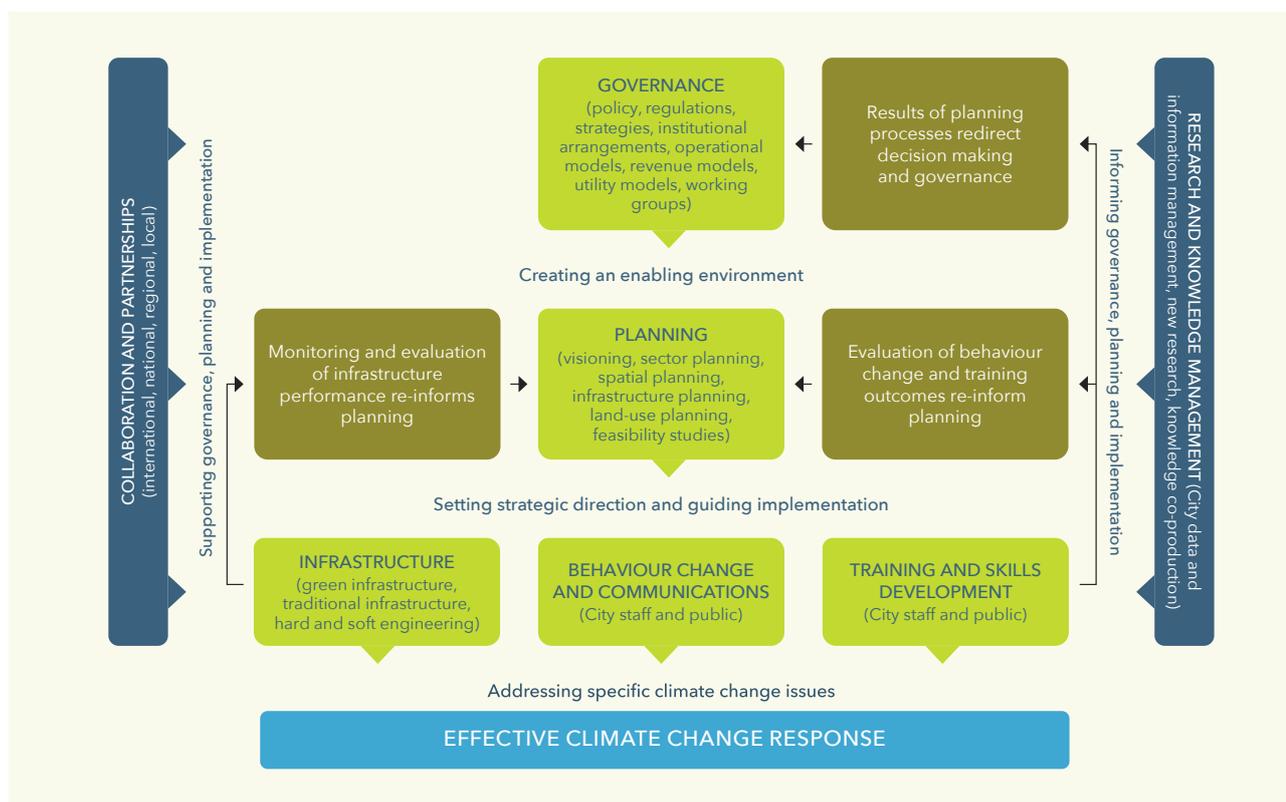


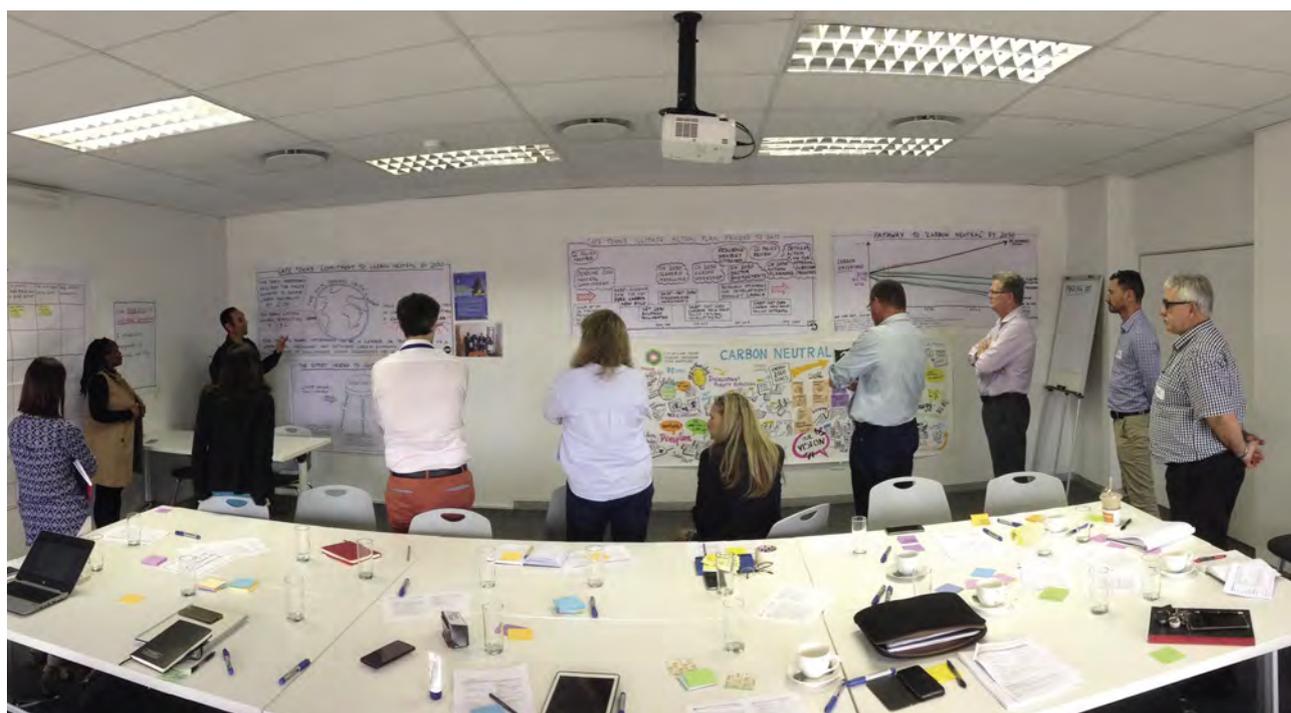
Figure 10: Framework for action

5. UNDERSTANDING THE ACTIONS

5.1. SELECTION OF ACTIONS

The approach adopted for selecting and detailing actions for this plan has been organic and iterative, building on previous planning for climate change response such as the Energy2040 Goal (2015), Climate Change Policy (2017) and Cape Town Resilience Strategy (2019), together with new evidence from the Climate Change Hazard, Vulnerability and Risk Assessment (2019), GHG Modelling and Scenario Analysis (2018–2020) and external research. Together with this evidence in hand, action development took place in consultation with the key sectors, and other internal and external stakeholders. When selecting actions for inclusion in the plan, the following criteria were considered:

- **Mandate:** Local government has a service delivery mandate defined in law, and also acts as citywide planner - under the oversight of elected officials - in a number of contexts including responding to climate change. Actions were therefore framed to remain within the City's mandate and, where required, defined roles to lead or collaborate with other spheres of government, residents and the private sector to address areas not directly within the City's control.
- **Realistic and achievable:** Actions that are not currently deemed to be technically, economically, legally or financially viable, or not appropriate for the local context, were not included in the plan. Where action is critical but requires further investigation, it typically takes the form of a feasibility study in the action plan.
- **Links to the Integrated Development Plan (IDP) and budget priorities of the City:** Actions need to be in line with the City's existing priorities (e.g. co-benefits such as job creation and basic service delivery) in order to ensure alignment with core City priorities and budget processes.
- **Cost effectiveness:** Actions that are cost-effective and can result in reduced costs through revenue generation, operational savings (e.g. energy efficiency) or avoided risk (e.g. the reduction of flood and fire risks) were prioritised as current budget constraints are likely to persist.
- **High impact:** Only actions that will contribute significantly to Cape Town's climate change response (adaptation, GHG reduction and co-benefits) should be included.



All of the actions contained in this plan are considered to be priority actions for fulfilling the City's vision. Actions deemed not to be priority actions, based on the above criteria, were not included in this version of the plan but may be explored further at a later stage.

As climate change response is not a centralised function within the City of Cape Town, but rather intended to be mainstreamed into the work of a number of different departments, actions will roll out in parallel and in line with existing departmental budget commitments, business plans and sector plans. Over time, it is intended that the actions in this plan will, in response to monitoring and evaluation, be assessed by departments for implementation in future budget cycles, business plans and sector plan updates.

5.2. A GUIDE TO READING THE ACTIONS

The different types of actions of this plan are organised into SFAs and CCWAs. Each SFA or CCWA includes an introduction providing context and outlines a set of goals it aims to achieve, with each goal including a number of actions to implement.

As seen on the next page, each action is presented in a separate table under the respective goals and includes a title, description, sub-actions (project level) and the status of the action. The lead and supporting departments and external stakeholders that are required to implement the action are also indicated.

The actions are summarised in a table at the end of the document in Annexure C, which include additional fields. There are 101 actions in total.

Four actions in the plan target important strategic areas that need to be pursued by multiple departments or through multistakeholder collaboration. These are actions in highly transversal areas where it is important for the City to show leadership as an organisation in a citywide

Climate Change Action Plan. These have been denoted as Climate Leadership Review Actions and are framed as follows:

- The City has strong sector centres of expertise (line departments) within which climate change is generally well mainstreamed after some years of policy and planning work. The institutional structure now also includes a number of transversal competencies (resilience, innovation, etc.), which are helping to coordinate action in responding to difficult challenges. Much of the important sectoral and transversal work is therefore under way and capacitated. These actions aim to assess the state of climate leadership through a periodic qualitative and quantitative review. This will reflect the contribution of relevant service delivery programmes to climate goals and support these programmes by identifying any gaps and recommending support where it is needed.
- These actions will be governed by triennial assessments that aim to:
 - reflect how sector programmes integrate into the bigger picture of the City's climate change response
 - discover and communicate how sectors can learn from each other
 - identify any gaps where sector teams need support or capacity building, or identify structural challenges hindering implementation
 - communicate how these might be addressed in separate sets of recommendations to political and administrative leadership.

ACTION CAPTURING TABLE:

GOAL NUMBER: NAME OF THE GOAL TO BE IMPLEMENTED

Lead department(s):

- This department is responsible for coordinating and/or leading the implementation of the action.

Supporting department(s):

- Departments that will be engaged by the lead department in implementing the action or will contribute to implementing the action.

External stakeholder(s):

These are the stakeholders outside the City government who play an important role in action implementation.

- National Government or parastatal
- Provincial Government
- Businesses/industrial associations
- Research institutions
- Residents
- Civil society organisation/non-governmental organisation (CSO/NGO)
- City support agencies
- Other
- Not applicable

Status of action:



New (concept):

The action is in conceptualisation phase



New (in planning):

The action is in the process of being planned in detail



Expansion of existing programme:

The action is currently being implemented but will be expanded or scaled up



Implementation:

The action is currently being put into effect



Completed:

The action is at an advanced stage or is in completion phase

Action number and title

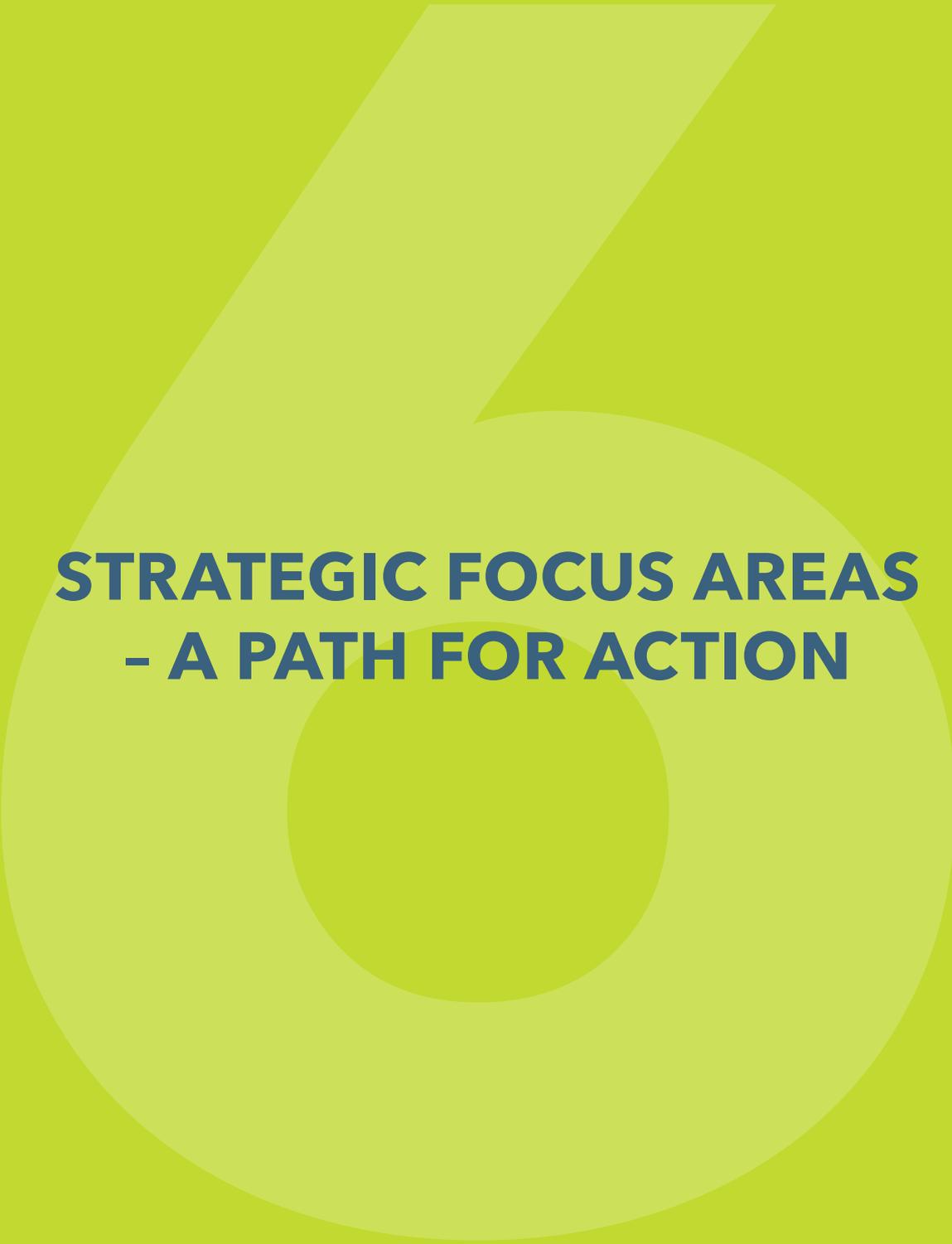
Name of action to be implemented

Description

A brief overview of what the action entails

Sub-actions

Detailed initiatives that contribute towards achieving the primary action

A large, light green, stylized number '6' is centered on the page. The number is composed of a thick, rounded vertical stroke on the left and a circular base on the right. The top of the vertical stroke is cut off at a 45-degree angle. The entire number is rendered in a semi-transparent, light green color that blends with the background.

**STRATEGIC FOCUS AREAS
- A PATH FOR ACTION**

6.1. SFA 1: URBAN COOLING AND HEAT RESPONSIVENESS

The Red Cross Red Crescent Climate Centre has identified heat and heatwaves as simultaneously one of the most dangerous climate risks, but also one that can be effectively adapted to and mitigated at a relatively lower cost than other climate risks. The president of the International Federation of Red Cross and Red Crescent Societies (IFRC), Francesco Rocca, notes that “the urban poor frequently bear the brunt of this silent emergency. In addition to threatening the lives and health of vulnerable populations, heatwaves have cascading impacts in other areas of society, such as reduced economic output, strained health

systems and rolling power outages”. A report by *The Lancet*¹⁹ estimates that “in 2017, 153 billion hours of work were lost [globally] due to extreme heat”, indicating that this risk can have significant negative economic impacts. The IFRC notes that “this emergency can only be avoided if city institutions, community groups, and planners contribute to reducing heat risk now and in the future.”²⁰

Actions in this SFA are focused on both adapting to the impacts of increased heat and putting measures in place to reduce (mitigate) heat where possible. Actions in this SFA link closely with health-related actions in [CCWA 5](#).



19 Watts, N., et al. (2018).
20 Singh, R., et al. (2019).

GOALS AND ACTIONS:

GOAL 1: REDUCE IMMEDIATE RISKS TO HEALTH DURING HEATWAVES AND HIGH-HEAT DAYS

<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) <p>Supporting department(s):</p> <ul style="list-style-type: none"> Disaster Risk Management City Health <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Provincial Government <hr/> <p>Status of action:</p>  <p>New (in planning)</p>	<p>Action 1.1 Draft and implement a heatwave and high-heat day action plan and standard operating procedure (SOP)</p>
	<p>Description</p> <p>Heatwaves and high-heat days pose a significant risk to public health, the health of City staff members and City infrastructure. This action aims to address the following risks:</p> <ul style="list-style-type: none"> Heat-related illnesses such as heatstroke and heat exhaustion Negative health and productivity impacts on outdoor workers Increased risk of mortality in elderly people and those with chronic health conditions Increased demand for air-conditioning Increased demand for cooling (e.g. municipal swimming pools) Damage to physical infrastructure (e.g. road surfaces). <p>(Note: This action aligns with specific actions in the Cape Town Resilience Strategy and is included here as it is a key climate change response action.)</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Draft a heatwave and high-heat day action plan and SOP focused on operational actions that need to be taken by the City to reduce risks during a heat event Progressively implement the heatwave and high-heat day action plan

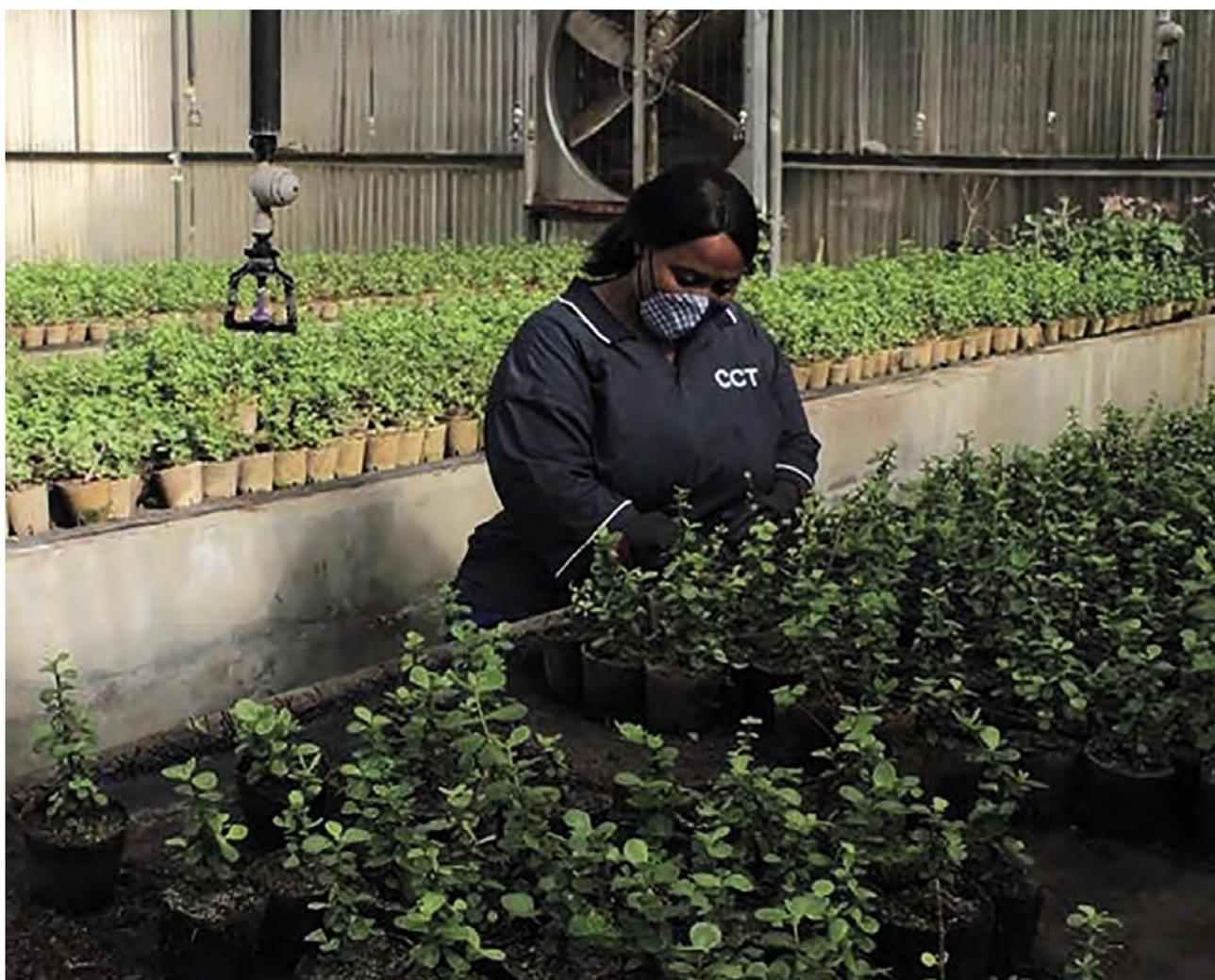
<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) <p>Supporting department(s):</p> <ul style="list-style-type: none"> Disaster Risk Management City Health Facilities Management Recreation and Parks Environmental Management Library and Information Services Urban Planning and Design Development Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal Provincial Government Businesses/industrial associations <hr/> <p>Status of action:</p>  <p>New (concept)</p>	<p>Action 1.2 Develop and implement a network of cooling centres</p>
	<p>Description</p> <p>A cooling centre is a facility that provides cooling services to residents and visitors during heatwaves and high-heat days. Cooling may take the form of air-conditioned buildings or water-based cooling facilities such as swimming pools and spray parks. Cooling centres can be public buildings (belonging to local, provincial or National Government) or private buildings that may or may not normally be open to the public (e.g. shopping centres, hotel lobbies). Parks and beaches may also be considered as cooling centres. Cooling centres may be open at all times or may only be “activated” during a heatwave or high-heat day.</p> <p>(Note: This action aligns with specific actions in the Cape Town Resilience Strategy and is included here as it is a key climate change response action.)</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Develop and implement a network of cooling centres in conjunction with relevant government and private stakeholders Communicate the cooling centre network to the public in order to ensure that residents and visitors are able to access these facilities during heat events Work towards the development of an approach to the design of City buildings and facilities to provide a multipurpose function that would include use as a cooling centre.

<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) <p>Supporting department(s):</p> <ul style="list-style-type: none"> Disaster Management City Health Scientific Services <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Research institutions <hr/> <p>Status of action:</p>  <p>New (concept)</p>	<p>Action 1.3 Develop and implement an early-warning and real-time monitoring system for heat</p>
	<p>Description</p> <p>Temperature (heat) monitoring has, to date, been conducted by the South African Weather Service (SAWS), as per its mandate to monitor and forecast weather across the country. However, SAWS has only nine weather stations that monitor temperature within the boundary of the City of Cape Town; of these, only three are situated inland and in highly urbanised areas. There are also many areas within the city that are not covered by an existing SAWS weather station. Access to real-time heat information will provide the City with important information required to take action in terms of its heatwave and high-heat day action plan and SOP; it will also provide the public with information that will enable them to take action to protect themselves against heat impacts. This will not replace official weather forecasts or weather warnings provided by SAWS, but will rather provide supplementary information.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Establish its own network of real-time heat-monitoring stations in areas not currently covered by a SAWS weather station and share information with SAWS where relevant Communicate real-time heat information to the public via a web-based platform and/or mobile phone app.

GOAL 2: PROACTIVELY REDUCE HEAT IMPACTS ON THE CITY THROUGH URBAN GREENING

<p>Lead department(s):</p> <ul style="list-style-type: none"> Recreation and Parks <p>Supporting department(s):</p> <ul style="list-style-type: none"> Environmental Management Human Settlements Directorate Transport Directorate Sustainable Energy Markets (Climate Change Team) <p>External stakeholder(s):</p> <ul style="list-style-type: none"> CSO/NGO <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 2.1 Devise and implement a focused tree-planting programme to reduce the heat island effect and provide shading</p>
	<p>Description</p> <p>The heat island effect means that densely urbanised areas experience hotter temperatures (up to 5 °C hotter) than surrounding suburban or rural areas. This is caused by a lack of green vegetation in areas of dense urban development. Concrete, brick, asphalt and other materials used for building absorb, store and emit more heat than green vegetation.</p> <p>Although most of Cape Town's natural ecosystems do not naturally include trees, tree planting in appropriate urban areas can have a significant impact on reducing heat islands. This can be integrated into the urban form in dense urban areas through the use of street trees and pocket parks. Trees reduce heat in dense urban areas through shading buildings and surfaces and through evapotranspiration.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Expand the City's existing tree-planting initiatives to create a focused tree-planting programme to reduce the heat island effect in identified high-risk areas Use urban forest canopy maps overlaid with heat island maps to identify high-risk areas and potential for tree planting Ensure that identified sites have tree planting and tree establishment potential, which includes sustainable irrigation to maintain trees Campaign for private landowners and owners of state land to participate in tree planting, tree maintenance and the protection of existing trees in high-risk areas Monitor the success of the tree planting programme in terms of the long-term survival of trees and the effectiveness of tree planting in reducing the heat island effect.

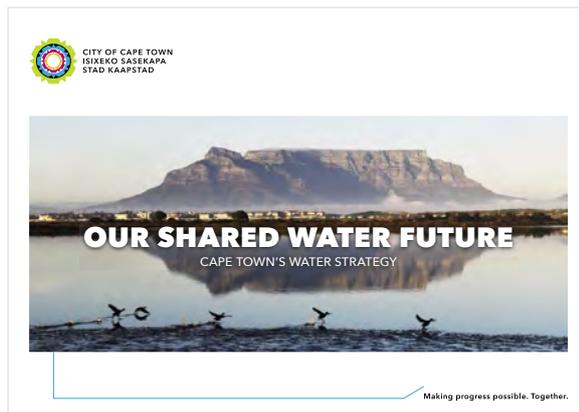
<p>Lead department(s):</p> <ul style="list-style-type: none"> Recreation and Parks Environmental Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> Human Settlements Directorate Transport Directorate Urban Planning and Design Urban Management Sustainable Energy Markets (Climate Change Team) <p>External stakeholder(s):</p> <ul style="list-style-type: none"> CSO/NGO <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 2.2 Devise and implement an urban greening programme to reduce the heat island effect</p> <p>Description The heat island effect means that densely urbanised areas experience hotter temperatures (up to 5 °C hotter) than surrounding suburban or rural areas. This is caused by a lack of green vegetation in areas of dense urban development, including both high-density commercial areas (e.g. Cape Town Central Business District [CBD]) and high-density residential environments – particularly informal areas. Concrete, brick, asphalt, metal and other materials used for building absorb, store and emit more heat than green vegetation.</p> <p>Urban greening, including the provision of well-vegetated parks, green roofs, green belts, river corridors, streetscapes and green public open spaces, in addition to urban nature reserves and biodiversity sites, can have a significant impact on reducing heat islands. Urban green areas reduce the heat island effect by reducing the amount of heat absorbed and emitted by hard surfaces and through evapotranspiration. These urban green areas may or may not include trees, depending on whether trees are appropriate in terms of either local biodiversity or local climatic and weather conditions.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Expand the City’s existing greening initiatives to create a focused urban greening programme to reduce the heat island effect in identified high-risk areas Monitor the success of the urban greening programme in terms of the long-term performance of green areas and the effectiveness of urban greening in reducing the heat island effect.
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6.2. SFA 2: WATER SECURITY AND DROUGHT READINESS

Drought and water scarcity have been identified as one of the most critical climate change challenges facing the City. As a result of the severe drought that occurred between 2015 and 2018, the City adopted a Water Strategy to ensure Cape Town's resilience to drought into the future. The vision of the Water Strategy is that "Cape Town will be a water-sensitive city by 2040 that optimises and integrates the management of water resources to improve resilience, competitiveness and liveability for the prosperity of its people".

This Climate Change Action Plan lists those actions contained in the Water Strategy that have been identified as most necessary to be implemented to protect the water sector against climate change risk. Actions in this focus area are focused on adapting to the impacts of reduced rainfall, drought and increased water scarcity, across various sectors.



OUR SHARED WATER FUTURE: CAPE TOWN'S WATER STRATEGY

The City of Cape Town's Water Strategy includes the following five core commitments:

1. Safe access to water and sanitation
2. Wise use
3. Sufficient, reliable water
4. Shared benefits from regional water resources
5. A water-sensitive city

The Water Strategy is also informed by the following 10 principles:

1. Value water
2. Grow inclusivity and trust
3. Build capability
4. Work together and across boundaries
5. Design for adaptation
6. Live with water
7. When it rains, slow, store and repurpose
8. Ready for shocks
9. Stimulate the green economy
10. Work with nature



GOALS AND ACTIONS:

GOAL 3: REDUCE DEMAND FOR WATER TO PROTECT WATER RESOURCES AND ENSURE SUSTAINABILITY OF SUPPLY

<p>Lead department(s):</p> <ul style="list-style-type: none"> Water and Sanitation <p>Supporting department(s):</p> <ul style="list-style-type: none"> Resilience Facilities Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 3.1 Continued implementation of the City’s water conservation programme focused on demand-side management</p> <p>Description Water conservation programmes within the City of Cape Town have historically taken the form of demand-side management programmes and projects, focused on reducing water use through a range of infrastructure and behavioural interventions. Historically, these have been successful at reducing water demand.</p> <p>Sub-actions Continued implementation of water demand management through:</p> <ul style="list-style-type: none"> Infrastructure programmes focused on: <ul style="list-style-type: none"> pressure reduction and pressure management programmes continuous zone monitoring and optimisation using various technologies, e.g. loggers, controllers, relevant electronic platforms leak detection and repair, and proactive replacement of ageing water reticulation infrastructure retrofitting of City facilities with water-efficient plumbing fixtures and fittings. Behavioural interventions focused on: <ul style="list-style-type: none"> raising awareness and providing residents, businesses and visitors with information on how to reduce their water use putting in place pricing mechanisms to reduce water wastage reducing water usage through water restrictions that limit specific activities or require households to remain within a usage limit. Promoting the use of alternative water sources (e.g. treated effluent, rainwater, groundwater, grey water) for non-potable use (e.g. industrial purposes, construction purposes, the cleaning of City property or equipment, gardening, car washing and use in swimming pools). <p>(Note: This action originates from the Cape Town Water Strategy and is included here as it is a key climate resilience action.)</p>
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GOAL 4: WORK TO AUGMENT AND INCREASE WATER SUPPLIES TO ACHIEVE 99,5% ASSURANCE OF SUPPLY

<p>Lead department(s):</p> <ul style="list-style-type: none"> Water and Sanitation <p>Supporting department(s):</p> <ul style="list-style-type: none"> Resilience Environmental Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal 	<p>Action 4.1 Augment Cape Town’s water supply to ensure the long-term sustainability of supply</p>
<p>Status of action:</p>  <p>Implementation</p>	<p>Description</p> <p>Cape Town receives water as part of the Western Cape Water Supply System (WCWSS), a regional scheme that is managed by the National Department of Water and Sanitation (DWS) in partnership with the City of Cape Town. The WCWSS allocates water to the City of Cape Town, other Western Cape municipalities and agriculture in the region. The WCWSS is currently entirely reliant on surface water, sourced from six large dams (Theewaterskloof, Wemmershoek, Voëlvlei, Berg River, and Steenbras Upper and Lower). Owing to ongoing drought conditions in the Western Cape, supply from the WCWSS remains constrained and is likely to continue to be constrained in a projected drier future. As such, the City has committed to taking action to diversify and augment Cape Town’s water supply and increase water security through investment in new water programmes.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Increase the level of assurance of supply to 99,5%. This means that for any given year there would only be a probability of 1 in 200 of there being insufficient water to meet planned demand Implement the Committed Water Augmentation projects between 2019 and 2030, with the goal of adding an additional approximately 290 Mℓ per day, through management interventions, groundwater abstraction, wastewater reuse, desalination and additional surface water supply Plan for and implement, if necessary, the Adaptable Programme of Water Augmentation projects up to 2040. The purpose of the adaptable programme is to plan schemes that may be needed in the future, but for which an immediate decision to implement is not needed. Adaptable programme projects include up to 250 Mℓ of new supply through further groundwater abstraction, wastewater reuse, desalination and additional surface water supply Continued implementation of climate change research and good governance measures, including an analysis of climate change impacts and regular engagement with stakeholders Update the hydrology for the WCWSS, should another severe drought be experienced. This would be as part of the monitoring of climate change impacts, given the uncertainty of the severity to which climate change will affect the WCWSS and the rate of its onset during the next few decades Improve management of the WCWSS through a hydro-economic analysis of the WCWSS Develop a bulk water decision support system to ensure that the City is able to operationally integrate new water sources with the management of the WCWSS. <p>(Note: This action originates from the Cape Town Water Strategy and is included here as it is a key climate resilience action.)</p>

<p>Lead department(s):</p> <ul style="list-style-type: none"> Water and Sanitation <p>Supporting department(s):</p> <ul style="list-style-type: none"> Recreation and Parks Transport Expanded Public Works Programme <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal CSO/NGO Other (neighbouring local municipalities) 	<p>Action 4.2 Remove invasive alien plant species in water supply catchment areas and aquifer recharge areas, and in natural areas across the city</p> <p>Description Invasive alien plant species consume significantly more water than local, indigenous vegetation that have evolved for local water-scarce conditions. Invasive alien plant species that are particularly problematic and therefore targeted for removal from water supply catchment areas, aquifer recharge areas and other natural areas include various Australian acacia species (e.g. rooikrans (<i>Acacia cyclops</i>), Port Jackson willow (<i>Acacia saligna</i>), black wattle (<i>Acacia mearnsii</i>), various pine species (<i>Pinus spp.</i>) and various gum species (<i>Eucalyptus spp.</i>). A range of other invasive alien trees and woody plant species is targeted for removal in these areas.</p>
<p>Status of action:</p>  <p>Implementation</p>	<p>Sub-actions</p> <ul style="list-style-type: none"> Remove invasive alien plant species from water supply catchment areas that fall within the City of Cape Town's control Work with other Western Cape municipalities and the National Department of Water and Sanitation to support the removal of invasive alien plant species in water supply catchment areas that fall outside of the City of Cape Town's control Remove invasive alien plant species from key aquifer recharge areas Remove invasive alien plant species from other natural areas and open spaces within the city that have been identified as requiring intervention to restore more natural water flows, including nature reserves and public open spaces.



6.3. SFA 3: WATER SENSITIVITY, FLOOD READINESS AND STORM MANAGEMENT

Flooding has long been a challenge faced by Cape Town. Although rainfall is projected to decrease over time, it is expected that Cape Town will continue to experience several high-rainfall storm events annually. Although the number of cold fronts making landfall is projected to decrease, it is not anticipated at this stage that winter storms related to cut-off lows will either decrease or increase. However, it is very important to note that flooding in Cape Town is largely related to high levels of vulnerability rather than particularly extreme rainfall events. This vulnerability is related

WHAT IS A WATER-SENSITIVE CITY?

A water-sensitive city is one that recognises the value and functions of all forms of water in the urban context and works to manage these in an integrated manner that also supports ecosystem services, ecological integrity and recreational amenity value. These water sources include stormwater, groundwater, watercourses and wetlands. Water-sensitive cities integrate water management closely with land-use and development planning and management to ensure a holistic approach. Through the City of Cape Town Water Strategy, the City has committed to becoming a water-sensitive “city with diverse water resources, diversified infrastructure and one that makes optimal use of stormwater and urban waterways for the purposes of flood control, aquifer recharge, water reuse and recreation, and that is based on sound ecological principles”.

The Cooperative Research Centre for Water Sensitive Cities (CRCWSC) has visually depicted the transition from a traditional water-supply city through various stages of change towards becoming a water-sensitive city (see Figure 11).²¹ The City of Cape Town is currently in the process of undertaking a project, based on the CRCWSC methodology, to determine where Cape Town falls on this spectrum and to identify the actions required for the city to become fully water sensitive.

to geographical location (low-lying areas with high water tables are prone to flooding) and economic vulnerability (informal settlements often lack adequate drainage).

Wind speed and strength are also projected to increase over time; Cape Town already suffers from damaging gale-force winds at times, and this will increase in intensity and frequency. Strong winds can cause significant damage to buildings (e.g. damaging roofs) and to infrastructure such as overhead electricity cables (either directly or due to damage from falling trees or branches).

The City’s Floodplain and River Corridor Management Policy (2009) recognises that “watercourses and wetlands, whether natural or constructed, form an integral component of urban stormwater management systems, are important for sustaining the aquatic ecology of the city, and are an essential element in restoring the urban fabric of the city by providing both recreational and socio-economic opportunities to all residents”. It also states that “a well-managed watercourse/wetland is a valuable resource for improving the quality of life and aesthetic nature of an urban area and provides benefits for public health, recreation and economic growth [which is] particularly important in the context of changing weather patterns”. The City’s Stormwater Management By-law (2005) also recognises that flooding is a significant risk for Cape Town; it aims to address this through the effective management of stormwater.



21 Cooperative Research Centre for Water Sensitive Cities (2020). *Water Sensitive Cities Index: Benchmarking cities against urban water indicators*. Available at: <https://watersensitivecities.org.au/solutions/wsc-index>

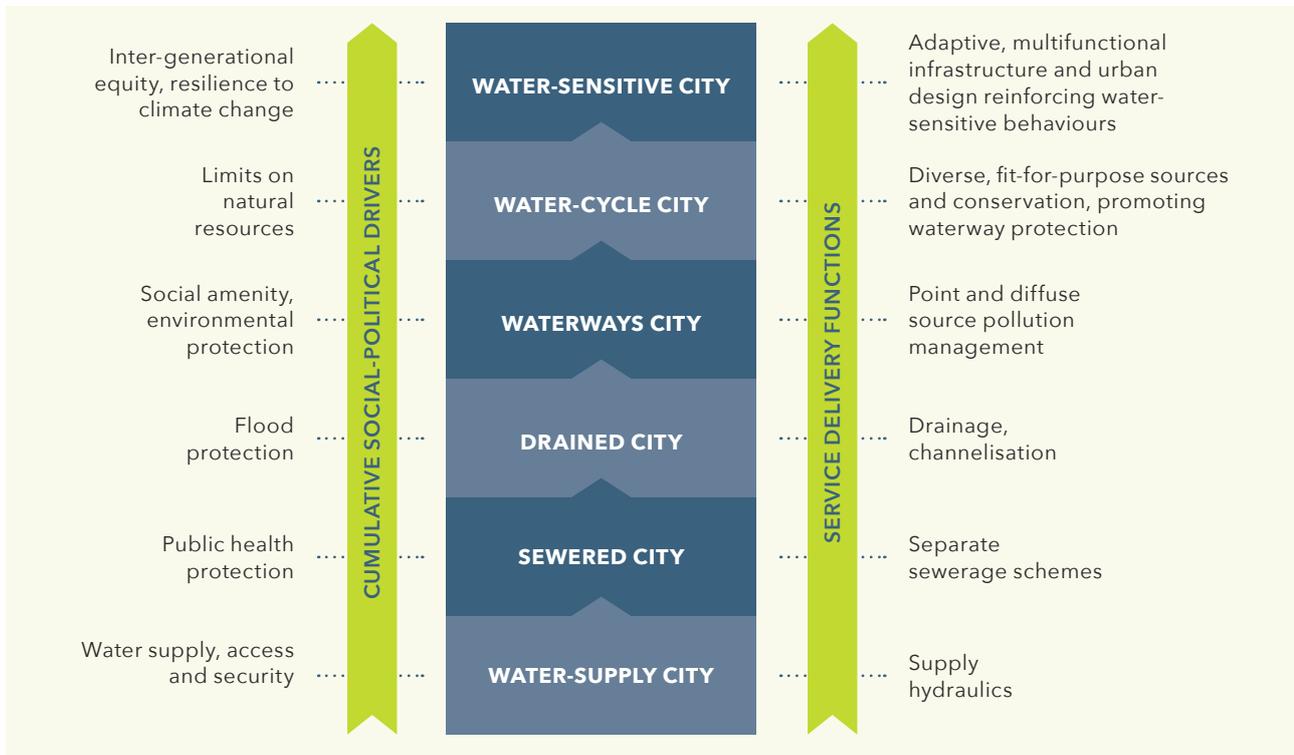


Figure 11: The transition from a water-supply city to a water-sensitive city

GOALS AND ACTIONS:

GOAL 5: PROACTIVELY REDUCE FLOOD RISK THROUGH THE IMPLEMENTATION OF A WATER-SENSITIVE CITY STRATEGY OR PLAN

<p>Lead department(s):</p> <ul style="list-style-type: none"> Water and Sanitation <p>Supporting department(s):</p> <ul style="list-style-type: none"> Environmental Management Recreation and Parks Urban Planning and Design Development Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Provincial Government <hr/> <p>Status of action:</p>  <p>New (in planning)</p>	<p>Action 5.1 Develop and implement a water-sensitive city strategy or plan for Cape Town</p> <p>Description As noted in the City of Cape Town Water Strategy, “Cape Town is home to an extensive network of rivers and wetlands. These freshwater systems fulfil a dual function – as havens for plant and animal life, and as ecological infrastructure networks for the management, treatment and conveyance of stormwater and treated wastewater effluent. The ‘built’ stormwater infrastructure – comprising roadside gutters, kerb inlets and pipes – interfaces directly with Cape Town’s receiving freshwater and coastal environments. An integrated understanding of and management approach to managing these connected systems are essential for the protection of the receiving environment. The ongoing organic and inorganic pollution and the littering of the city’s stormwater and freshwater systems pose a threat to both biodiversity and human health”.</p> <p>Consequently, the City has identified the transition to a water-sensitive city as a key goal of the Water Strategy, and has therefore committed to “actively facilitate the transition of Cape Town over time into a water-sensitive city with diverse water resources, diversified infrastructure and one that makes optimal use of stormwater and urban waterways for the purposes of flood control, aquifer recharge, water reuse and recreation, and that is based on sound ecological principles. This will be done through new incentives and regulatory mechanisms, and through the way the City invests in new infrastructure.”</p> <p>(Note: This action originates from the Cape Town Water Strategy and is included here as it is a key climate resilience action.)</p> <p>Sub-actions Develop and implement a water-sensitive city strategy/plan for Cape Town, focusing on:</p> <ul style="list-style-type: none"> economic and financial incentives for water-sensitive urban design regulatory mechanisms to enable water-sensitive urban design direct investment in infrastructure.
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<p>Lead department(s):</p> <ul style="list-style-type: none"> Water and Sanitation <p>Supporting department(s):</p> <ul style="list-style-type: none"> Environmental Management Recreation and Parks <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Research institutions CSO/NGO Other (technical advisory group) <hr/> <p>Status of action:</p>  <p>New (in planning)</p>	<p>Action 5.2 Restore and rehabilitate the City’s rivers and wetlands to create liveable urban waterways</p>
	<p>Description</p> <p>Cape Town has 21 catchments, of which 12 are commanded by rivers. Most, if not all, of the rivers in these catchments have been negatively affected over many years by development, urbanisation, pollution and changing land use. In particular, many of what were once natural rivers have been modified into concrete lined channels or canals, or buried in pipes and culverts. The total length of rivers and streams in Cape Town is 1 900 km and the total length of canals and channels, 480 km.</p> <p>Healthy urban waterways provide an important flood attenuation function during periods of high rainfall and storm events. Waterways that have been highly modified through canalisation are no longer able to adequately perform that function. In addition, urban areas that have been subject to extensive surface hardening (e.g. concrete, tarred or paved surfaces) suffer from increased flood risk and flood impacts due to an increase in surface runoff and reduced infiltration during rainfall events. The restoration and rehabilitation of rivers and wetland areas will enable these spaces to better provide protection against flooding.</p> <p>(Note: This action originates from the City of Cape Town Resilience Strategy and is included here as it is a key climate resilience action.)</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Implement a demonstration project building on the conceptual work of the “Source to Sea” initiative. The demonstration project could include the following: <ul style="list-style-type: none"> De-canalise part of a river and rehabilitate the surrounding wetland in partnership with the local community Reconnect the river with the groundwater and the surrounding wetland Roster long-term engagement, collaboration and educational opportunities together with the surrounding community. Identify locations to replicate and scale up similar projects around the city.

GOAL 6: TAKE ACTION TO REDUCE FLOODING AND STORM DAMAGE THROUGH DISASTER MITIGATION APPROACHES

<p>Lead department(s):</p> <ul style="list-style-type: none"> Water and Sanitation <p>Supporting department(s):</p> <ul style="list-style-type: none"> Environmental Management Disaster Risk Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Research institutions <hr/> <p>Status of action:</p>  <p>New (concept)</p>	<p>Action 6.1 Improve the City’s ability to address flood risk through improved flood-risk mapping and the implementation of early-warning systems</p>
	<p>Description</p> <p>An important part of addressing flood risk is understanding the landscape in which flooding occurs. Although many areas of Cape Town are known to be flood prone, there is currently no comprehensive and integrated system for mapping flood risk and flood incidents. In addition, flood lines for river systems in Cape Town may need to be updated and possibly revised in order to ensure that these accurately reflect flood risk in the city.</p> <p>Early-warning systems for flood risk have been put in place in many parts of the world, providing local government and residents with information about rising flood risk before flooding occurs. These systems are usually based on rising river levels. However, much of Cape Town’s flooding occurs due to poor surface drainage rather than river flooding, although river flooding does play a role. It is therefore necessary to determine whether it is feasible to implement an early-warning system and, if so, what form it should take.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Review and revise flood lines where required Research and implement an integrated flood-risk and flood-incident mapping programme Research the feasibility of implementing early-warning systems for flooding in Cape Town and, if feasible, work towards implementation Develop and implement new catchment management plans for each catchment, which include a focus on flood-risk management Increase cooperation with SAWS regarding impact-based forecasting and determine whether this can be strengthened in Cape Town.

<p>Lead department(s):</p> <ul style="list-style-type: none"> Disaster Risk Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> Water and Sanitation Human Settlements Directorate Transport Directorate Recreation and Parks Environmental Health Solid Waste Management Safety and Security Directorate Customer Relations Social Development and Early Childhood Development Urban Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal Provincial Government CSO/NGO <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 6.2 Continued implementation of the City's Winter Readiness Plan and expansion/scaling up where required</p> <p>Description The City's Winter Readiness Plan is focused on preventing flooding during winter. This plan is coordinated by the Disaster Risk Management Department and implemented by a number of departments across the City. The Winter Readiness Plan focuses on reducing flooding by:</p> <ul style="list-style-type: none"> identifying high flood-risk areas in advance of winter rains and taking steps to address risk in these areas, where possible clearing leaves, sand and other obstructions from stormwater drains to enable better drainage pruning branches from trees that pose a risk to infrastructure, such as power lines during a storm educating the public on how to protect their homes from flooding. <p>Sub-actions</p> <ul style="list-style-type: none"> Continued implementation of the City's Winter Readiness Plan Expand or scale up the Winter Readiness Plan where required Initiate new risk-reduction projects based on lessons learned from the implementation of the Winter Readiness Plan.
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6.4. SFA 4: COASTAL MANAGEMENT AND RESILIENCE

Cape Town has a coastline of approximately 307 km, consisting of both rocky and sandy shores. The city's coastline provides the residents of and visitors to Cape Town with a multitude of social and economic benefits and opportunities, as well as essential ecosystem goods and services. Cape Town's coastline is an important asset for the city's economy, provides recreational and tourism opportunities and supports important biodiversity assets. An economic assessment of the contribution of Cape Town's coastline to its GDP estimates the value to be approximately R40 billion per annum ($\pm 10,7\%$ to GDP/annum).²²

The coastline also provides an important buffer function in protecting both public and private coastal infrastructure against coastal erosion and high seas during storm events. However, the natural functions of the coast are being compromised due to the extent and nature of urban development. Encroachment on the coastline and subsequent 'coastal squeeze' has interrupted natural sand movement dynamics, had an impact on natural vegetation cover, and put in place fixed infrastructure that is vulnerable to the effects of wave action and windblown sand.

Climate change is projected to have a significant negative impact on the coastline in two ways: first, through increased coastal erosion due to a change in coastal dynamics caused by increased wind speed, a change in wind direction, and changes in ocean currents and wave climate; and second, through mean sea-level rise. Although sea-level rise is seen as a longer-term risk, increased coastal erosion is already taking place at various points on the city's coastline. This poses a significant risk to both public and private infrastructure and property in these areas.

In 2009, an assessment of coastal public infrastructure at risk from climate change-related impacts was conducted. The assessment aimed to identify specific pieces of infrastructure at risk as the basis for the development of programmes and projects aimed at either protecting, maintaining, or removing infrastructure at risk. At-risk public infrastructure includes:

- roads, footpaths, boardwalks, slipways and access points to the beach
- stormwater infrastructure
- water and sewage pipes and related infrastructure, such as pump stations
- public facilities such as beach ablutions, kiosks and lifesavers' buildings
- tidal pools
- electricity infrastructure including cables (underground and overhead) and substations
- jetties and breakwaters.

CITY OF CAPE TOWN INTEGRATED COASTAL MANAGEMENT POLICY

The City's Integrated Coastal Management Policy (2014) recognises climate change as a risk, and commits to ensuring the following:

- That coastal development takes place in a way that does not compromise the coastal environment's ability to buffer against climate change-induced risks and hazards.
- That decision making related to the coastline takes into account the need to respond to climate change and climate-induced coastal risk over the short, medium and long term.
- The implementation of proactive and progressive measures, including socio-institutional responses, to reduce coastal risk from climate change, sea-level rise and storm surge events.
- Where natural systems still exist, ensuring the protection and maintenance of these natural systems to preserve their integrity and therefore their ability to respond to climate risk.
- Requiring all new coastal developments and changes to existing developments to incorporate mitigation of and/or adaptation to the impacts of coastal climate change as part of the approval process.

²² Urban-Econ (2017).

GOALS AND ACTIONS:

GOAL 7: PROMOTE COASTAL RESILIENCE TO THE BENEFIT OF BOTH COASTAL COMMUNITIES AND COASTAL ECOSYSTEMS

<p>Lead department(s):</p> <ul style="list-style-type: none"> Environmental Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> Transport Water and Sanitation Electricity Generation and Distribution Recreation and Parks Sustainable Energy Markets (Climate Change Team) Urban Planning and Design Development Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal Provincial Government Businesses/Industrial associations Research institutions Residents CSO/NGO 	<p>Action 7.1 Initiate a process to ensure that coastal communities and ecosystems are resilient to the impacts of climate change-induced coastal pressures such as sea-level rise and coastal erosion</p>
<p>Status of action:</p>  <p>New (in planning)</p>	<p>Description</p> <p>The City's coastal urban edge was adopted by Council in 2012 as part of the City's Municipal Spatial Development Framework (MSDF). The coastal urban edge was in return gazetted as the City's Coastal Management Line (CML) on 19 March 2021 in fulfilment of the requirements of the Integrated Coastal Management Act, 1998. The purpose of the coastal urban edge/CML is to ensure risk-averse and sustainable coastal development through spatially demarcating coastal hazard areas and existing coastal ecosystems, such as dune cordons, as important natural buffers, and guiding development in such areas. This is important in the context of both the escalating pressures associated with climate change and Cape Town as a rapidly expanding coastal city.</p> <p>However, due to historical planning decisions, there are areas that are already developed and expected to become increasingly exposed to the effects of climate change. In addition, inappropriately located coastal development can exacerbate the negative impacts of climate change by disrupting natural coastal processes.</p> <p>Sub-actions</p> <p>Conduct a comprehensive assessment and review to determine the following:</p> <ul style="list-style-type: none"> Whether existing regulations are sufficient and, if not, what additional regulations need to be put in place for development in known risk areas The ownership of land parcels and what measures need to be put in place to address these where ownership is unclear or land where formal erven have not been defined What measures need to be put in place to ensure permanent conservation of coastal green belts as important buffers against the impacts of climate change What additional management measures need to be put in place to ensure the effective management of the area seaward of the coastal edge/CML, including determining roles and responsibilities within this space What additional resources are required to effectively manage the area seaward of the coastal edge and what funding mechanisms need to be put in place to ensure the effective management of this space The feasibility of co-financing options for the protection of private properties in coastal areas What additional measures, including potential legislative amendments, need to be pursued or put in place to ensure the protection of coastal public property and ensure that access to the coast as a public right remains in place in the context of changes to the coastal environment due to climate change.





<p>Lead department(s):</p> <ul style="list-style-type: none"> Environmental Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) <hr/> <p>Status of action:</p>  <p>New (in planning)</p>	<p>Action 7.2 Initiate the planning, development and execution of a coastal and sea-defence decision framework for Cape Town</p>
	<p>Description</p> <p>Parts of Cape Town’s extensive coastline have been developed with fixed infrastructure, thereby significantly restricting natural coastal processes from taking place unhindered in these areas. It is anticipated that such infrastructure will be increasingly exposed to climate change-induced coastal pressures in the medium to long term.</p> <p>The City will therefore need to apply a multicriteria and risk-sensitised decision framework to determine the most appropriate coastal interventions, including hard engineering responses, soft engineering responses, ecosystem-based adaptation or phased retreat, or a combination, in these areas. The Coastal and Sea Defence Decision Framework will enable a multidisciplinary consensus on the most sustainable, equitable and risk-averse intervention over a multigenerational time scale.</p> <p>The Coastal and Sea Defence Decision Framework may be used to assess the following range of interventions for implementation:</p> <ul style="list-style-type: none"> The rehabilitation or restoration of natural coastal ecosystems The creation of artificial or engineered vegetated dune systems The construction of sea walls or other hard infrastructure to ‘hold the line’ The construction of sea defences with soft engineering interventions such as geobag container revetments Re-engineering and upgrading existing infrastructure to withstand increased impacts Beach nourishment and the manipulation of sand Managed retreat, where coastal defences are not appropriate or would have significant undesirable side effects in the protection of infrastructure A combination of various approaches. <p>Sub-actions</p> <ul style="list-style-type: none"> Undertake necessary studies, including placing greater emphasis on resource economics, as and when required, and ensure that the results of such studies feed into the Coastal and Sea Defence Decision Framework so that decisions are well informed and evidence based Apply the Coastal and Sea Defence Decision Framework to areas of high risk and complexity along the coastline that require intervention. Recognise that each situation is unique, that coastal risk has emergent properties and that a “one size fits all” approach is not possible, and apply this framework with the strategic intent of achieving the triple bottom line on a multigenerational scale On an ongoing basis, evaluate and plan for coastal defences in emerging high-risk areas. This must include planning for uncertainty through ensuring option retention where possible On an ongoing basis, evaluate and monitor the implementation of coastal defences.

<p>Lead department(s):</p> <ul style="list-style-type: none"> • Environmental Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> • Sustainable Energy Markets (Climate Change Team) <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • National Government or parastatal • Provincial Government • Businesses/industrial associations • Research institutions • Residents • CSO/NGO <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 7.3 On an ongoing basis, conduct necessary transdisciplinary research related to sea-level rise and other climate change-induced coastal pressures and hazards as the baseline informant in order to respond appropriately to such risks in the coastal zone</p> <p>Description The coastal zone is a complex space of non-linear and multiscale interactions. The science related to understanding these processes in the context of climate change is constantly evolving. It is therefore necessary for the City to stay up to date with current scientific research and conduct Cape Town-specific research in order to ensure that coastal management decision making is based on the best available evidence.</p> <p>The City has previously conducted a sea-level rise risk assessment (2009), which identified areas at high risk of impact. However, as the science on this subject evolves, it is necessary to update the model to reflect this. The City has also conducted detailed fine-scale coastal dynamics modelling for the Big Bay/ Small Bay coastal node, which has informed coastal defence planning in this area. However, there are additional areas of the coastline that would benefit from similar finer-scaled research.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> • Update the City's sea-level rise risk assessment and ensure that this remains up to date into the future • Conduct fine-scale erosion assessments where a need for these is identified • Stay up to date with scientific knowledge related to coastal management in the context of climate change, and initiate further research programmes if necessary.
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<p>Lead department(s):</p> <ul style="list-style-type: none"> • Environmental Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> • Legal Services • Sustainable Energy Markets (Climate Change Team) <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • National Government or parastatal • Provincial Government <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 7.4 On an ongoing basis, conduct necessary legal reviews and research, and put in place appropriate regulations to address the complex legal challenges surrounding property ownership and liability in the context of a receding coastline and risk exposure, respectively</p> <p>Description Legislation regarding the coastal zone is complex; it is not without loopholes and is constantly being updated. There is a need to both understand and correctly apply national and provincial legislation to the coastal zone in Cape Town, and to put in place appropriate by-laws and regulations for Cape Town. Climate change adds additional complexity due to the effects of sea-level rise and coastal erosion on private and public property.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> • Continued implementation of the comprehensive Coastal Management By-law (2020), which includes provisions related to managing the impacts of climate change on the coastal zone, and revising it when necessary • Initiate reviews of national and provincial legislation to determine the adequacy and appropriateness of such legislation in the face of emergent risks driven by climate change • Work to ensure that coastal legislation is effectively enforced and that the City is compliant with this legislation • Put in place appropriate planning regulations including, but not limited to, coastal overlay zones to manage the impacts of climate change in the coastal zone.
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GOAL 8: PUT IN PLACE EFFECTIVE COOPERATIVE AND EMPOWERING MECHANISMS FOR ADDRESSING COMPLEX COASTAL MANAGEMENT ISSUES IN THE CONTEXT OF CLIMATE CHANGE

<p>Lead department(s):</p> <ul style="list-style-type: none"> Environmental Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> Water and Sanitation Law Enforcement Recreation and Parks Sustainable Energy Markets (Climate Change Team) <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal Provincial Government Businesses/industrial associations Research institutions Residents CSO/NGO <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 8.1 Put in place cooperative and collaborative mechanisms for addressing complex coastal management issues including climate change, which engage the public, businesses, and other spheres of government, and ensure interdepartmental collaboration in the City on an “as when required” basis</p> <p>Description The coast is a complex environment, both physically and socially. In order to address this complexity and find solutions that are feasible, affordable and acceptable to a range of stakeholders, it is necessary to put in place new cooperative mechanisms for addressing complex coastal management issues, including climate change.</p> <p>Cooperative mechanisms are required in order to engage with the following key stakeholders: members of the public, organised community groups (such as ratepayers’ associations), businesses and business groups, non-governmental environmental organisations working on coastal issues, and other spheres of government.</p> <p>There is no “one size fits all” solution for engagement with stakeholders, and therefore these types of mechanisms will vary from area to area. These mechanisms may be temporary (in order to address and resolve a specific problem) or permanent (in order to provide a forum for ongoing engagement in high-risk areas) and will likely evolve over time to meet the needs of the various stakeholders.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Establish cooperative mechanisms as and when required for addressing complex coastal management issues, including climate change Engage with the key stakeholders through these mechanisms, as needed.
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6.5. SFA 5: MANAGING FIRE RISK AND RESPONSIVENESS

The location of Cape Town within the Cape Floristic Region, that contains vegetation types that are both fire-prone and require fire to thrive, means that fire has been a relatively frequent occurrence in the area throughout its history and should be seen as a natural part of the local ecosystem. However, the climatic conditions that make Cape Town a fire-prone area also contribute to the spread of destructive fires in urban areas.

Urban fires disproportionately affect informal settlements and have caused considerable loss of life and property in affected communities. Informal settlement fires have complex causes, and various factors contribute to the ignition and spread of these fires:

- The use of potentially unsafe energy sources (such as paraffin stoves, wood fires and candles) for cooking, heating and/or lighting
- The use of fire-prone building material, such as untreated wood, for informal dwellings

- Overloaded, illegal or poorly maintained electrical connections
- High densities in informal settlements, which allow fire to spread quickly between dwellings and may limit access for firefighters
- Hot, dry and windy conditions during summer months that lead to the increased spread of fire.

When considering adaptation action related to wildfires, it is important to acknowledge that fynbos is a fire-adapted vegetation type - fire contributes both to the germination of seeds and acts as a mineralising agent to ensure ideal soil conditions. Wildfires, however, pose a risk to people who live at the interface of urban and natural areas, and to property and infrastructure located in those areas. In addition, wildfires that occur too frequently can damage fire-adapted ecosystems; this is often exacerbated by the presence of invasive alien plant species that significantly increase fire risk and fire intensity.



GOALS AND ACTIONS:

GOAL 9: PROACTIVELY REDUCE FIRE RISK AND THE IMPACT OF FIRES ON COMMUNITIES AND NATURAL AREAS

<p>Lead department(s):</p> <ul style="list-style-type: none"> • Fire Services • Human Settlements Directorate • Disaster Risk Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> • Environmental Management • Sustainable Energy Markets (Climate Change Team) • Urban Management • Urban Planning and Design • Development Management • Water and Sanitation <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • National Government or parastatal • Provincial Government • Residents • Research institutions • CSO/NGO • Other (Law Enforcement) <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 9.1 Reduce urban fire risk and the impact of urban fires on communities</p> <p>Description Urban fires, especially in informal settlements and backyard structures, pose a significant risk to human life and property, and displace hundreds to thousands of people every year. Fires in formal residential areas, commercial and industrial areas, and open spaces such as road verges are generally well managed and do not generally spread significantly or cause a large number of deaths or loss of structures. However, on average approximately 4 500 informal dwellings are damaged, destroyed or affected by fire each year, with considerable variation within and between years. Approximately 100-115 deaths occur annually due to fires in informal settlements and backyard structures.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> • Continued implementation of public fire safety education programmes aimed at residents in both informal and formal areas • Continued roll-out of, and improvement in, quality of fire-proofed materials as part of building kits distributed to fire victims in informal settlements • Continued implementation of re-blocking of informal settlements (where applicable) to improve access for fire services • Conducting research to better understand the causes of informal settlement and backyard structure fires and the factors that cause these to spread; and implementing actions accordingly based on the outcomes of this research • Advocating recommendations in the Guideline to Reduce the Occurrence and the Spread of Fires in Informal Settlements and Backyarders.
<p>Lead department(s):</p> <ul style="list-style-type: none"> • Sustainable Energy Markets • Electricity Generation and Distribution <p>Supporting department(s):</p> <ul style="list-style-type: none"> • Fire Services • Disaster Risk Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • National Government or parastatal • Provincial Government • Businesses/industrial associations • CSO/NGO <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 9.2 Design and implement a programme and incentives for affordable, safe energy solutions for low-income and informal households</p> <p>Description Low-income and informal households frequently use energy sources other than electricity for cooking, lighting and heating. These may include candles, paraffin stoves and open fires, which significantly increase the risk of dwelling fires. Low-income and informal households are often not able to use electricity due to a lack of access to electrical connections, or the high cost. As such, it is necessary to look at increasing access to electricity or other safe energy sources for cooking, lighting and heating.</p> <p>(Note: This action aligns with the activities of goal 11: “Ensure low-income residents are climate resilient and have equitable access to essential services” under the spatial and resource inclusivity strategic focus area and should be considered alongside action 11.1.)</p> <p>Sub-actions</p> <p>Conduct research to determine the costs and benefits of:</p> <ul style="list-style-type: none"> • increasing the allocation of free basic electricity to low-income and informal households • the extent to which energy efficiency measures can influence and assist with the existing subsidy allocation • promoting or providing low-income and informal households with solar kits for lighting and charging of cellphones • promoting or providing low-income and informal households with access to alternative safe energy sources for cooking, lighting and heating • implementing actions accordingly, based on the outcomes of this research.

<p>Lead department(s):</p> <ul style="list-style-type: none"> • Fire Services • Environmental Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> • Human Settlements Directorate • Development Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • National Government or parastatal • CSO/NGO <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 9.3 Reduce wildfire risk and the impact of wildfires on urban communities</p>
	<p>Description</p> <p>Wildfires pose a risk to both biodiversity and communities living adjacent to areas that are prone to wildfires. Much of the natural vegetation within the Cape Floristic Region is fire-prone and requires fire in order to persist. However, fires that are too frequent or intense pose a risk to biodiversity, and especially to rare and endangered vegetation types or species that may have a limited range. Fires also pose a significant risk to communities living adjacent to natural areas, with threats posed to both life and property. Reducing the occurrence and spread of excessive wildfires will therefore reduce the risk to both biodiversity and adjacent communities. Invasive alien tree species contribute to the spread and intensity of wildfires, and therefore addressing this issue is a priority.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> • Continue implementation of the City’s invasive alien plant species clearing programme • Work with communities adjacent to natural areas to maintain firebreaks • Work with SANParks to reduce wildfire risk in the Table Mountain National Park • Take swift action to extinguish wildfires that pose a risk to either biodiversity or communities • Allow fires to burn where required for the health of biodiversity, as long as these do not pose a risk to life or property • Implement planned ecological burns to promote biodiversity and/or reduce fuel load.

6.6. SFA 6: SPATIAL AND RESOURCE INCLUSIVITY

The spatial legacy of apartheid has positioned many communities, largely poor Capetonians, far from amenities and opportunities. Increased urbanisation has perpetuated this pattern, with the in-migrant poor settling informally in marginal locations, which are especially vulnerable to the impacts of climate change such as extreme heat and flooding. Low economic growth and the accompanying social stress and resource constraints make it challenging for the City to keep up with essential infrastructure. This leads to the risk of worsening inequity in access to formal housing, energy, water, sanitation and waste services, and the maintenance of existing services. Spatial and economic inequity is highlighted by the fact that the 25% poorest commuters spend an average of 43% of their household income on transportation²³ and suffer the longest travel times.

This SFA targets climate response that addresses the elements of spatial integration and access to resources and essential services that together compound inequity. The objective is a just plan for the transformative and systemic change needed to build climate resilience and reduce GHG emissions, with any trade-offs being made in favour of the poorest residents of the city. Achieving the goals of this focus area is highly contingent on strong and unified political support for the various actions.

Spatial inclusivity

Cape Town's MSDF lays the foundation for a more inclusive, integrated and vibrant city. The framework addresses the legacies of apartheid, rectifies existing imbalances between types of residential development and avoids the creation of new structural imbalances in the delivery of services. The MSDF addresses spatial disparity by outlining a restructured urban form and functionality for Cape Town that is premised on the following:

- **Where to develop:** TOD, land-use intensification and densification in and around the corridors, nodal points and transit precincts, and a prioritisation of development and investment to support this approach
- **Where not to develop:** Conserving and enhancing the natural assets of the city
- **Managing risks:** Acknowledging inherent natural and human-made risks and development directives.

The City can influence the form of the city, enhance climate resilience and lower GHG emissions by promoting spatial inclusivity through the following levers:

- Granting development rights
- The investments it makes in infrastructure and transport
- The implementation of state-assisted housing programmes
- The release of its own well-located land for development.

Promoting and regulating towards a more efficient urban form reduces reliance on private transport and provides more options for safe, efficient and affordable non-motorised and public transport (in support of the goals of SFA 9: Mobility for quality of life and livelihoods).

The formal and informal development of low-income housing is a primary driver of the urban form of the city and determines the extent to which it can achieve greater efficiency and resilience. Recognising this trend in development, the City has already put in place a number of short- and long-term measures that are being enhanced and supported through the actions in this focus area.

Resource inclusivity

Pre-Covid-19, real GDP per capita for the city had slipped back to 2006 levels. Consequently, the economy has offered little scope of transforming extreme income disparities and associated service access and affordability inequity. For example, even though Cape Town is highly electrified,²⁴ the 34% who are the poorest of the city's residents spend between 5% and 25% of their household expenditure on the energy required for heating, cooking, lighting and other uses.²⁵ In general, higher-income households spend a far lower proportion of their total income on their energy needs, even though their average consumption is much greater. Pervasive informal housing coupled with increasing real electricity prices has led to continued energy poverty, instances of illegal connections and reliance on paraffin. Risks include fire and the health impacts of exposure to cold, damp and heat.

As of 2020, approximately 23 000 households were awaiting electrification, which would unlock access to an energy subsidy. However, a further 10 000 households cannot be connected to the grid because they are in informal settlements located on land that is unsuitable or unsafe for

23 City of Cape Town (2018). Comprehensive Integrated Transport Plan 2018-2022.

24 City of Cape Town Socio-Economic Profile (2018) (p. 18).

25 Cape Town State of Energy Report (2015) (p. 60), based on Stats SA Census data of 2011.



development, is legally disputed or is reserved for infrastructure expansion. The City's options for maintaining the subsidised provision of electricity and other services are also narrowing. Innovative models for affordable and user-acceptable alternative service provision solutions are therefore needed. Innovative solutions require collaboration across City departments, improved primary data (with benchmarks and performance tracking metrics) and strong collaboration between suppliers, ratepayers, businesses and civil society to collectively maintain and enhance the provision of essential services to the city's poorest residents.

The sustainable provision of resources requires a long-term view and will need to strike a balance between affordability, ecological impacts and acceptability to communities. This provision also needs to be legally appropriate, politically acceptable and have practical, robust and sound financial mechanisms.

The actions in this focus area intend to ensure that over time, all Capetonians:

- have high-quality and affordable essential services: water, sanitation, refuse collection and clean energy
- are able to live in well-located, energy-efficient and climate-proof housing
- can easily access safe and affordable transport options
- have a healthy local environment and access to green spaces.

GOALS AND ACTIONS:

GOAL 10: DENSIFY MASS TRANSIT ROUTES THROUGH MIXED-USE DEVELOPMENTS THAT SUPPORT PUBLIC TRANSPORT AND INCLUDE SOCIAL HOUSING

<p>Lead department(s):</p> <ul style="list-style-type: none"> Urban Planning and Design Transport Planning <p>Supporting department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) Environmental Management Policy and Strategy Human Settlements Directorate Urban Catalytic Investment Development Management Property Management Water and Sanitation Solid Waste Management Electricity Generation and Distribution <p>External Stakeholder(s):</p> <ul style="list-style-type: none"> Businesses/industrial/associations (including the property development sector) CSO/NGO²⁶ Provincial Government 	<p>Action 10.1</p> <p>Ensure that the Municipal Spatial Development Framework (MSDF) and District Spatial Development Frameworks (DSDFs) are climate responsive, enhance the effectiveness of the Transit-Oriented Development (TOD) Strategic Framework and support the long-term development of inclusive, climate-resilient, zero-emission precincts</p>
<p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Description</p> <p>The MSDF provides high-level policy guidance to direct decision making on the nature, form, scale and location of urban development, land-use change, infrastructure development, disaster mitigation and environmental resource protection. It informs smaller-scale district plans, which aim to guide spatial development processes and land-use management within each district and are approved by the Council of the City of Cape Town as policy. The district plans also include an Integrated Environmental Management Framework, developed in terms of the National Environmental Management Act, 1998 (NEMA). It is therefore essential that climate change response be mainstreamed into these.</p> <p>In addition to the MSDF and DSDFs, the City has developed a TOD Strategic Framework. This framework consists of a range of enabling mechanisms that can be used to enable TOD. This includes engagement with key external stakeholders – such as property development organisations and professional bodies working in the built environment sector – to promote and ensure adherence to land-use and planning policies.</p> <p>The successful implementation of these mechanisms will ensure that TOD areas make provision for high-density mixed-income and mixed-use residential developments, including social housing and, where applicable, inclusionary housing. The lead departments will coordinate with the supporting departments to implement the sub-actions below.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Ensure that climate change is adequately considered in revisions of the MSDF, DSDFs and TOD Strategic Framework Use the TOD Strategic Framework mechanisms and those further refined in the DSDF Implementation Plan to incentivise and enhance the densification and diversification of land uses in development corridors and align private development with the TOD network, including DFAs (and New Development Areas in the DSDF) In order to maximise flexible and multipurpose use of space in densely developed areas, promote flexibility in the development of new buildings (and redevelopment of existing buildings) so that they can easily be repurposed or converted to alternative functions (e.g. from commercial to residential or mixed use); make necessary amendments to the Municipal Planning By-law and Development Management Scheme in order to facilitate this Implement the TOD Strategic Framework: <ul style="list-style-type: none"> Reactively through responses to applications submitted by the private sector Proactively through a programme for the release of strategically located land for TOD and affordable housing. Determine the most effective means for tracking the delivery, effectiveness and impacts of enablement mechanisms and include indices that monitor changes in land use Ensure transparent, citywide reporting on the status of TOD enablement mechanisms, an analysis of their effectiveness and recommendations for updating the approach.

²⁶ Including Social Housing Institutions (SHIs) accredited by the Social Housing Regulatory Authority (SHRA). SHIs utilises government funding (and discounted land) for part of its capital expenses and is the only government-subsidised housing programme that can enable high-density affordable housing. SHRA is a public entity in terms of Schedule 3A of the Public Finance Management Act, 1999 (Act No. 29 of 1999) – an agency of the National Department of Human Settlements.

<p>Lead department(s):</p> <ul style="list-style-type: none"> Human Settlements Directorate <p>Supporting department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) Water and Sanitation Solid Waste Management Development Management Property Management Urban Planning and Design Social Development Recreation and Parks <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Businesses/Industrial associations CSO/NGO Provincial Government <hr/> <p>Status of action:</p>  <p>New (concept)</p>	<p>Action 10.2 Promote and support integrated human settlement development that is climate responsive</p>
	<p>Description</p> <p>The City's draft Human Settlements Strategy articulates the role of the Human Settlements Directorate in rolling out basic service provisions to backyard dwellers located on City-owned public rental housing. The strategy also supports priority programmes for upgrading informal settlements and enables opportunities to enhance healthy and safe formal and informal building practices, and upgrades towards formality.</p> <p>An inclusionary housing policy is also being developed that will serve as a mechanism for designating land use for inclusionary housing.</p> <p>This work, together with the TOD Strategic Framework and draft Housing Delivery Roadmap, is critical for the formation of sustainable integrated communities. The sub-actions below aim to strengthen the ongoing climate responsiveness of housing delivery programmes in both the formal and informal housing sectors.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Combat NIMBYism²⁷ by ensuring that especially non-technical stakeholders understand what is meant by terms like 'social' or 'inclusionary' housing in both a general and development-specific context Ensure that high-quality green open space is included in new developments in order to support climate resilience Promote transversal support in relevant City departments to increase housing opportunities through densification, formalisation, accessing underutilised land and structures, and inclusionary housing.



27 NIMBY: Not In My Backyard.



Lead department(s):

- Urban Catalytic Investment
- Urban Planning and Design (Urban Sustainability Branch)

Supporting department(s):

- Sustainable Energy Markets (Climate Change Team)
- Environmental Management
- Human Settlements Directorate
- Urban Management
- Development Management
- Water and Sanitation
- Solid Waste Management
- Electricity Generation and Distribution

External stakeholder(s):

- Businesses/industrial associations
- CSO/NGO

Status of action:



Implementation

Action 10.3

Ensure City catalytic sites prioritise the development of mixed-use and mixed-income inclusive housing along public transport corridors, and ensure that pilot projects on urban sustainability are net-zero carbon and minimise the cost of occupancy with energy efficiency

Description

The City has a significant portfolio of well-located land and a programme to package and release this land to the market for mixed-use and mixed-income, inclusive housing and densifying development along public transport corridors. The City will pilot the development of carbon-neutral sites through actions in the Catalytic Land Development Programme, and through implementing and facilitating participation in C40's Reinventing Cities Programme.

The City is also pursuing an urban sustainability pilot project, which aims to identify sites that will be used for pilot projects and which demonstrate innovative approaches to sustainable urban development.

Sub-actions

- Work with advocacy groups to explore the best options for providing mixed-income housing in catalytic sites
- Continue with the piloting of mixed-market models that unlock incentives, City-owned land and partnership models for integrated affordable housing
- Ensure that urban sustainability pilot projects embody principles of climate resilience, net-zero carbon and minimise the cost of occupancy with energy efficiency.

GOAL 11: ENSURE LOW-INCOME RESIDENTS ARE CLIMATE RESILIENT AND HAVE EQUITABLE ACCESS TO ESSENTIAL SERVICES

<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets Electricity Generation and Distribution <p>Supporting department(s):</p> <ul style="list-style-type: none"> Human Settlements Directorate <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal Provincial Government CSO/NGO Businesses/Industrial associations <hr/> <p>Status of action:</p>  <p>New (in planning)</p>	<p>Action 11.1 Alleviate energy poverty through energy efficiency and alternative energy interventions, education and communication, and address barriers to accessing clean and affordable energy sources</p> <p>Description In the long term, a multidimensional approach is required to reduce energy poverty. In addition to engaging with communities and with other stakeholders such as National and Provincial Government, the City will continue leading efforts with its energy poverty alleviation pilots and programmes.</p> <p>(Note: In addition to the improved resilience resulting from energy poverty alleviation efforts, this action also provides a climate change adaptation co-benefit that aligns with the activities of goal 9: “Design and implement a programme and incentives for affordable, safe energy solutions for low-income and informal households” under the SFA “Managing fire risk and responsiveness” and will be considered alongside action 9.2.)</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Consider interim/alternative cleaner energy services as part of the basket of basic services offered to low-income residents Investigate the provision of subsidies for alternative energy for households that do not have access to grid electricity Develop education and awareness programmes for low-income energy users. This will include energy efficiency, safety tips, tampering and theft, and communication efforts to reduce incidents of vandalism and attacks on service providers Carry out further survey-based research on ‘energy stacking’ practices Ascertain the eligibility of different housing typologies and work with the National Department of Mineral Resources and Energy (DMRE) to enable the roll-out of solar water heaters Work to ensure that existing energy subsidies to low-income households and the City for the poor (national grants) are fully accessed Continue optimising subsidised electricity tariffs and their administration Encourage the use of new and innovative technologies such as rooftop solar PV, solar water heaters, battery storage and smart grid functionality Facilitate the involvement of private partners in the provision of alternative energy services to low-income households Enhance the sustainability of traditional and alternative energy solutions through promoting the correct use of appliances and ongoing maintenance Promote and facilitate the use of liquefied petroleum gas (LPG) instead of paraffin and biomass with a view to long-term transition to 100% electric cooking Continue working with Eskom to ensure access and affordability of basic energy services in areas that Eskom supplies.
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6.7. SFA 7: CARBON-NEUTRAL ENERGY FOR WORK CREATION AND ECONOMIC DEVELOPMENT

Achieving carbon neutrality by 2050 implies a wholesale transformation of the way energy is supplied to Cape Town's economy. Electricity currently accounts for 57% of the city's GHG emissions, making this the largest opportunity for mitigation in the city. However, the potential for electrification of the transport fleet and some industrial processes means that carbon-neutral electricity is the key to eliminating some 75% of overall emissions in the longer term.

Globally, the energy sector is in transition, with electricity supply shifting to decentralisation and cheaper, renewable sources causing business model disruption and engineering challenges. Nationally, the electricity industry has been in difficulties, with a debt crisis at the vertically integrated national utility Eskom, steep price increases and intermittent supply disruptions (load-shedding). In addition, the carbon intensity of energy supply threatens the economic competitiveness of every local product and service, especially since the transition to carbon-neutral energy supply is well under way in developed countries. Historically, the finances of South African cities have been highly reliant on electricity revenues, but dropping demand due to low economic growth and the uptake of energy-efficient technologies and small-scale embedded

"Distributed data processing works better than centralised data processing, at least in periods of accelerating technological changes."

- Yuval Noah Hariri, *Homo Deus: A History of Tomorrow* (2018)

generation (SSEG) makes the energy transition an issue of municipal financial sustainability at the local level.

A way forward for cities needs to include not just reduced dependence on electricity revenues but also a more client-centred and service-oriented utility business model, together with the unbundling of retail, wires and generation to ensure cost recovery. The City's distribution network includes, at this time, in excess of 40 intake points from the national grid. The current generation assets of the utility itself comprise only the Steenbras Pump Storage Scheme and two relatively small emergency gas turbines supported by energy export purchases from SSEG customers and the Darling Wind Farm. Notwithstanding the impact of load-shedding, attempting to island



Credit: GreenCape

THE CITY OF CAPE TOWN'S SMALL-SCALE EMBEDDED GENERATION (SSEG) REGISTRATION PROGRAMME

The City of Cape Town introduced its first SSEG tariff in July 2012, adding a feed-in tariff the following year. With rapid SSEG growth and no framework of national legislation, the City responded by developing a by-law that required SSEG systems to be registered, and grid-tied installations to comply with defined standards. Non-compliant systems create safety risks and legal challenges for network operators, infrastructure, homeowners and the City itself. Illegal systems, however, remain an ongoing challenge. The City has responded with registration awareness campaigns using social media, rates bill inserts and an online video.

The climate change mitigation role of SSEG was recognised in the City's 2015 Energy2040 Goal, which targeted 120 MW of citywide rooftop solar photovoltaic SSEG by 2020. While the market didn't quite reach this ambitious aspirational target, SSEG growth has been exponential since 2014:



Figure 12: At the end of 2020, the total installed SSEG capacity was over 47 MW, and in-process and approved applications were over 90 MW

Cape Town's municipal distribution grid with 100% variable renewable energy supply is currently neither technically practical nor financially viable.

Regulatory, structural and engineering barriers to decarbonisation can, however, be overcome through facilitating the deployment of renewable energy technologies at different scales. These may be on-site or the energy wheeled across the Eskom and City-owned grid, aggregating renewable electricity exported by customers with any bulk-purchased renewable electricity to offer a range of carbon-neutral options to commerce, and industry in particular. This approach allows for a decisive (but if needs be, modest) start, incrementally decarbonising all customers over time. Critically, the national Electricity Regulation Act Regulations on New Generation Capacity were amended on 16 October 2020 to allow municipalities to apply to the minister to procure or buy new generation capacity in accordance with the IRP. The City has welcomed the amendments as they acknowledge that municipalities have a role to play in new generation.

Although regulatory reform as it stands may currently fall short of the market decentralisation ultimately required to meet the goals of this Climate Change Action Plan, there are good reasons to at least test the new regulations in good faith. These include the growing demand for green power, the continuity of engagement on regulatory concerns, solidarity with other local governments, and following the principle of collaboration established by the City's Climate Change Strategy.

The medium- to long-term carbon-neutral future requires carbon-neutral molecular fuel for industry. Hydrogen is emerging as the base for this, as well as a transport fuel for heavy vehicles and storage for curtailed wind and solar capacity. South Africa's relative technological advantage in hydrocarbon synthesis gives it a potential platform for the regional export of these fuels and represents a local industrial opportunity.

Renewable energy needs to be scaled up, aggregated²⁸ and strategically supplied, where

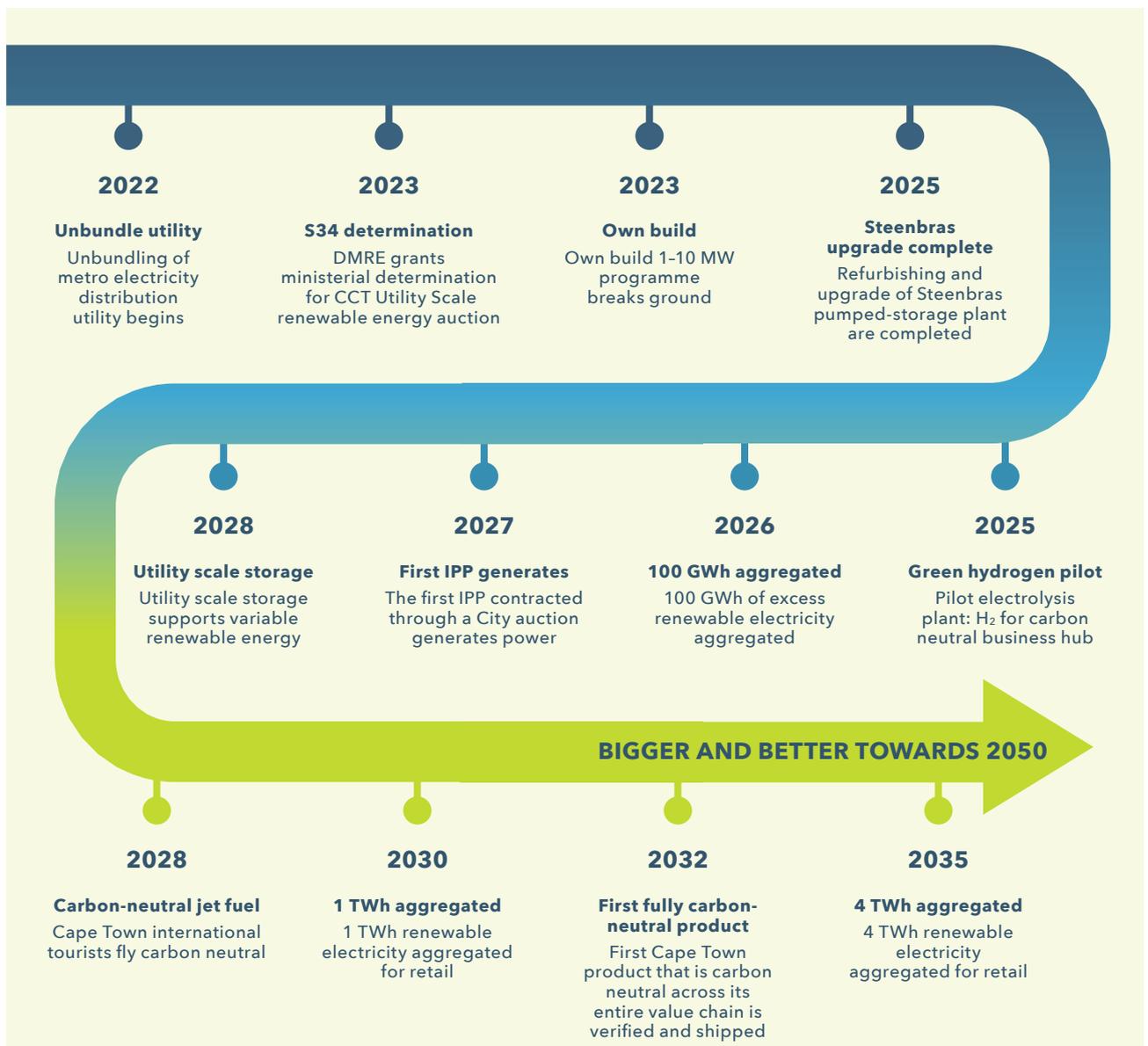


Figure 13: A vision timeline for a local energy transition that will require the City to fulfil both implementing and support roles

needed, at a stable price while ensuring the financial viability of the City’s electricity utility. This means working incrementally towards a reduced dependence on central utilities and central planning, and showing regional leadership in a collaborative national energy sector transition. This will require a combination of technical capability, economic rationale and political will²⁹ over time to make the City of Cape Town’s energy supply system cleaner, more flexible and less vulnerable.

An energy transition vision timeline

The vision timeline in Figure 13 presents an aspirational path for the laying of a foundation for carbon-neutral energy in the period up to 2050. A collaborative effort by numerous partners is required to make carbon neutrality a reality; the

City has an implementing or support role in all of these milestones. The decarbonisation of the electricity sector has been prioritised by the City through the creation of the SEM Department. This department is in the same directorate as the municipal utility, Electricity Generation and Distribution (EGD), in order to support the transition of the local sector. Many key transition projects are under way in both EGD and SEM.

²⁸ The grouping together of net-zero carbon electricity generated by various distributed sources so that it can be sold as a product.

²⁹ Stakeholder interview - Prof. Anton Eberhard, July 2020.

GOALS AND ACTIONS:

GOAL 12: MOVE AS QUICKLY AS PRICES AND OPPORTUNITIES ALLOW TOWARDS 100% CLEAN ELECTRICITY SUPPLY BY 2050

<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets <p>Supporting department(s):</p> <ul style="list-style-type: none"> Electricity Generation and Distribution <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Residents Businesses/industrial associations <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 12.1 Promote and administer the uptake of renewable small-scale embedded generation (SSEG) across residential, commercial and industrial sectors</p>
	<p>Description</p> <p>Currently, SSEG capacity growth is exponential in Cape Town. Nevertheless, the parallel connection of any generator to the electrical grid has serious safety and network management implications. This requires regulation complemented by awareness campaigns. Registered SSEG customers are placed on the appropriate tariff so that excess electricity that is fed into the grid is credited to the customer on a net billing basis. Evidence from the City's customer base suggests a strong role being played in uptake by a highly negative perception of the national utility as well as attractive economics for commercial-scale systems. In this context, the focus is not on the setting of citywide capacity targets when uptake is being driven by factors outside of the local utility's control. Rather, it is on achieving the best system outcomes and fairly compensating generating customers while ensuring connection costs are recovered, including those of subsidised indigent customers.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Carry out promotional and awareness campaigns in relation to the uptake of SSEG and the importance of registration Assess the network technical readiness and requirements of accommodating increased penetration of SSEG Move to allow and compensate net generation, enabled through, for example a green electricity aggregator or trading platform Consider residential Time-of-Use tariff charges and compensation for SSEG customers to manage better outcomes with price signals and more fairly compensate customers generating from batteries at peak times Investigate and implement cheaper residential advanced metering infrastructure (AMI) costs.

<p>Lead department(s):</p> <ul style="list-style-type: none"> Electricity Generation and Distribution <p>Supporting department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 12.2 Finalise and implement a framework and tariffs for the wheeling of renewable electricity</p>
	<p>Description</p> <p>The City is developing a 'wheeling' framework that will allow independent generators to sell electricity directly to electricity consumers embedded in the City's electricity grid. Wheeling is the financial transaction enabling the transportation of third-party electrical energy (in kWh) over the City's/Eskom's distribution/transmission network. This allows for the third-party supplier to sell this electrical energy to a City customer at that customer's point of supply. The municipality/Eskom provides access to their respective grids and play an administrative role in facilitating the transaction between the generators and electricity users.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Implement wheeling framework in the Enterprise Resource Planning system (currently SAP) Explore special wheeling tariffs for green SEZs Clarify the accounting rules for the exchange of energy between City of Cape Town entities. If required, develop the necessary arrangements to allow wheeling between City of Cape Town facilities, for example water supply energy recovery turbines, and a net-zero carbon building.

<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets <p>Supporting department(s):</p> <ul style="list-style-type: none"> Electricity Generation and Distribution <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Research institutions <hr/> <p>Status of action:</p>  <p>New (in planning)</p>	<p>Action 12.3 City-level energy planning that incorporates the carbon-neutral goal</p>
	<p>Description</p> <p>Undertake an IRP for the City that incorporates the carbon-neutral goal for supply and demand (e.g. ultimate electrification of the vehicle fleet).</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Develop baselines, targets and viable energy mix scenarios Work with local research groups Build in-house energy systems modelling expertise at an appropriate level and with appropriate tools.

<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets <p>Supporting department(s):</p> <ul style="list-style-type: none"> Electricity Generation and Distribution Corporate Portfolio, Programme and Project Management Supply Chain Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal Provincial Government <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 12.4 Develop a renewable energy roadmap and implement as and when economically viable</p>
	<p>Description</p> <p>The City is in the process of developing its Renewable Energy Roadmap, which will detail how it plans to meet its renewable energy targets and support the Net-Zero Carbon (NZC) Buildings Programme.</p> <p>Meeting the City's commitment to achieve net-zero carbon for all buildings that it owns or occupies (excluding plants like wastewater treatment plants) by 2030 will require in the region of 15 GWh of energy efficiency and 75 GWh of renewable electricity. Energy efficiency retrofits and on-site photovoltaics (PV) will be deployed where viable, but it is anticipated that a substantial quantity of electricity wheeled to sites will be required. The full programme is anticipated to approach the following capacities:</p> <ul style="list-style-type: none"> On-site rooftop PV (< 1 MVA): ± 12 MW Stand-alone PV on City land (1-10 MVA): ± 18 MW <p>In addition, the City is implementing ± 6 MW of power projects using landfill gas and wastewater gas that will likely be used on those sites but may be aggregated to support the NZC Buildings Programme. Considerably more renewable electricity is required to aggregate for customers. The goal of the roadmap is to map out a pathway to bringing significant renewable capacity into the local grid. The Green Economy Modelling Scenario of the Carbon-Neutral 2050 Goal requires around 550 MW of embedded generation in addition to the decarbonisation of the grid from the implementation of national policy by 2030. Most of this could come from citywide SSEG growth, but for the City's utility to be a player in green energy and reduce the risk of shortfall, this would require buying or procuring energy of at least 100-200 MW of renewable energy capacity leading up to 2030.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Finalise the Renewable Energy Roadmap towards the maximum contribution of renewable energy to local supply Identify electricity decarbonisation pathways for the City in three areas: <ul style="list-style-type: none"> SSEG (< 1 MVA) mostly on City-owned facility rooftops. A guideline for City facilities undertaking these projects has been developed Ground-mounted SSEG (< 10 MVA) identifying and developing suitable land not zoned for other uses (e.g. buffer zones) where the local grid is strong enough to evacuate the power An Independent Power Producers (IPP) Procurement Programme that is financially sustainable and meets all regulatory requirements. Investigate the potential of floating solar PV to open up potential for more local sites.



<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets <p>Supporting department(s):</p> <ul style="list-style-type: none"> Electricity Generation and Distribution <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal <hr/> <p>Status of action:</p>  <p>New (in planning)</p>	<p>Action 12.5 Develop an electrical energy storage roadmap</p> <p>Description A carbon-neutral electricity supply requires careful integration of peaking plant and storage into the grid over time as the supply of variable renewable energy grows. The existing Steenbras pumped-storage plant has proved invaluable during the recent supply interruptions. The drop in the price of battery storage at various scales offers new opportunities for embedded storage or storage integrated into IPP solutions. Embedded storage may also offer an alternative to strengthening the grid locally where demand peaks are growing, while at the same time increasing the opportunities for energy price arbitrage.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Develop an electricity storage roadmap including a tender structure that will appropriately incentivise decentralised storage Assess energy storage requirements and energy storage options of different scales and technologies over time under a scenario of high-grid penetration of renewable energy (IPPs and SSEG) Investigate the use of tariffs to incentivise customer storage being made available to the grid.
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<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets <p>Supporting department(s):</p> <ul style="list-style-type: none"> Electricity Generation and Distribution <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal Provincial Government <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 12.6 Local and regional electricity transition in a framework of mutual support with national programmes</p> <p>Description Continue to engage National Government ministries and the National Energy Regulator of South Africa (NERSA) to allow the procurement of renewable energy from IPPs with a minimum of restrictions on the timing, scale, quantity and technology of new capacity.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Develop a feasibility study for the procurement of renewable electricity from i) IPPs by the City of Cape Town utility through auctions, and ii) other mechanisms should these be appropriate, as required by recent Electricity Regulation Act amendments Address policy blockages or constraints with smaller projects to test business models and determine if the policy environment remains constrained in practice. (The City could, for example, contract IPPs to operate ground-mounted or solar rooftop PV systems only for City operations use. This enables the development of an IPP contracting process at minimum) Collaborate with the Western Cape Government on relevant initiatives to enable regional municipalities to procure renewable energy directly so that efforts are coordinated and information shared.
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GOAL 13: GET TECHNOLOGICALLY AND COMMERCIALY READY TO OPERATE THE METROPOLITAN DISTRIBUTION GRID OF THE FUTURE

<p>Lead department(s):</p> <ul style="list-style-type: none"> Electricity Generation and Distribution <p>Supporting department(s):</p> <ul style="list-style-type: none"> Information Systems and Technology Sustainable Energy Markets Supply Chain Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 13.1 Invest in transitioning to the grid of the future</p> <p>Description Invest in systems, standards development, research, staff and skills in the business development, operations and engineering areas needed to transition the electricity supply industry locally and nationally.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Upgrade Supervisory Control and Data Acquisition (SCADA) and Outage Management System (OMS) control centre systems to the Advanced Distribution Management System (ADMS) with integrated Distributed Energy Resources Management System (DERMS) Engage the South African Bureau of Standards (SABS), NERSA, Eskom and other municipalities to develop standards, specifications and practices for modern grids Review key national standards including SANS 507-1 and SANS 10142-1 to improve the network design parameters and SSEG integration; ensure that SANS 10400 part XA (buildings) is technically compliant with these.
<p>Lead department(s):</p> <ul style="list-style-type: none"> Electricity Generation and Distribution <p>Supporting department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets Policy and Strategy (Economic Analysis) <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 13.2 Investigate, prepare and implement a new utility business model</p> <p>Description Investigate, prepare and implement a new utility business model, which may include the unbundling of transmission, distribution and generation, alternative funding models and service offerings, and customer retention options.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Aggregate renewable-powered electricity that is cheaper than carbon-intensive electricity for the industrial sector to promote fuel switching and energy efficiency Continue ongoing innovation in tariff design to recover network costs, manage demand and support low-income customers Unbundle Electricity Generation and Development into separate generation, wires and retail businesses with network cost recovery protected in a cost-reflective network tariff.
<p>Lead department(s):</p> <ul style="list-style-type: none"> Electricity Generation and Distribution <p>Supporting department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets Communications <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Residents <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 13.3 Customer relations for a liberalising market</p> <p>Description Develop a more transparent and interactive relationship with customers that feeds into greater information exchange and can be leveraged for new service offerings.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Develop a retail trading platform Develop digital apps to communicate and interact with customers Give more feedback and information on the tariff build-up and how this is governed by the regulator and contributes to running the City.

GOAL 14: MINIMISE THE ECONOMIC COST OF ENERGY TRANSITION THROUGH MAXIMISING ENERGY EFFICIENCY AND DEVELOPING A REGIONAL VALUE CHAIN FOR CARBON-NEUTRAL MOLECULAR FUELS

<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets <p>Supporting department(s):</p> <ul style="list-style-type: none"> Communications <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Businesses/industrial associations <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 14.1 Devise and implement communication campaigns that promote energy efficiency</p> <p>Description Continue campaigns to promote the reduction of energy consumption through the use of energy-efficient lighting, heating, ventilation and cooling (HVAC), appliances and equipment.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Continue the Cape Town Energy, Water and Waste Forum Revive and continue the Electricity Savings and Smart Living campaigns Explore the use of innovative apps, calculators, appliance labelling system support and databases to promote the uptake of energy efficiency.
<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets <p>Supporting department(s):</p> <ul style="list-style-type: none"> Information and Knowledge Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Businesses/industrial associations Provincial Government <hr/> <p>Status of action:</p>  <p>New (in planning)</p>	<p>Action 14.2 Unlock transition with energy data</p> <p>Description Develop an energy audit and open data reporting framework, in collaboration with key stakeholders (e.g. Western Cape Government and National Cleaner Production Centre).</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Scale up local energy audits Create a standard for digitalising device stock and capacity, baselines and energy efficiency measures and potentials Develop a framework for the public dissemination of energy audit data, benchmarks (including regulated audits for buildings) and the standardisation of confidentiality practices around energy data Articulate the practical legal framework and approach to energy data in an energy policy for the City of Cape Town.
<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Businesses/industrial associations National Government or parastatal Provincial Government <hr/> <p>Status of action:</p>  <p>New (concept)</p>	<p>Action 14.3 Develop a regional value chain for carbon-neutral molecular fuels</p> <p>Description Supply the fuels and distribution systems needed to decarbonise critical globally trading value chains first and then progressively the whole economy as technology costs enable this.</p> <p>(Note: Some of the sub-actions of this action align with the activities of goal 28: “Advance the local green products and services market and reduce the risks of climate impacts on local economic development” under the “Economic impacts and green economy opportunities” CCWA and should be considered alongside action 28.2.)</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Support local projects to scale up hydrogen production and green hydrogen-based synthetic molecular fuels to supply value chains that need this for global competitiveness Move progressively towards consumption-based accounting practices across value chains to support product and service-based carbon footprinting to keep pace with global requirements Augment circular practices with carbon-neutral molecular fuels and solar thermal heating to produce carbon-neutral materials such as bricks, cement, plastic and glass Produce, distribute and quality assure an end product that is carbon neutral to promote Cape Town as a carbon-neutral manufacturing hub.

6.8. SFA 8: ZERO-EMISSION BUILDINGS AND PRECINCTS

The built environment offers significant opportunities to improve climate resilience and decrease emissions. In Cape Town, residential and commercial buildings account for approximately 24%³⁰ of energy consumption and are responsible for the largest proportion of carbon emissions (approximately 42%) due to the high carbon intensity of South African electricity.

The growth of Cape Town's building stock will significantly increase the city's GHG emissions unless aggressive action is taken to address the efficiency and carbon intensity of buildings. It is therefore important that buildings are designed and constructed to be highly energy-efficient to prevent the lock-in effect of inefficient design and to negate the need for expensive retrofitting in the future. These opportunities in the built environment exist at a range of scales; from a single building on a site to a neighbourhood or precinct, a district to an entire municipal area. Furthermore, precincts and neighbourhoods should be designed, built or retrofitted to enable low-carbon lifestyles that provide safe non-motorised transport options, access to public transport, energy-efficient service delivery and opportunities for the deployment of larger-scale renewable energy.

As a signatory of the C40 Net-Zero Carbon Buildings declaration, the City of Cape Town, together with other South African cities, is committed to accelerating transformative climate action in the built environment. This commitment requires net-zero carbon performance of all new buildings on a citywide basis by 2030 and the pursuit of net-zero carbon for all existing buildings by 2050. To lead by example, the City also commits to ensuring that - for its own operations - all new facilities that it owns, occupies and develops are net-zero carbon in operation by 2030, and to the extent that it is possible, the same is true for existing facilities. These commitments are in line with national policy directives, particularly those articulated in the draft National Energy Efficiency and Climate Change Strategies and the National Development Plan, which envisages building standards of net-zero emissions by 2030.

As part of the suite of measures aimed at achieving net-zero carbon buildings, the City is looking to promote the adoption of more stringent energy efficiency targets and renewable energy use in new buildings. This can be achieved through integrated passive design, higher performance building



30 City of Cape Town GHG inventory (2018 data year).

envelopes, energy-efficient lighting and HVAC,³¹ building management systems and appliance specifications, with the remaining energy demand increasingly being met by on-site embedded generation, City-supplied green energy or alternative procurement of renewable energy. Beyond ramping up energy efficiency efforts, a multipronged approach to achieving net-zero carbon is required. This will range from increasing institutional capacity, developing awareness campaigns and finance mechanisms to City-owned renewable energy projects and enabling the purchase of renewable energy from IPPs.

The transition to net-zero carbon buildings requires Cape Town to actively engage, collaborate and build strong partnerships with various stakeholders. This includes other spheres of government, the private sector in particular, unions, civil society, communities and academia. Communication and transparency are also critical, and the City will need to convey the scientific, economic and social rationale for higher building performance. Net-zero carbon buildings and

precincts need to form part of the post-Covid economy recovery by creating a built environment that is resilient to future shocks and is operationally more cost effective.

Technology will play a key part in delivering net-zero carbon buildings. It can also be used to monitor real-time conditions in buildings to autonomously manage the internal climate and efficiently adjust to suit the required light levels, temperature and air quality. It will also enable building owners to collect and analyse data that can be used to make operational energy-saving decisions. Furthermore, technology can support the creation of an enabling environment for renewable energy by establishing a digital and democratic energy market in Cape Town. The success of the multipronged approach hinges on the City's ability to lead and drive the required changes through promoting low-carbon infrastructure provision, energy-efficient building design and clean energy supply to achieve a more resource-efficient and resilient urban environment.

THE CITY OF CAPE TOWN'S ENERGY EFFICIENCY AND DEMAND-SIDE MANAGEMENT (EEDSM) AND SMARTFACILITY PROGRAMMES

Energy efficiency is the most cost-effective way to meet net-zero carbon targets. The City of Cape Town has been investing in energy efficiency across its own operations like street lighting, traffic lights and buildings since 2009, with the help of a national grant. Monitoring building performance is key to measuring the savings from these projects and supporting them with behaviour change. The City's SmartFacility smart metering and app has enabled nearly 700 facilities in the City to monitor and benchmark their electricity demand and is continuously being rolled out to remaining City facilities.

SmartFacility allows facility managers and staff on the City network to view, generate and download user-friendly dashboards and reports for monitoring and the proactive management of electricity consumption. This will be a key tool in achieving the goals of the Net-Zero Carbon Buildings programme.



31 Heating, ventilation and air-conditioning.

GOALS AND ACTIONS:

GOAL 15: ALL NEW BUILDINGS (RESIDENTIAL, COMMERCIAL) TO BE NET-ZERO CARBON BY 2030

<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets <p>Supporting department(s):</p> <ul style="list-style-type: none"> Development Management Urban Planning and Design Electricity Generation and Distribution Policy and Strategy <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatals Other (C40 cities: eThekweni, Johannesburg and Tshwane) <hr/> <p>Status of action:</p>  <p>New (in planning)</p>	<p>Action 15.1 Develop and implement building energy efficiency and renewable energy mechanisms and relevant instruments that facilitate all new buildings (residential, commercial) to be net-zero carbon by 2030</p> <p>Description New buildings have a critical role to play in reducing GHG emissions and the need for energy efficiency retrofits at a later stage. The City will look to promote more stringent energy efficiency instruments, as well as renewable energy mechanisms for new buildings to ensure that all new buildings built in Cape Town are low and zero carbon.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Develop and implement relevant instruments with stipulated percentage improvements over time towards net-zero carbon by 2030 Develop pathways and identify technologies to ensure the large-scale adoption of renewable energy sources Facilitate the implementation of renewable energy and energy storage projects Identify and design innovative financial mechanisms and/or streamline systems for on-site and off-site renewable energy adoption in new buildings Establish a monitoring system and process to track progress towards the net-zero carbon target for new buildings Engage with various stakeholders and establish partnerships to facilitate compliance with regulations and voluntary mechanisms, and ensure the City learns from best practice Provide technical support to ensure net-zero carbon objectives included in metropolitan and district spatial planning and in catalytic project design.
<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets <p>Supporting department(s):</p> <ul style="list-style-type: none"> Communications <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Businesses/industrial associations Residents <hr/> <p>Status of action:</p>  <p>New (concept)</p>	<p>Action 15.2 Develop and implement a support programme for influencing developer and market behaviour (informed by a strong evidence base)</p> <p>Description Pursuing the goal of net-zero carbon buildings requires changing practices and behaviours in buildings. Involving building users by educating and encouraging them to take responsibility for their consumption is key in achieving energy efficiency, the uptake of renewable energy and the associated reduction in carbon emissions. This action complements the building energy efficiency and renewable energy strategies and mechanisms action (15.1) and will be informed by a robust evidence base.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> As part of the City's broader climate change communications strategy, develop and disseminate information on designing, constructing and operating net-zero carbon and resource-efficient buildings through events, forums, exhibits, digital media and publications Increase awareness of the role of renewable energy in achieving net-zero carbon buildings in the city.

<p>Lead department(s):</p> <ul style="list-style-type: none"> Human Settlements Directorate <p>Supporting department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets Environmental Management Resilience Development Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal Provincial Government Businesses/industrial associations 	<p>Action 15.3 Work to ensure that state-subsidised housing (including social housing, public-rental housing and Breaking New Ground³²[BNG] housing) is energy efficient and climate resilient and that low-income residents have equitable access to essential services</p>
<p>Status of action:</p>  <p>New (concept)</p>	<p>Description The BNG programme is currently being phased out by National Government in favour of a 'site and service' approach with support for homeowners to build their own homes (currently under development by National Government). This will have a significant impact on both the built form of the city and also the level of formalisation of housing. It will affect the construction value chain and have knock-on implications for climate resilience and energy efficiency. Social housing is developed using national grant funding and social housing institutions' (SHIs) own equity in these developments. Energy efficiency and climate-resilient design are already integrated into social housing, and although the City has limited influence in enforcing development guidelines, it can provide guidance on best practice.</p> <p>This action will focus on working with the construction value chain to improve the options and affordability of resource-efficient and climate-resilient design, and develop guidelines and smart options for the energy-efficient and climate-resilient design of affordable, subsidised, site and service Community Residential Units (CRU) programme, and hostel refurbishment. Engagements with SHIs are needed to look at examples of energy-efficient and climate-resilient social housing.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Engage stakeholders in the state-subsidised housing value chain (National Department of Human Settlements, Provincial Department of Human Settlements, lenders, materials suppliers) to determine options for improving the climate resilience and energy efficiency of state-subsidised housing Develop a guideline document for a site and service scheme to allow for incremental improvements to structures (for example, where the City builds a wet core and the residents build their own zinc structure that can be upgraded to a brick and mortar structure) Develop and make available energy-efficient designs and construction practices to informal contractors and residents Carry out advocacy and research and development regarding affordable and climate-resilient building materials and construction techniques (for example, drawing on the work of the Better Living Challenge).

GOAL 16: ALL EXISTING RESIDENTIAL AND COMMERCIAL BUILDINGS TO BE RETROFITTED WITH ENERGY-EFFICIENT TECHNOLOGIES TO BE NET-ZERO CARBON IN OPERATION BY 2050

<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets <p>Supporting department(s):</p> <ul style="list-style-type: none"> Electricity Generation and Distribution Policy and Strategy Legal Services Finance: Revenue, Valuations, Treasury Services Supply Chain Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal Provincial Government Businesses/industrial associations Residents CSO/NGO Other (financial institutions and contractors) 	<p>Action 16.1 Develop and implement innovative incentive mechanisms that may include financing, rewards, recognition or similar to encourage faster uptake/ application to energy efficiency and renewable energy property upgrades</p>
	<p>Description The Innovative Incentive Programme intends to identify and implement viable mechanisms that facilitate the financing and/or rewards the uptake of renewable energy and energy efficiency measures in private homes. Options include utilising the City's rate/tariff collection process to recover the funds and/or the City acting as a facilitator in connecting customers to approved installers, grouping customers together to achieve better pricing and connecting customers to third-party financing options. This programme will allow residential property owners to install energy efficiency measures, solar thermal and solar PV systems in a more streamlined, quality-assured and cost-effective manner through longer-term loans and/or preferential financing.</p>

<p>Status of action:</p>  <p>New (concept)</p>	<p>Sub-actions</p> <ul style="list-style-type: none"> • Undertake a feasibility study that will include a legal review, a cost/benefit analysis (social/economic/financial) and an assessment of viable alternatives • Engage with stakeholders: Various spheres of government (local/provincial/national), financial institutions, contractors, general public, non-profit organisations (NPOs) • Obtain Council approval • Undertake a Regulatory Framework Development • Design a pilot programme • Develop a pilot programme implementation plan that includes monitoring and evaluation of the programme and further roll-out.
<p>Lead department(s):</p> <ul style="list-style-type: none"> • Sustainable Energy Markets <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • Businesses/industrial associations • Residents <hr/> <p>Status of action:</p>  <p>New (concept)</p>	<p>Action 16.2 Facilitate the development of a programme that aims to improve energy efficiency in all existing residential and commercial buildings, and facilitating the provision of renewable energy towards net-zero carbon (in operation) by 2050</p> <p>Description The existing building sector is a key component to reaching the desired carbon reductions. A strategy and roadmap for the existing building sector needs to be developed in order to implement an extensive retrofit and renewable energy programme.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> • Develop a strategy that identifies the necessary technical and financial pathways and partners to achieve the net-zero carbon existing buildings goal • Evaluate the current energy demand and carbon emissions from the existing buildings stock and identify opportunities to improve • Prioritise buildings with higher carbon emissions to undergo building upgrades in order to achieve net-zero carbon emission buildings • Establish guidelines, goals and programmes for existing buildings to reach net-zero carbon emissions • Design and facilitate a multistakeholder engagement process as it relates to the net-zero carbon existing buildings goal.
<p>Lead department(s):</p> <ul style="list-style-type: none"> • Sustainable Energy Markets <p>Supporting department(s):</p> <ul style="list-style-type: none"> • Policy and Strategy • Communications <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • Businesses/industrial associations • Other (real estate agents) <hr/> <p>Status of action:</p>  <p>New (in planning)</p>	<p>Action 16.3 Develop and implement voluntary and legal instruments or mechanisms aimed at improving the resource efficiency of existing residential properties through disclosing the residential building energy and water performance to potential homebuyers and/or tenants</p> <p>Description The aim is to develop regulatory mechanisms and communication campaigns to encourage investment in sustainable home improvements that lower energy and water needs and reduce carbon emissions, while improving thermal comfort, safety and health for the occupants. It will empower consumers to make informed decisions about the ongoing operational costs, liveability and comfort levels, and the environmental impact of the home.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> • Disseminate the voluntary Smart Home Disclosure to homebuyers, property owners and the real estate market. The Smart Home Disclosure is a tool that provides information on the sustainability attributes of a home, including tips for improvement • Expand the scope of the Smart Home Disclosure to establish the benchmarking of energy and water performance for residential buildings • Identify and support innovative mechanisms to increase customer access to energy-efficient property upgrades • Engage the Strategic Policy Unit and other relevant stakeholders to develop regulations that require (at the point of marketing) the disclosure of the property's home energy and water consumption.

32 Formerly referred to as an RDP (Reconstruction and Development Programme) house, a BNG (Breaking New Ground) house is 40 m² in size with two bedrooms; a separate bathroom with a toilet, shower and hand basin; a combined living area and kitchen with wash basin; and a ready-board electrical installation where electricity supply is available in the township, developed by government for transfer to qualifying households earning less than R3 500 a month.

GOAL 17: ALL NEW AND EXISTING MUNICIPAL BUILDINGS (EXCLUDING INDUSTRIAL PLANTS AND UTILITIES) TO BE NET-ZERO CARBON BY 2030

<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets <p>Supporting department(s):</p> <ul style="list-style-type: none"> Facilities Management Property Management Electricity Generation and Distribution Water and Sanitation Community Services Safety and Security Directorate Grants Department <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 17.1 Continue with municipal operations’ energy efficiency retrofit, energy audit, and energy and water metering programmes, aiming to optimise energy demand and operational costs across municipal facilities by 2030</p>
	<p>Description</p> <p>The adoption of lifecycle costing in municipal infrastructure planning has highlighted the importance of energy efficiency early in the procurement stage. The various contributions of capital cost, maintenance costs and operational (electricity) costs over a 10/15-year lifespan can be analysed for motors, lights, air-conditioners, etc. Invariably, low-capital cost energy-consuming assets have very low energy efficiency ratings. Conversely, the higher capital cost energy-consuming assets have high energy efficiency ratings. The focus needs to be on the fact that the asset (e.g. light-emitting diode lights [LEDs]) initially purchased at a higher capital cost yields a significantly lower operational (electricity) and maintenance cost. Since 2009, the City’s municipal energy efficiency programme has saved over 231 GWh of electricity, which translates to a financial saving of R300 million, and a carbon saving of 229 035 tCO₂e. Annual demand from City facilities in 2018 was 373 GWh; this is therefore equivalent to over 60% of an entire year’s operational demand.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Continue to retrofit buildings that have T8 fluorescent lighting with LED lights equipped with passive infrared (PIR) sensors Expand metering and sub-metering programme for all City-owned buildings Continue the development and expansion of the SmartFacility online application for facilities managers, and track the performance of meeting net-zero carbon commitment and the Energy Performance Certificates status of municipal buildings Install efficient hot-water heating systems (heat pumps, etc.) Retrofit standard air-conditioning systems with energy-efficient HVAC systems including, but not limited to, inverters, timers, floating head pressure control, variable speed drives, etc. Adopt free cooling and night pre-cooling techniques and investigate feasibility assessments of heat-gain reduction in buildings Explore the installation of energy-efficient vertical transport systems (escalators and lifts).



<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets <p>Supporting department(s):</p> <ul style="list-style-type: none"> Electricity Generation and Distribution Finance Directorate Facilities Management Property Management Recreation and Parks Water and Waste Directorate Environmental Management Urban Planning and Design <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal Other (external consultant to analyse opportunities) <hr/> <p>Status of action:</p>  <p>New (in planning)</p>	<p>Action 17.2 Develop a programme plan to achieve net-zero carbon for all new and existing municipal buildings by 2030</p>
	<p>Description</p> <p>As part of the C40 Net-Zero Carbon Buildings declaration, the City commits to ensuring that all new buildings and facilities owned, occupied and operated by the municipality are net-zero carbon in operation by 2030; and that, to the extent possible, the same is true for existing facilities.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Establish a net-zero carbon baseline for municipal buildings and annual targets to achieve the 2030 goal Develop a strategy and roadmap that identify the necessary technical and financial pathways and actions to achieve the goal of net-zero carbon for municipal buildings by 2030 Develop necessary guidelines and specifications for net-zero carbon (energy efficiency and renewable energy access) and broader resource efficiency in all new and existing municipal buildings Develop a standardised approach to planning, financing and implementing net-zero carbon for new and existing municipal buildings Develop a methodology to report annually on building performance towards targets, and evaluate the feasibility of including emissions beyond operational carbon (such as refrigerants) Create an internal guideline on the installation of own-energy generation systems on City buildings (currently in draft form) Develop mechanisms to procure green energy from off-site sources, where required Increase awareness of and ways to manage and monitor net-zero carbon in municipal buildings among municipal officials, especially facilities managers, through campaigns and training.

<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets <p>Supporting department(s):</p> <ul style="list-style-type: none"> Electricity Generation and Distribution Facilities Management Property Management Recreation and Parks Water and Waste Directorate <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal <hr/> <p>Status of action:</p>  <p>New (in planning)</p>	<p>Action 17.3 Facilitate the uptake of Energy Performance Certificates so that all relevant municipal buildings disclose their energy consumption data</p>
	<p>Description</p> <p>The implementation of Energy Performance Certificates (EPCs) was gazetted in December 2020, which requires all government-owned non-residential buildings to display an EPC. This will be extended to privately owned buildings two years later. The South African National Energy Development Institute (SANEDI) is charged with maintaining a National EPC Register, which will provide valuable information pertaining to energy consumption in buildings. The EPCs will play an important role in facilitating the reduction in energy-use intensity in existing buildings towards net-zero carbon. It will also act as a performance monitoring tool in addition to the use of sub-metering and utility accounts.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Design a programme to ensure the compliance of all municipal buildings with EPC regulations Evaluate how many municipal building types are above 1 000 net square metre floor area that will need to display EPCs Initiate the tender process to appoint a consultant to undertake the energy performance assessment in accordance with SANS 1544 Expand the metering and sub-metering programme for all City-owned buildings.

6.9. SFA 9: MOBILITY FOR QUALITY OF LIFE AND LIVELIHOODS

The City's climate change vision includes Cape Town being a city where travel is safe, reliable, economically viable and electric-powered public transport (including minibus taxis) is preference to private vehicles. A formal transport system is complemented by appealing active mobility, where walking is safe and cycling infrastructure is a depoliticised, efficient and healthy utility.

As mentioned in SFA 6: Spatial and resource inclusivity, the current spatial form of Cape Town has a negative impact on many residents, obligating many – particularly those who can least afford it – to travel long distances in order to reach places of work, schools and services such as healthcare. Cape Town has a historic endowment of electric rail infrastructure, which has been the backbone of transport in the city and remains the cornerstone for transport planning. However, the service, which is operated by Metrorail, a division of the state entity PRASA, is in abject crisis. This offers a stark warning that ambitious plans require a society where all stakeholders collaborate to make things work for the common good.

Over time, population growth and property development in outlying areas of the city have placed a higher demand on commuter services and private vehicles have historically increased at nearly 3% per annum.³³ However, transport demand has also been thrown into disarray as a result of the Covid-19 pandemic, which may ultimately result in a step-change in mobility trends. Transport planners are still grappling with how the new normal might have an impact on different income groups and geographical areas. There has been suppressed economic activity and sustained travel demand in some areas, and reduced travel demand in others, due to flexible work hours and work-from-home trends. Vehicles transporting freight over great distances between Cape Town and other centres across the country continue to be a substantial source of transport fuel demand; however, e-commerce is also disrupting the traditional ways in which goods are transported around the city.

In recent years, the transport sector has consumed roughly half of the total energy. Fossil fuels used by internal combustion engines are the second biggest source of the city's emissions (after electricity consumption). Fossil fuels are also a net drain on the economy, and expose the local

HOW CAN RESIDENTS CONTRIBUTE TO ACHIEVING OUR TRANSPORT GOALS?

There are many ways that residents can support Cape Town in eliminating carbon emissions from the transport system. All of these efforts have multiple co-benefits in relation to resource efficiency, energy security, labour force productivity, air quality and health:

- Where possible, avoid unnecessary trips by working from home, and encouraging flexible work arrangements such as travelling outside of peak hours
- Making use of e-commerce for purchasing goods
- Take back the motor vehicle-dominated streets and cycle, walk or e-bike wherever it is feasible
- Use taxis and carpool when e-hailing and commuting
- Choose an electric car if it is affordable
- Travel by train (and contribute to solving the rail crisis). How?
 - Share your property lighting with railway precincts if you live nearby
 - Lobby your union, councillor and parliament for better service
 - Campaign for rail sector reform
 - Demand transparency from transport state entities
 - Do community clean-ups of railway precincts (station areas only, and not the railway lines!)
 - Report cable theft and do not buy copper and cable informally
- Travel by bus. Your rates and taxes bought the system
- Grow your own food and choose locally produced food and essentials.

economy to volatile crude oil prices.³⁴ Historically, traffic congestion and inefficiencies have been on the rise, leading not only to an increase in the city's GHG emissions, but also to poor air quality and associated health impacts on our residents. To reduce emissions from the transport sector, the City will need to continue building an efficient and ultimately electric transport network through the best practice EASIA framework (enable, avoid, shift, improve, adapt).³⁵ This entails promoting efficiencies in transport governance, land use,

33 National Traffic Information System (eNatis) (2012-2017).

34 From 2002 to 2014, petrol nearly doubled in real-term costs and then dropped close to half that rise by 2017.

35 Stucki, M. (2015).

multimodal transportation, road-space usage and vehicles. The City will also need to ensure that transport infrastructure is adapted to climate hazards. In the local context, EASIA involves enabling a shift to walking and cycling while switching to electric vehicles in the transport sector off the back of clean energy, and continuing longstanding national and local efforts to achieve better public transport and, in particular, be proactive on the rail system so that its future role in the system is clear. Meanwhile, the City will be proactive about ensuring that we capitalise on the global trend towards electric vehicles and their manufacture while decarbonising local electricity supply.

To ensure we have a system of mobility in Cape Town that is not only carbon neutral but also enables quality of life and livelihoods, this plan must:

- reduce the frequency and distance of trips due to improved spatial planning
- fast-track the shift towards an efficient and integrated public transport system
- increase active mobility and non-motorised transport
- ensure that it is feasible for all vehicles to be powered with clean fuels.

There is a strong interdependency between the goals and actions of this SFA and the spatial and resource-inclusivity goals and actions (which will lead to reduced demand for travel).



GOALS AND ACTIONS:

GOAL 18: THROUGH THE CITY'S ROLE AS THE TRANSPORT PLANNING AUTHORITY AND THE CONTRACTING AUTHORITY FOR BUS RAPID TRANSPORT (BRT) SERVICES, SUPPORT THE RESTORATION, REHABILITATION AND EXPANSION OF THE RAIL SYSTEM TO A CARRYING CAPACITY OF 30% ABOVE 2010 LEVELS BY 2030, AND PUT IN PLACE A CONTINGENCY FOR ALTERNATIVE MASS TRANSIT INFRASTRUCTURE IN THE EVENT THAT THE RAIL SYSTEM DOES NOT RECOVER OR CEASES TO BE FUNCTIONAL ALTOGETHER

<p>Lead department(s):</p> <ul style="list-style-type: none"> Transport Directorate, and specifically the following departments: Network Management (interface lead) Public Transport Operations Transport Planning <p>Supporting department(s):</p> <ul style="list-style-type: none"> Urban Catalytic Investment leads collaboration with PRASA and Transnet on Transit-Oriented Development (TOD) precincts <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal 	<p>Action 18.1 Support PRASA in restoring and rehabilitating the rail system, and expanding services where possible</p>
	<p>Description</p> <p>Work with other spheres of government, including the state enterprises PRASA and Transnet, to support the safe and reliable operation of local trains.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Continue with rail subcommittee functions of the City's Intermodal Planning Committee (IPC) which feeds back to the Land Transport Advisory Board (as per the National Land Transport Act, 2009) Extend the life of the rail enforcement initiative Explore the devolution of the rail service In review of the City's Integrated Public Transport Network Plan 2032 (IPTN), scenarios will be considered and tested in relation to the future role of all modes of transport, including rail Support the conclusion of an agreement with PRASA on a mixed-used public transport mobility hub at the Bellville CBD station.
<p>Status of action:</p>  <p>Implementation</p>	



<p>Lead department(s):</p> <ul style="list-style-type: none"> • Network Integration <p>Supporting department(s):</p> <ul style="list-style-type: none"> • Transport Planning <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • National Government or parastatal • Provincial Government <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 18.2 Develop legal, strategic and planning responses that define how the City can respond to the integrated transport planning challenge posed by the rail crisis</p>
	<p>Description</p> <p>In response to the ongoing rail crisis, the City's 2017 Council resolution (C07/10/17) proposed a study to examine the feasibility, considerations and implications of alternative rail solutions in Cape Town and its functional area. A legal opinion in response to concerns raised by National Treasury has since determined that such a study is not within the City's mandate. Nevertheless, rail remains the backbone of the City's integrated transport plans, for which it does have a mandate.</p> <p>The City therefore has a responsibility to develop a strategy that assesses scenarios of rail service recovery, or continued decline, and appropriate planning responses to this, so as to maintain and improve the service levels of public transport in a growing city. Such a strategy should define triggers for when alternatives, within the City's existing mandate, should be pursued based on the performance of the rail system, and prevailing levels of collaboration and transparency. A key input to this will be legal opinion that explores how the City can respond rather than if it can respond.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> • Ensure that this item remains on the agenda of the City's Land Transport Advisory Board • Carry out a planning study that assesses the role of rail as the backbone of transport planning within the City of Cape Town metropolitan area, and develop contingency options and clear triggers for initiating them • Prepare an incremental strategy for the development of an Intergovernmental Relations Framework through which the IPC and/or other intergovernmental relations (IGR) mechanisms lobby state-owned enterprises (SOEs) to invest in and manage the rail network in a way that best facilitates economic recovery. This should be done with a particular focus on advocating rail revitalisation through rail investment and management by PRASA, with greater involvement of the City and Western Cape Government in the regional management • Continue to engage with the relevant national departments (National Treasury, Department of Transport), Western Cape Government and parastatals (PRASA and Metrorail) in the process of developing the strategy and planning study.

<p>Lead department(s):</p> <ul style="list-style-type: none"> • Transport Planning <p>Supporting department(s):</p> <ul style="list-style-type: none"> • Business Enablement • Network Operations <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • Provincial Government <hr/> <p>Status of action:</p>  <p>New (concept)</p>	<p>Action 18.3 Explore contingencies for alternative mass transit options</p>
	<p>Description</p> <p>Explore the scenario of an integrated transport system without rail in the revision of the City's IPTN (2032).</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> • Run this scenario through the Western Cape Government's integrated transport modelling tool • Explore options for giving a time advantage to road-based public transport on the existing network.

GOAL 19: INTEGRATE TRANSPORT MODES TO IMPROVE EFFICIENCY AND FAST-TRACK A MODAL SHIFT FROM PASSENGER KILOMETRES BY PRIVATE VEHICLES TO OTHER MODES (DECREASING FROM 58% IN 2016 TO 23% IN 2050)

<p>Lead department(s):</p> <ul style="list-style-type: none"> • Transport Planning <p>Supporting department(s):</p> <ul style="list-style-type: none"> • Urban Planning and Design <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • Residents • Businesses/industrial associations <hr/> <p>Status of action:</p>  <p>New (in planning)</p>	<p>Action 19.1 Use the Integrated Public Transport Network (IPTN) Plan 2032 and the non-motorised transport (NMT) network plans to maximise change in modal shift away from private vehicles</p>
	<p>Description</p> <p>Continue to implement the City’s IPTN Plan (2032) and the NMT network plans to maximise change in mode shift away from private vehicles.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> • Ensure that the NMT network plans provide NMT access to the IPTN • Fast-track the design of appropriate pilot projects to operationalise taxi operating companies (to improve the minibus taxi [MBT] sector and its integration with other modes of public transport).

<p>Lead department(s):</p> <ul style="list-style-type: none"> • Transport Planning <p>Supporting department(s):</p> <ul style="list-style-type: none"> • Communications <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • Residents • Businesses/industrial associations <hr/> <p>Status of action:</p>  <p>New (in planning)</p>	<p>Action 19.2 Fast-track high-occupancy vehicle (HOV) lanes and complete the City of Cape Town Congestion Management Plan</p>
	<p>Description</p> <p>Examine opportunities to integrate the transport system and incorporate the adoption of HOV lanes on critical transport routes (focusing on an evidence-based approach), through creating missing links and capacity to support road-based public transport. The Congestion Management Plan comprises of four components:</p> <ul style="list-style-type: none"> • Behavioural change • Infrastructure improvements • Operational improvements • Supporting stakeholder tactical urbanism activities.
	<p>Sub-actions</p> <ul style="list-style-type: none"> • Complete study on speed advantage for road-based public transport • Implement the public transport priority measures projects emanating from the above study • Implement existing plans to encourage changes in travel behaviour • Implement existing plans for infrastructure improvements in favour of public transport and NMT • Implement existing plans for operational improvements • Support stakeholder initiatives that support tactical urbanism • Engage other local transportation services in relation to all of the above, for example, the taxi industry and Golden Arrow Bus Services (GABS).





<p>Lead department(s):</p> <ul style="list-style-type: none"> • Transport Planning <p>Supporting department(s):</p> <ul style="list-style-type: none"> • Communications • Transport Shared Services (Communications) <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • Residents • Provincial Government <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 19.3 Ensure that pedestrianisation programmes prioritise improved safety and increase the number of pedestrian/cycling trips made</p>
	<p>Description</p> <p>The City's NMT infrastructure programme is implemented according to the NMT network plan. In the next five years, the City will be expanding the NMT network, which includes footways, cycle routes, signage and intersection improvements that are universally accessible, in order to achieve improved access, mobility and safety for all.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> • Submit the Universal Access Development Plan for approval • Complete the Pedestrianisation Plan for approval • Update the 2017 Cycling Strategy • Implement the NMT network plans • Identify locations of bicycle racks and NMT across the city in accordance with the NMT network plan • Introduce targeted awareness programmes to promote NMT • Link implementation to tactical urbanism activities, and to the Western Cape Education Department's Walk to School programme.

<p>Lead department(s):</p> <ul style="list-style-type: none"> • Transport Planning <p>Supporting department(s):</p> <ul style="list-style-type: none"> • Organisational Effectiveness and Innovation (developing partnerships) • Property Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • Businesses/industrial associations <hr/> <p>Status of action:</p>  <p>New (concept)</p>	<p>Action 19.4 Promote the citywide adoption of Travel Demand Management (TDM) measures, in particular measures that support flexible working and a shift to more sustainable transport modes</p>
	<p>Description</p> <p>Engage businesses, particularly larger employers, to promote alternative transport options and behavioural change programmes such as flexible working programme to manage travel demand.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> • Implement the Future of Work programme in the City as an organisation • Engage with relevant big business, including representative organisations such as the Cape Town Chamber of Commerce, to encourage the private sector to implement travel-demand measures.

GOAL 20: PREPARE FOR A SCENARIO OF COMPLETE TRANSITION TO ELECTRIC OR ALTERNATIVE FUEL-POWERED FREIGHT, BUS, TAXI AND PASSENGER VEHICLES BY 2050

<p>Lead department(s):</p> <ul style="list-style-type: none"> Public Transport Operations Fleet Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> Transport Planning Sustainable Energy Markets <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal Businesses/industrial associations <hr/> <p>Status of action:</p>  <p>New (concept)</p>	<p>Action 20.1 Develop a procurement strategy for low-carbon emission vehicles and fuel technologies towards carbon neutrality</p>
	<p>Description</p> <p>Carry out a comprehensive study to evaluate which alternative vehicle and fuel options are best for the City's MyCiTi BRT system and how best to address the supporting infrastructure required. This supports the City's commitment to the C40 Green and Healthy Streets declaration. Furthermore, in line with the City's Fleet Management Strategy, this action involves developing a procurement strategy for low-carbon emission vehicle options for the City's corporate fleets.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Carry out a comparative analysis to evaluate alternative vehicle and fuel technologies for the MyCiTi system Develop a transitional business case for an incremental shift to the most appropriate option for the MyCiTi system (including acquisition and lifecycle costs, and resource requirements) Consult with relevant government departments (DMRE and Department of Trade and Industry) in relation to the above Based on real-world usage data that compare electric to internal combustion vehicles, develop a procurement strategy for low-carbon emission vehicle options for the City's corporate fleets that aligns with the Fleet Management Strategy.

<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets Transport Planning Energy Generation and Distribution <p>Supporting department(s):</p> <ul style="list-style-type: none"> Public Transport Operations City Health (Air Quality Section) <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Businesses/industrial associations Provincial Government National Government or parastatal Research institutions <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 20.2 Develop the necessary policy and regulatory environment to promote the uptake of electro-mobility freight and electric passenger transport (including public and private vehicles and minibus taxis) and manage risks to the electricity grid</p>
	<p>Description</p> <p>The City to formalise its stance on electric vehicles and establish the City's role in promoting the uptake in both the public and private sector. This work applies to both public transport vehicles (buses and minibus taxis) and passenger vehicles.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Engage with relevant stakeholders - including the Electric Vehicle Infrastructure Association (EVIA) - and develop a position paper to promote the uptake of public transport, freight and private electric vehicles Investigate the potential impact on the City's electrical grid infrastructure with increased EV uptake, and assess options for depot charging and on-route charging systems Develop an EV framework to outline how the City of Cape Town will promote and manage the widespread adoption of electric mobility. This will provide details on key measures and next steps required in this transition. The framework will be used to position Cape Town as a leading EV-friendly city in South Africa, and provide guidance on how EV-enabling regulations can be integrated into national policies and by-laws Investigate the viability of a potential electricity tariff structure to support the uptake of EVs. This would also be used to manage the effects of EV charging on the City's grid through shaping charging behaviour.



<p>Lead department(s):</p> <ul style="list-style-type: none"> • Fleet Management • Sustainable Energy Markets <p>Supporting department(s):</p> <ul style="list-style-type: none"> • Facilities Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • Business/industrial associations • Research institutions • CSO/NGO 	<p>Action 20.3 Show City leadership and gather real-world data from EV pilot programmes such as the installation of publicly accessible demonstration chargers and the procurement of EVs for the City fleet</p>
<p>Status of action:</p>  <p>Implementation</p>	<p>Description Use the installation of demonstration EV chargers as part of an awareness campaign to encourage EV uptake in Cape Town and to review the impact and sustainability of such installations as City assets. Another area of work involves a pilot programme of EVs in the City’s fleets, from which data are gathered to inform future decision making on fleet composition.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> • Gather real-world usage data by assessing the energy consumption and overall performance of the five electric vehicles compared to internal-combustion engine vehicles in the City’s fleet to inform future decision making on the expansion of the EV component of the fleet • Use the City’s two public, solar-powered EV charging stations to: <ul style="list-style-type: none"> • gather data to understand the potential impacts EV charging has on the grid • consider practical implications of the larger-scale roll-out of EV chargers for City fleets, based on the experience of the pilot chargers • gather data for awareness raising to promote EV uptake and expand charging infrastructure • demonstrate the role of supporting infrastructure to facilitate the widespread use of EVs. • Host an EV task team with key City departments and external stakeholders to drive an enabling environment for the uptake of EVs in the City. External stakeholders include clean energy advocacy groups, supplier network groups in the automotive sector and businesses, energy service providers, and networks of original equipment manufacturers.

GOAL 21: ENSURE THAT CLIMATE CHANGE AND AIR QUALITY MONITORING AND METRICS FOR TRANSPORT ADEQUATELY SUPPORT THE ASSESSMENT OF ACTIONS AND BY-LAWS IN THE SECTOR

<p>Lead department(s):</p> <ul style="list-style-type: none"> Corporate IS&T Transport Planning Sustainable Energy Markets <p>Supporting department(s):</p> <ul style="list-style-type: none"> City Health (Environmental Health, Air Quality Branch) Spatial Planning and Environment Directorate Human Settlements Directorate <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 21.1 Compile a baseline carbon footprint measurement for the operations of the City of Cape Town Transport, Spatial Planning and Environment, and Human Settlements directorates</p> <p>Description A service provider will assist with compiling a baseline carbon footprint measurement for the operations of the Transport, Spatial Planning and Environment, and Human Settlements directorates (which includes non-transport emissions from the various directorates), and propose a mitigation plan for reducing emissions in these departments.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Ensure that eFueling data from the fleet can be automatically captured Enable the availability of carbon footprint data to City systems through an application programming interface (API) in order for it to be integrated with the whole City's carbon footprint.
<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) <p>Supporting department(s):</p> <ul style="list-style-type: none"> Transport Planning City Health (Air Quality Branch) <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Research institutions <hr/> <p>Status of action:</p>  <p>New (concept)</p>	<p>Action 21.2 Integrate GHG emissions and air quality metrics into the Urban Development Index (UDI)</p> <p>Description Develop an environmental index (including air quality) to supplement the UDI. The UDI is a set of indices that the City has compiled to track progress in achieving dense, transit-oriented growth as one of its strategies to overcome apartheid's spatial planning, and further periodically measure the efficiency and integration of the transport system. It includes metrics related to transport, such as modal split and accessibility to flexible transport options, as well as metrics on land use, housing and urban transformation and inclusivity.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Develop a credible, geographically spread data source for measuring GHGs and other pollutants across the city Ensure that the data are configured in such a way that they are compatible with and can be integrated into the UDI data set.

6.10. SFA 10: CIRCULAR WASTE ECONOMY

General waste disposed in landfills in Cape Town has remained steady in recent years, with an average annual (2016–2019) disposal rate of around 1,7 million tonnes. National and provincial legislative obligations for climate change mitigation, Extended Producer Responsibility (EPR), waste prevention and diversion have created significant challenges, which South African cities need to respond to. The City has acknowledged these challenges while also responding to pressing concerns about diminishing landfill space and integration of the informal waste sector, and promoting separation at source (S@S), waste avoidance, resource beneficiation and reuse. All of these efforts will be captured in the City's Waste Strategy that is currently under development.

There are key challenges facing an accelerated waste transition, including:

- Particularly significant fluctuations in the international/national and local economics of recycling markets. This has resulted in volatility and a lack of secondary industry and investment in downstream recipient industries for certain recyclables
- Rapid urbanisation and densification, particularly informality
- Revenue and budgetary constraints that affect the provision of efficient and cost-effective waste infrastructure and services.

Landfilled organic waste³⁶ is not only a contaminant of other potentially recoverable materials in the waste system,³⁷ but also a major source of methane emissions in Cape Town. Methane arising from both landfilled organic waste and wastewater treatment is a powerful GHG that historically has resulted in the waste sector being responsible for 10% - 11% of Cape Town's citywide GHG emissions. Solid waste contributes 94% and wastewater about 6% to the total combined emissions for the waste portion of the citywide GHG inventory. The proportional contribution of waste to total city emissions has been relatively consistent over time. However, left unchecked, absolute emissions from the waste sector would grow in line with expected city population growth rates. The City has already made some inroads in addressing emissions from this sector with plans to invest in landfill gas capture and methane flaring at landfills and wastewater treatment works (WWTW), with further augmentation of waste treatment facilities already in the pipeline.

Reaching carbon neutrality requires all organic waste to be fully diverted from landfills in conjunction with supporting measures to eliminate the disposal of any material to landfill. These supporting measures have resource efficiency and resilience benefits, and include waste material recovery and deriving value from these materials, supported by EPR and industrial symbiosis.³⁸ These measures are critical for creating a market for recovered materials and could also have multiple (non-climate related) benefits with respect to job creation, the cleanliness of the city, and reduced littering and illegal dumping.



³⁶ Organic waste is any material that is biodegradable and comes from either a plant or an animal. Biodegradable waste is organic material that can be broken into carbon dioxide, methane or simple organic molecules. Examples of organic waste include green waste, food waste, food-soiled paper, non-hazardous wood waste, green waste, and landscape and pruning waste.

³⁷ Organically contaminated recyclables arriving at a materials recovery facility are generally diverted to landfill.

³⁸ Industrial symbiosis is a form of brokering to bring companies together in innovative collaborations, finding ways to use the waste from one company as raw materials for another.

The organic waste resulting in GHG emissions needs to be considered as part of the larger transition in the waste system, so this plan aims to support the overall transition to a circular waste economy. This transition is a shared responsibility of the City and the private sector. Yet the stringent goals imposed by national and provincial targets are responsible for driving a great deal of urgent efforts by the City to manage how best to respond to these targets. The City has already created systems and infrastructure that will have to adapt to accommodate EPR mechanisms that the private sector will be responsible for implementing. Since 2006, supported by an Integrated Waste Management Policy and a Council-approved by-law in 2010, the City has been in the process of transitioning away from an outdated waste service delivery model based on the collection and landfilling of waste. Additional actions coordinated with other stakeholders - notably residents, businesses, industry, and the Provincial and National Government - will be required in order to support this transition. The City will also need to be responsive to forces of supply and demand in the markets for useful waste products and recoverable waste materials. Residents have a pivotal role to play in minimising their waste, reducing costs by refraining from illegal dumping, making waste-

aware product choices and recycling proactively. Advocacy work is required to tackle the production and use of single-use and non-recyclable materials. The City already undertakes processing and off-site beneficiation of garden waste and there is potential to stimulate solutions for the remaining organic waste in both the private sector and the City waste streams.

The goals and actions in this SFA reflect the aspirations of the national and provincial targets, and are currently being assessed for technical and financial feasibility. High levels of cooperation and a definition of roles and responsibilities with stakeholders are necessary to achieve these goals. The progress made by the City to date is part of a transition that has already started in the waste sector (in private, City and informal waste collection), and will exploit several cross-cutting benefits, including the development of waste-to-energy systems alongside the stimulation of new waste-oriented economies. The actions below will increase the understanding of the costs and benefits of - and resources required - for this transition, and strengthen the evidence base and technical capacity with improved data and regular waste characterisation updates.

GOALS AND ACTIONS:

GOAL 22: DEVELOP AND IMPLEMENT AN INTEGRATED WASTE MANAGEMENT STRATEGY THAT IS FINANCIALLY FEASIBLE AND MAXIMISES MATERIAL EFFICIENCY BY PRIORITISING WASTE AVOIDANCE, REDUCTION, TREATMENT AND RECYCLING IN LINE WITH NATIONAL TARGETS

<p>Lead department(s):</p> <ul style="list-style-type: none"> • Solid Waste Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> • Policy and Strategy • Communications <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • Research institutions • Businesses/industrial associations <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 22.1 Develop a funding strategy to fund waste diversion infrastructure and operating expenditure for waste minimisation and diversion from landfill</p>
	<p>Description</p> <p>The funding strategy will consider alternate funding sources to implement the legislative changes affecting the City's solid waste management service, and explore green economy opportunities and potential partnerships with producer responsibility organisations and investors.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> • Finalise a waste economy study to contribute to an understanding of the opportunities of the circular economy and inform the development of the Waste Strategy and implementation programme • On the basis of a waste cost system model, the programme will be used to prioritise diversion and treatment, safe operation, environmental management, and communication and awareness activities.

<p>Lead department(s):</p> <ul style="list-style-type: none"> • Solid Waste Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> • Policy and Strategy • Environmental Management • Sustainable Energy Markets • Water and Sanitation • Development Management • Recreation and Parks • Transport Directorate • Roads and Infrastructure Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • Businesses/industrial associations • City support agencies³⁹ <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 22.2 In collaboration with the City departments and external stakeholders, develop and implement the Circular Economy Action Plan</p>
	<p>Description</p> <p>The Circular Economy Action Plan will seek out innovative opportunities to support waste-free design and keep products, components and materials at their highest use and value for as long as possible through cross-cutting interventions and programmes in the city.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> • Determine the appropriate institutional structures and mechanisms for driving Cape Town's circular economy transition • Together with the sector development agency, GreenCape, initiate a circular materials economy project to dovetail with the circular sectors project • Develop an effective programme of communication and marketing campaigns with regard to transitioning to a circular economy in Cape Town.

<p>Lead department(s):</p> <ul style="list-style-type: none"> • Solid Waste Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> • Sustainable Energy Markets <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • Provincial Government • Research institutions • Businesses/industrial associations <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 22.3 Improve the waste management evidence base</p>
	<p>Description</p> <p>Carry out further waste characterisation studies to track progress and inform updates on climate action and waste plans. These studies will be carried out every five years and cover the entire waste stream (the municipal and private sector), including full lifecycle assessments and with a view to improving current practices. This work will need to be carried out in collaboration with Provincial Government to ensure coverage of the private sector waste stream, and will include specific coverage of the waste stream in municipal buildings and facilities.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> • Accelerate the accreditation of waste service providers and improve private waste diversion reporting. Accreditation and reporting compliance of waste collection entities in the private sector is necessary to ensure that citywide waste diversion targets can be met • Ensure that future waste characterisation studies build on existing studies and improve data • Improve and regularise solid waste diversion and disposal data management and reporting, both from City and private sector sources; this includes waste management activities carried out by other City departments • Focus on accounting for organic waste and inorganic waste separately, to best understand specific actions needed to divert organic waste.

³⁹ Some of the actions in the plan are supported by special purpose vehicles, which are external supporting NPOs that are engaged through a combination of grants - voted by Council and contributions from departmental budgets. This is administered by the Enterprise and Investment Department.

<p>Lead department(s):</p> <ul style="list-style-type: none"> • Solid Waste Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> • Environmental Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • Research institutions • City support agencies³⁹ 	<p>Action 22.4 Investigate options for the recovery of textile and fabric waste</p>
	<p>Description</p> <p>Fabric and textile waste contributes a significant and persistent proportion of total landfilled waste, and there is currently no formalised arrangement for the recovery of potentially useful and valuable textile and fabric waste. The City can play an enabling role in facilitating private waste beneficiation companies with textile waste recovery, in addition to helping to strengthen the supply and demand dynamics, and facilitating investment in more companies.</p>
<p>Status of action:</p>  <p>New (concept)</p>	<p>Sub-actions</p> <p>An investigation is required to:</p> <ul style="list-style-type: none"> • explore and learn from existing initiatives in relation to fabric and textiles, such as national and global programmes that promote cleaner production • determine upstream (producer and retailer) options for repurposing or avoiding such waste • determine downstream options for the separation of this waste from the waste stream, and alternative options for disposal.

GOAL 23: REDUCE ORGANIC WASTE DISPOSAL TO LANDFILL (IN LINE WITH THE PROVINCIAL INTEGRATED WASTE MANAGEMENT PLAN TARGETS) BY 50% BY 2022 AND 100% FROM 2027, THROUGH BETTER WASTE SEPARATION, TREATMENT AND UTILISATION

<p>Lead department(s):</p> <ul style="list-style-type: none"> • Solid Waste Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> • Environmental Management Department • Recreation and Parks • Electricity Generation and Distribution <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • Residents 	<p>Action 23.1 Maximise the diversion of garden and food waste</p>
	<p>Description</p> <p>The City has already been facilitating the use of both decentralised and centralised facilities (including drop-offs) to maximise diversion, and has intentions to expand these efforts over time.</p>
<p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Sub-actions</p> <ul style="list-style-type: none"> • Provide infrastructure for both separation at-source and end-of-stream interventions • Ensure that other City departments managing green waste participate in green waste diversion (e.g. alien clearing, parks and trimming of trees for power lines) • Continue the development of material recovery facilities (MRFs) at three sites (Bellville, Helderberg, Coastal Park) • Develop organic waste mechanical separation plants (Bellville MRF 2022/25) and Athlone Refuse Transfer Station MRF • Investigate decentralised options for organic waste separation, informed by lifecycle cost analysis.

<p>Lead department(s):</p> <ul style="list-style-type: none"> • Solid Waste Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> • Communications <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • Residents 	<p>Action 23.2 Scale up the roll-out of composting containers</p>
	<p>Description</p> <p>The City's home composting project for organic waste enables Cape Town residents to compost their organic food waste at home. It began in 2013 as a feasibility study with a sample of 616 households from four medium- and low-income areas in Cape Town. As a result of the success of the pilot phase, it was rolled out in further phases from 2016 with over 5 000 containers being distributed per year on a first come, first served basis, bringing the total to over 22 000 containers rolled out to date. This action requires scaling up the roll-out of the programme to extend its reach to all eligible households.</p>
<p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Sub-actions</p> <ul style="list-style-type: none"> • On the basis of an evaluation of the pilot phase, report and make recommendations on the efficacy of the roll-out, the satisfaction of recipients, the degree of disuse and any challenges with the technology.



GOAL 24: INCREASE DIVERSION OF RECYCLABLES FROM DISPOSAL TO LANDFILL TO 40% BY 2025, 55% BY 2030, > 70% BY 2035 AND 85% BY 2050 THROUGH IMPROVED COLLECTION, WASTE SEPARATION AND PROVIDING SUPPORT TO INFORMAL WORKERS

<p>Lead department(s):</p> <ul style="list-style-type: none"> • Solid Waste Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • Residents 	<p>Action 24.1 Plan and implement a scaling up of services to collect waste separated at source and increase the roll-out of Think Twice dry waste collection services</p>
<p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Description</p> <p>As part of efforts to implement at-source collection of organic waste, packaging waste and recyclables through a combination of commercial contracts, business initiatives (EPR), entrepreneurs, waste pickers and SMMEs, the City has developed a recycling collection programme. This is known as Think Twice and is for the collection of containerised dry recyclables from formal households designated for separation and sorting at MRFs in the city. Residents living in select areas of the city can sign up to the Think Twice initiative that offers a free household recycling service. The programme is now offered to over 190 000 households across Cape Town and diverts over ± 20 000 tonnes of recyclables from landfill every year. The City plans to expand this programme in the years ahead and has rolled out the first phase of expansion for the tender that supplies the Kraaifontein MRF. The diversion of recyclables from landfills also takes place at more than 20 drop-off sites across Cape Town.</p> <p>These facilities will enable larger-scale expansion of the Think Twice service. This action aims to achieve 100% of formal household coverage by 2030.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> • Introduce a transition of the collection of recyclables from weekly to fortnightly, to ensure efficiency and save costs • Investigate and introduce 'pay as you throw' funding options for at-source collection services • Carry out research to understand the existing value chain in the informal sector • Work towards the integration of informal waste pickers through establishing an internal task team in SWM and explore a cross-departmental structure (through the Informal Sector Support Framework [ISSF]) to implement integration guidelines for waste pickers, developed by national experts.

<p>Lead department(s):</p> <ul style="list-style-type: none"> Solid Waste Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> Communications Sustainable Energy Markets <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Residents <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 24.2 Carry out communication and marketing campaigns to promote behaviour change and to champion participation in the circular economy</p>
	<p>Description</p> <p>The City's Solid Waste Management Department faces difficult challenges, having to collect waste from neighbourhoods and businesses spanning a very broad range of socio-economic circumstances and formality in a rapidly urbanising city. The Circular Economy Action Plan (action 22.2) aims to alleviate pressure on the resources of landfill space and to meet the demands of regulations and environmental aspirations. Further advocacy measures are required to support the transition to a circular economy, and citywide collaboration and communications are key to achieving this.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Continue with commitments the City has made as a signatory to the SA Plastics Pact (https://www.saplasticspact.org.za) Continue with three types of awareness-raising programmes and clean-up campaigns (in line with the Platform for Accelerating the Circular Economy (PACE)) to: <ul style="list-style-type: none"> promote waste avoidance (waste minimisation) prevent illegal dumping (cleansing) stimulate the formal and informal economy of waste materials recovery (waste minimisation). Publicise the available circular economy and waste indicators in appropriate City publications.

<p>Lead department(s): See first sub-action</p> <p>Supporting department(s):</p> <ul style="list-style-type: none"> Solid Waste Management Facilities Management All other City departments <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Not applicable <hr/> <p>Status of action:</p>  <p>New (concept)</p>	<p>Action 24.3 Implement mandatory segregation of recyclables and organics, and collection at all municipal buildings and facilities</p>
	<p>Description</p> <p>Currently there are some recycling and separation of waste taking place in selected municipal buildings and facilities. Expanding these programmes is critical to bringing the City's own operations and facilities in line with the commitments to a circular economy and zero waste-to-landfill, and to lead by example. The management of facilities in the City involves a range of internal stakeholders. As a first step, this action therefore includes determining the appropriate institutional structures and mechanisms to drive this programme.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Determine the appropriate institutional structures and mechanisms for driving the City's own waste separation and recycling efforts Address municipal procurement to minimise on-site usage and consumption of materials that cannot be recycled or recovered in City buildings and facilities Engage staff and customers on municipal premises to promote behavioural change, and issue directives to on-site catering services, cleaning staff and other municipal service providers.

<p>Lead department(s):</p> <ul style="list-style-type: none"> Solid Waste Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> Roads Infrastructure and Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Businesses/industrial associations <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 24.4 Maximise the crushing and reuse of builders' rubble</p>
	<p>Description</p> <p>As part of overall waste diversion aspirations, building rubble has a significant role to play in reducing waste volumes received at landfill and, like many other waste materials, cannot be usefully recovered when it is mixed with other waste. The City has already pioneered efforts to separate, crush and reuse builders' rubble in line with the principles of a circular economy. The crushing and reuse can be managed internally or contracted externally. The City has entered into a contract for the crushing of construction and demolition waste at selected landfill sites. A portion of the crushed material is being sold back to the construction industry at the Coastal Park Landfill site.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Scale up efforts to recover and reuse as much builders' rubble as possible Continue to ensure that value can be derived from construction and demolition waste materials generated in the city.

GOAL 25: REDUCE THE CLIMATE AND ENVIRONMENTAL IMPACT OF WASTE AND WASTEWATER DISPOSAL FACILITIES BY INCREASING BIOGAS AND LANDFILL GAS COLLECTION EFFICIENCY, TREATMENT AND UTILISATION

<p>Lead department(s):</p> <ul style="list-style-type: none"> Solid Waste Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets Electricity Generation and Distribution <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 25.1 Complete landfill gas-to-energy projects at all major landfill sites</p> <p>Description A critical component of the overarching approach to integrated waste management (goal 22) is to ensure that landfill gas projects at the current landfill sites progress from flaring to landfill gas-to-energy (electricity generation) projects at all three major landfill sites. The aim is to use the electricity at the landfills, including the material recovery and other facilities, in order to reduce the power purchased from Eskom.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Bellville, Vissershok and Coastal Park Landfill gas infrastructure for flaring (2021/22).
<p>Lead department(s):</p> <ul style="list-style-type: none"> Water and Sanitation (Wastewater Branch) <p>Supporting department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets Electricity Generation and Distribution <hr/> <p>Status of action:</p>  <p>New (in planning)</p>	<p>Action 25.2 Continue efforts to implement and expand the beneficiation of wastewater sludges and associated recovery of biogas, heat and nutrients at City wastewater treatment works (WWTW)</p> <p>Description Beneficiation of wastewater sludges and use of the resultant biogas are part of the City's long-term sludge master plan and treatment strategy. The treatment, management, reuse and disposal of wastewater sludge is the primary concern. However, biogas, heat and nutrient recovery have a role to play in reducing operational costs, reducing the carbon footprint and moving towards a circular economy. The biogas produced at the planned facilities will be scrubbed, stored and used as fuel for the boilers that will generate the steam required for thermal hydrolysis pre-treatment (which indirectly also heats the anaerobic digesters) and the balance of the biogas will be fed to biogas to energy installations. The electricity produced at the biogas to energy facilities will be sufficient to power the facility itself (i.e. the entire biosolids beneficiation facility). There will be surplus electricity that will be fed to the hosting wastewater treatment works, thereby lowering the City's operational cost by reducing power purchases.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Through a regionalised sludge treatment programme, three regional biosolids beneficiation facilities (BFFs) will be developed in the south, north and east of the city. The facilities will receive and treat all sludge from the surrounding donor WWTWs. They will be designed to ensure heat transfer and maximise the use and reuse of heat produced on site. The first facility (Southern BFF) will be located at the Cape Flats WWTW to maximise reuse of the existing infrastructure. It will have a capacity of approximately 150 dry tonnes of sludge per day and will include biogas to energy.

THE FOLLOWING IMPORTANT ASPECTS OF CLIMATE ACTION IN WASTE ARE INTEGRATED IN SFA 7 "CARBON-NEUTRAL ENERGY FOR WORK CREATION AND ECONOMIC DEVELOPMENT" AND CCWA 4 "ECONOMIC IMPACTS AND GREEN ECONOMY OPPORTUNITIES":

- See action 12.4 for link to energy from landfill gas and wastewater gas
- See action 28.2 for promotion of circularity in the green economy
- See action 29.1 for stimulating the market for waste materials by facilitating widespread sustainable green procurement.



7. CROSS-CUTTING WORK AREAS - ENABLING LEVERS FOR ACTION

7.1. CCWA 1: MAINSTREAMING, GOVERNANCE, RESEARCH AND KNOWLEDGE MANAGEMENT

Mainstreaming is essential in order to make sure the City's climate change response is not seen as the responsibility of only one or two departments, but rather becomes a shared responsibility across all City departments and functions. Mainstreaming also works to ensure that climate change response is recognised as an essential part of all City policies, strategies, frameworks and procedures. This is done in such a way that from a strategic alignment perspective, it is considered as part of the City's policy process, rather than being regarded as a niche or sectoral work area. In addition, it is essential that the City remains up to date with the latest research related to climate change adaptation and mitigation, in order for this to be effectively mainstreamed into action and that actions are taken based on the best available scientific knowledge. Therefore, improved data, information and knowledge management are important to guarantee that research outputs are effectively utilised, managed and disseminated as per the City's Research Framework, and that it is fed back into planning and implementation processes.



GOALS AND ACTIONS:

GOAL 26: MAINSTREAM CLIMATE CHANGE RESPONSES INTO KEY CITY STRATEGIES, POLICIES, PROCESSES AND PLANS

<p>Lead department(s):</p> <ul style="list-style-type: none"> Policy and Strategy Sustainable Energy Markets (Climate Change Team) <p>Supporting department(s):</p> <ul style="list-style-type: none"> All relevant departments to be engaged in sector planning process <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 26.1 Work towards the inclusion of climate responsiveness in City of Cape Town sector plans</p> <p>Description The City of Cape Town sector plans are key governance tools that provide frameworks for decision making and programme implementation. Sector plans, under development during 2020 and 2021, are high-level plans for various operational sectors in the City of Cape Town. This includes water and sanitation, waste management, energy, environment, transport and others. They are implementation focused and linked to the City's capital budget programme; it is therefore essential that climate change response is mainstreamed into relevant sector plans.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Guide the integration of climate change response as a cross-cutting theme into relevant sector plans Draw on the Climate Change Team's expertise, support the relevant departments in considering climate risks and integrate a climate change response into relevant sector plans.
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<p>Lead department(s):</p> <ul style="list-style-type: none"> Policy and Strategy <p>Supporting department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Businesses/industrial associations Residents CSO/NGO 	<p>Action 26.2 Ensure that climate change is adequately accounted for in the review and development of City strategies, policies, by-laws and implementation plans</p>
<p>Status of action:</p>  <p>Implementation</p>	<p>Description City of Cape Town strategies, polices, by-laws and implementation plans provide the governance framework for the strategic direction and operational implementation of City programmes and projects, as well as for compliance and enforcement. It is therefore essential that climate change response is adequately incorporated and integrated into these governance tools, in order to ensure this is mainstreamed into City operations.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Ensure that when existing City strategies, policies, by-laws and implementation plans are reviewed or updated, climate change response is meaningfully considered and integrated into revised versions, where relevant Ensure that when new City strategies, policies, by-laws and implementation plans are developed, climate change response is meaningfully considered and integrated, where relevant.

<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) <p>Supporting department(s):</p> <ul style="list-style-type: none"> Corporate Project, Programme and Portfolio Management Policy and Strategy Resilience Finance Directorate Environmental Management 	<p>Action 26.3 Integrate climate change response into City strategic infrastructure, budgeting and project management processes</p>
<p>Status of action:</p>  <p>New (in planning)</p>	<p>Description Project identification and development of a pipeline of projects ready for inclusion in the City budget planning cycles is a key step in implementing the actions in this plan. An important part of this process is developing a climate taxonomy and demonstrating a valid business case.</p> <p>The City has developed a sophisticated Corporate Project Portfolio Management system that enables the alignment of projects - mostly capital projects - with organisational strategy. The results have shown this to be an effective mechanism for resource allocation and improved service delivery. It has also achieved clear decision support, screening, assessment and advice to senior management on the composition of the portfolio, its progress against plans and any conflicting priorities.</p> <p>The City's Climate Change Action Plan, together with its Resilience Strategy, presents an opportunity to consider climate change and resilience-building benefits across a whole portfolio of projects rather than for individual projects.</p> <p>(Note: This action aligns with specific actions in the Cape Town Resilience Strategy and is included here as it is a key climate change response action.)</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Engage with the Strategic Management Framework (SMF) on an annual basis to ensure climate change mitigation goals, climate risk and vulnerabilities are considered by the Executive Management Team Ensure that appropriate screening mechanisms are included in Project Portfolio Management (PPM) processes to ensure that large capital projects are resilient to the impacts of climate change, both during execution and following commissioning Develop or adopt a climate taxonomy to build credibility, foster investment, ensure the disclosure of performance and, in particular, enable screening and portfolio analysis Make sure that both the scoping and screening stages for all capital projects capture the intended climate mitigation and adaptation of the projects, where relevant Perform an annual portfolio analysis to determine how different climate risks are being responded to, and highlight the risks for which in the short to medium term there are insufficient prioritised projects Ensure that there is a pipeline of climate change-related projects and enabling actions that will enter the project pipeline for strategic scoping, screening, budgeting and implementation.

<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) <p>Supporting department(s):</p> <ul style="list-style-type: none"> Environmental Management Policy and Strategy <hr/> <p>Status of action:</p>  <p>New (in planning)</p>	<p>Action 26.4 Convene and maintain an active climate change transversal working group, including work streams focused on adaptation and mitigation</p>
	<p>Description</p> <p>Climate change is a cross-cutting issue that requires the cooperation of multiple City departments to ensure effective implementation. No one department is responsible for the City's climate change response in its entirety. Consequently, it is necessary to have in place transversal working arrangements to make sure that this important cross-cutting issue is adequately dealt with by all relevant departments and functions.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Convene a climate change transversal working group, including work streams focused on adaptation and mitigation Hold regular meetings of the working group, as required by the workload and outputs Assign roles and responsibilities to working group members to ensure accountability Report back regularly to senior management (Executive Management Team) and relevant portfolio (political) committees.

GOAL 27: CONDUCT AND COMMISSION CLIMATE CHANGE-RELATED RESEARCH AND ENSURE THAT THE CITY REMAINS UP TO DATE WITH EMERGING RESEARCH IN THE FIELD

<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) <p>Supporting department(s):</p> <ul style="list-style-type: none"> Policy and Strategy Environmental Management Various others, depending on research focus areas (RFAs) <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Research institutions <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 27.1 Put in place an ongoing comprehensive climate change response research programme</p>
	<p>Description</p> <p>Research on climate change mitigation, adaptation and resilience forms an important part of supporting well-informed decisions and the planning of programmes and projects. It is necessary to have a good understanding of the climate hazards, vulnerabilities and risks facing Cape Town, as well as the various adaptation options that are available to address these. Similarly, a good understanding of the evolving mitigation technologies and approaches and associated costs, resource needs and economic impacts are essential in a financially constrained future. This research programme will also focus on programme- and project-specific research in order to ensure that decision making and programme and project implementation is informed by the best available science and is evidence based, where possible.</p> <p>(Note: This action aligns with specific actions in the Cape Town Resilience Strategy and is included here as it is a key climate change response action.)</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Every 10 years, or sooner if deemed necessary, undertake a comprehensive climate change vulnerability and risk assessment Every five years, or sooner if deemed necessary, commission an update report on climate change research to ensure that the City remains up to date with current climate science and climate projections for the region Put in place a process to, on an ongoing basis, identify infrastructure interdependencies Every three years, or additionally as required by planning, undertake a review of the cost benefits of major mitigation opportunities across sectors, particularly scaling technologies like hydrogen electrolysis and distributed storage Conduct research on the following key cross-cutting adaptation issues identified as requiring further research in the Hazard, Vulnerability and Risk Assessment Study: <ul style="list-style-type: none"> The health impacts of climate change (specific to Cape Town) Rural-to-urban migration and its forecasting.

<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) <p>Supporting department(s):</p> <ul style="list-style-type: none"> Organisational Performance Management (Data Science) Policy and Strategy Information and Knowledge Management Various others, depending on RFAs <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Research institutions (academic institutions, to be identified based on specific RFAs) <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 27.2 Enhance climate change data, modelling and knowledge management in the City to support decisions</p>
	<p>Description</p> <p>An improved data culture and higher data technical standards, both within and outside the City, will be required to respond effectively to climate change and improve the evidence base and tools for decision making. As a result, 18 actions across 15 goals in the Climate Change Action Plan include data strategy or data science sub-actions.</p> <p>The City has invested extensively in an open data portal, developed a data strategy, begun to develop its competencies in data science, and reports annually on adaptation and mitigation to the public CDP platform. Effective monitoring and evaluation will require greater public transparency by business and government through the digital sharing of open data on integrated platforms.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Establish a data work stream in collaboration with the Data Coordinating Committee to ensure data actions in the Climate Change Action Plan align with the Data Strategy and are implemented in a coordinated way Collaborate with OPM Data Science to develop data analytic products Extend existing platforms such as SmartFacility (see SFA 8 – section 6.8) into an integrated climate change data and information sharing platform. This is for transversal internal use and to make a version public through the City's Open Data Portal or other platforms on an ongoing basis Ensure continuous updating, validation, analysis and metadata development of the City's databases related to energy and climate change, supporting annual submissions to the public CDP, the periodically compiled State of Energy and Carbon Report and other City publications Ensure effective management of the data, information and knowledge products that are produced as a result of the climate change research programme, and make the information widely available so that it can be mainstreamed into City policies, plans, programmes and projects Maintain the ongoing development of GHG inventories and simulation models for mitigation potential, utilising more sophisticated approaches (where appropriate) to City scale and resources.

<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) <p>Supporting department(s):</p> <ul style="list-style-type: none"> Organisational Effectiveness and Innovation Communications <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 27.3 Work towards applying innovation in the City's climate change response through the continued use of innovation tools, methodologies and platforms</p>
	<p>Description</p> <p>The City's Innovation Team provides a supporting role to service delivery departments and facilitates the use of innovative approaches to assist with co-designing effective solutions to complex business challenges. The Future Cities dialogue sessions, led by the Innovation Team, support a futures thinking approach and provide staff with an opportunity to engage with possible future scenarios and trends. These dialogues aim to gear the City of Cape Town to take advantage of the opportunities or to proactively address the challenges these trends reveal. These sessions seek to introduce the organisation to topics and themes, spark dialogue and generate innovative ideas about climate change. The City has also implemented an online collaboration platform that can be used to solicit ideas and test concepts of climate change.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Apply innovation tools and methodologies to enable innovative climate action responses Coordinate dialogue sessions to share information, transfer knowledge, increase awareness and drive behavioural change in support of reaching the objectives of the Climate Change Action Plan Facilitate ideation campaigns on the City's online platform where collaboration and ideation can take place transversally Provide an opportunity for the results of testing programmes and "learning by doing" initiatives to be shared with the innovation forum members.

<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) <p>Supporting department(s):</p> <ul style="list-style-type: none"> Policy and Strategy Environmental Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Research institutions <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 27.4 Encourage co-production, learning and knowledge exchange as a method of ensuring the effective mainstreaming of climate change response and research outputs</p> <p>Description The co-production of knowledge has been identified as an important approach to ensuring effective responses to climate change. As identified in the FRACTAL (Future Resilience for African CiTies and Lands) project, “Ideas and practices of co-producing knowledge challenge the positioning of science as a superior source of knowledge, and critique the top-down binary models of transferring knowledge from academia to ‘end users’. This underpins a shift from aiming to produce knowledge that is scientifically robust to (co)producing knowledge that is also socially robust and thereby more readily applicable for addressing real-world problems in a given context”.⁴⁰</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Establish an internal City of Cape Town climate change response community of practice to encourage learning and knowledge exchange among City staff Re-initiate the Cape Town Climate Change Think Tank in conjunction with leading academic institutions to promote learning and knowledge exchange Work cooperatively with academic partners to co-produce knowledge, including the ongoing implementation of an embedded researcher programme and an academic writing programme for City officials Work towards providing an effective internal consulting service to City departments in terms of developing climate change response-related indicators, research projects and knowledge products.
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40 Taylor, A. et al. (2017).

7.2. CCWA 2: ECONOMIC IMPACTS AND GREEN ECONOMY OPPORTUNITIES

The economic impact of climate change has been identified as a major challenge facing Cape Town. This impact is related to both the negative effects of climate change on infrastructure, human health and the city's natural resource base, as well as to the potential impacts on the city's international economic competitiveness. This is due to the current high levels of carbon embedded in goods and services that are anticipated to face border adjustment, starting in the EU and then eventually other markets. Targeted, flexible, scalable and planned solutions to decarbonisation are therefore needed so that value chains and economic niches that are highly integrated regionally, nationally and globally can remain competitive.

Considerable economic opportunities present themselves in emerging sectors and in harnessing new technologies and approaches. Addressing climate change, however, requires the reform of resource-intensive sectors, significant increases in energy efficiency, shifts in production and consumption patterns, and the adaptation of all sectors to current and anticipated climate impacts. This global transition will continue to have an impact on economies and jobs, requiring new approaches and skills.

"The importance of the (economic) targets lay not in reaching a scientifically optimal level of investment.

Rather, establishing an optimistic, forward-looking plan was an end in itself. He wanted action that would generate more action. Initiating momentum would prevent the economy from falling back into its pre-war risk-averse ways and again 'crystallizing at a low level.'"

- Daniel Yergin and Joseph Stanislaw (1998), *Commanding Heights* (profile of Jean Monnet, the architect of French post-war reconstruction)



Promoting a green economy approach has been a longstanding policy focus in the City. However, although the City is an important economic actor, it operates within strictly legislated bounds with a focus on service delivery. Many activities related to the green economy therefore fall outside of the scope of local government mandates. Because of this, the goals and actions in this work area are aspirational and require extensive collaboration between spheres of government, specialised support agencies, business leadership and companies themselves.

A market role for the City is strengthened by the Green Procurement Action Plan (2020), which has been developed to give effect to commitments of the City's Environmental Strategy. The City's Supply Chain Management Policy states that "[g]reen procurement should be considered for all specifications of goods, services and construction works", and that "[i]n the development of bid specifications, innovative mechanisms should be explored to render the service or product more resource- and energy-efficient".

The draft Inclusive Economic Growth Strategy (IEGS) - intended to supersede the 2013 Economic Growth Strategy - includes sustainability as a key principle and highlights that "the City is well positioned to be leading the way in reducing carbon emissions and promoting sustainable business practices through procurement". The 2019 Resilience Strategy includes a strong economic focus, with actions that target sustainable procurement, the promotion of the green economy, industrial symbiosis, the circular economy, the informal economy and workforce transition.

The actions of the Climate Change Action Plan draw directly from this policy base, aiming to support this ongoing work to promote local economic development and job creation through responding to climate change.

THE ATLANTIS SPECIAL ECONOMIC ZONE (SEZ)

Situated on the west coast of South Africa, approximately 40 km from the Cape Town CBD, the Atlantis SEZ capitalises on the province's growing renewable energy and green technology sector. It supports the manufacturing sector to become suppliers and component manufacturers for the renewable energy sector, with a particular focus on independent power producers in the government's Renewable Energy Independent Power Producers Programme (REIPPP).

The 124-ha site, specifically declared a green technology SEZ, was launched in December 2018. It is a partnership between the City of Cape Town, the Western Cape Government and the National Department of Trade, Industry and Competition (DTIC). Both the City and National Government have a suite of investment incentives for the zone and aim to create a one-stop shop for investors to reduce bureaucracy.

THE WORKING DEFINITION OF THE GREEN ECONOMY used in City plans is "expanded economic opportunities through the provision of goods and services and the use of production processes that are more resource efficient, enhance environmental resilience, optimise the use of natural assets and promote social inclusivity".

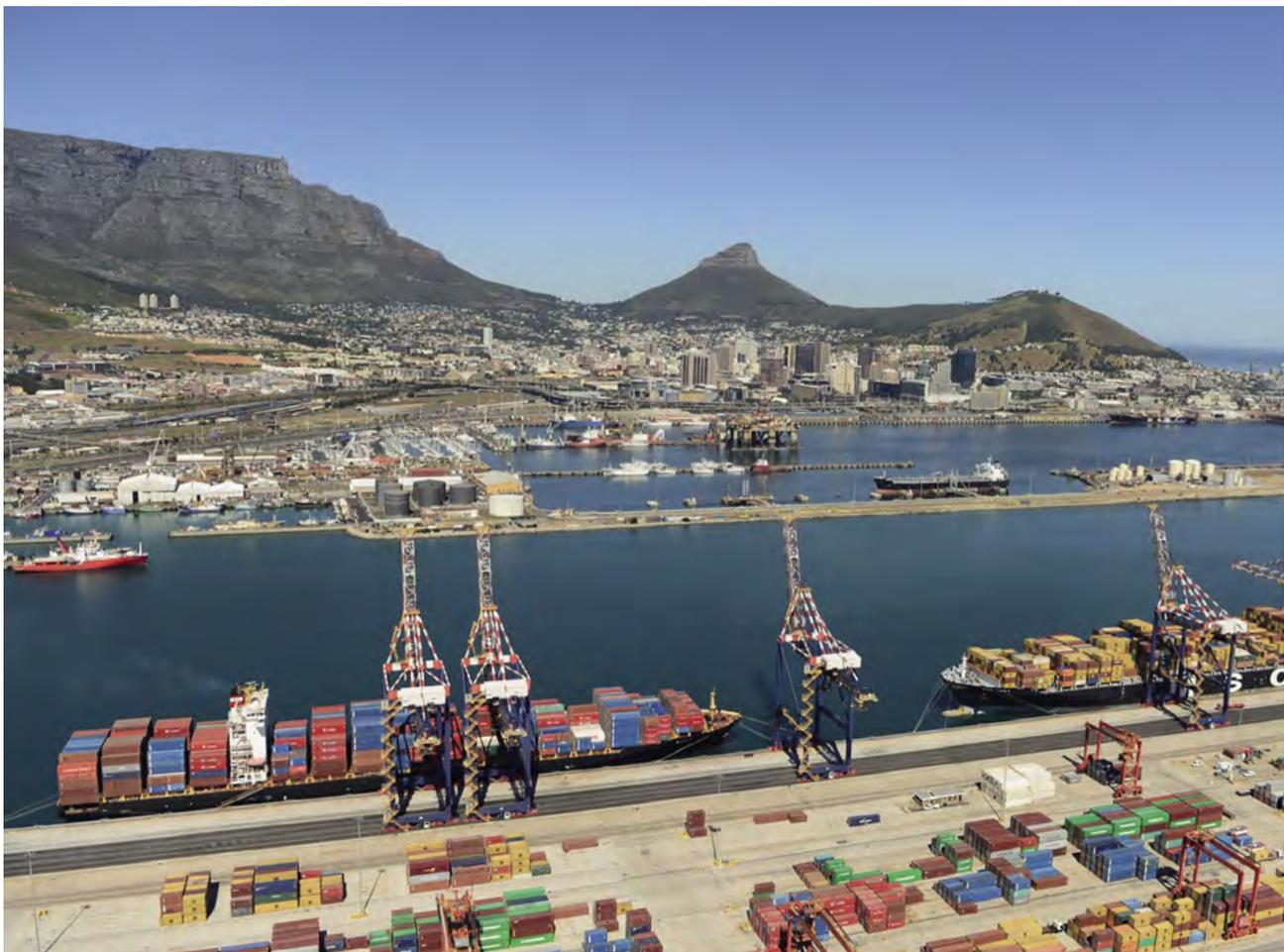
To help drive an opportunity-focused green economy transition, the City of Cape Town aims to do the following:

- Enhance the ease of doing business in Cape Town
- Promote Cape Town as the green-tech hub of Africa
- Support a broader conception of the green economy, which fosters innovative projects that promote and protect biodiversity and ecosystem services
- Promote and facilitate green procurement practices to drive the demand for green products and services and therefore grow local supply
- Promote green economy investments both locally and internationally
- Promote sustainable tourism
- Facilitate the creation of green jobs and develop the green skills pipeline through training.

GOALS AND ACTIONS:

GOAL 28: ADVANCE THE LOCAL GREEN PRODUCTS AND SERVICES MARKET, AND REDUCE THE RISKS OF CLIMATE IMPACTS ON LOCAL ECONOMIC DEVELOPMENT

<p>Lead department(s):</p> <ul style="list-style-type: none"> Enterprise and Investment <p>Supporting department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets Environmental Management Policy and Strategy <p>External stakeholder(s):</p> <ul style="list-style-type: none"> City support agencies (Wesgro,⁴¹ South African Renewable Energy Business Incubator [SAREBI], GreenCape) <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 28.1 Facilitate investment in the local green economy</p> <p>Description This action aims to establish Cape Town as a green destination to visit, live, work, play and invest in through creating an enabling environment for business. The desired outcome is an increase of domestic and foreign investment in the green economy. The Atlantis SEZ is a strong existing foundation from which to work.</p> <p>(Note: This action aligns with specific actions in the Cape Town Resilience Strategy and is included here as it is a key climate change response action.)</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Continue implementation of the City's Investment Incentives Policy to invite investment in Cape Town Promote the Atlantis SEZ as a destination for investment in green technology Fund and maintain the operationalisation of the Atlantis Investment Facilitation Office as a one-stop shop for prospective investors and firms to acquire business support and to smooth the landing of their investments Contribute towards the development of green economy skills through participating in skills development interventions Collate and regularly update market intelligence on the Cape Town economy and showcase it through the Invest Cape Town brand.
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⁴¹ Wesgro is a legislated Schedule 3C Public Entity and serves as the official tourism, trade and investment promotion agency for Cape Town and the Western Cape.

<p>Lead department(s):</p> <ul style="list-style-type: none"> Climate Leadership Review Action (Triennial assessments by SEM – see section 5.2) <p>Supporting department(s):</p> <ul style="list-style-type: none"> Environmental Management Sustainable Energy Markets Water and Sanitation Solid Waste Management Electricity Generation and Distribution Communications Events <p>External stakeholder(s):</p> <ul style="list-style-type: none"> City support agencies (Wesgro, SAREBI, GreenCape) 	<p>Action 28.2 Promote the development of South African green products and services to increase local demand and supply</p>
	<p>Description</p> <p>This action is aimed at identifying key sectors that contribute to the City’s green economy approach and providing support through awareness, market intelligence and decision support to increase local, regional and global uptake of South African green products and services.</p> <p>This action has been identified as a climate leadership review action as multiple internal and external departments are responsible for the implementation of the sub-actions identified here, primarily through existing programmes of work.</p> <p>(Note: This action is enabled by goals 13 and 14 under the SFA “Carbon-neutral energy for work creation and economic development” and should be considered alongside actions 14.1 and 14.3.)</p>
	<p>Review assessment areas include:</p> <ul style="list-style-type: none"> Facilitate improved business networks for sharing waste outputs as inputs to support industrial symbiosis and the circular economy Collaborate with special purpose vehicles or other industry stakeholders on the development of citywide indicators for waste material. This includes recycling, upcycling, reparability and product exchange, in alignment with the EPR regulations Promote and facilitate energy, water and waste efficiency to enhance the demand for green goods through knowledge-sharing platforms, effective communication and market intelligence, and the improvement of resource data and its dissemination Promote standardised quality assurance labelling that showcases verified circularity attributes such as recycled content and low or zero carbon inputs Enhance the green economy business narrative of the City through proactive outreach and prioritisation in the City’s strategy, policy, communications and plans Promote Cape Town’s green credentials as a destination for responsible tourism, green events and green technology.
<p>Status of action:</p>  <p>Expansion of existing programme</p>	

<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) <p>Supporting department(s):</p> <ul style="list-style-type: none"> Urban Management Resilience Environmental Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> City support agencies (Wesgro, SAREBI, GreenCape) 	<p>Action 28.3 Reduce the climate impact risk to the local economy</p>
	<p>Description</p> <p>The recent Climate Change Hazard, Vulnerability and Risk Assessment study highlighted the impacts that the city faces in the coming decades. The drought that has already been experienced emphasised the vulnerability of enterprises to such climate shocks. Certain key sectors – such as the significant job-generating agriculture, food and beverage (AFB) value chain – are particularly vulnerable. The City has a responsibility not just to secure its own infrastructure and resilience, but also to equip local business with the knowledge it needs to put in place the necessary measures and plans so that local economic development can continue.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Work with sector support agencies to promote climate change adaptation and resilience in local industries Actively communicate the business and cost risk implications of the Climate Change Hazard, Vulnerability and Risk Assessment study to enterprises and sectors in the City; work with businesses to identify actions required to both become more resilient and to supply and service each other’s climate resilience needs Expand on the business case for increased investment in natural assets through working with the tourist industry and academia to quantify natural capital benefits Develop and implement an informal enterprise survey to gain richer data on the informal economy Assess and communicate the trade risk to local industry posed by global climate regulations.
<p>Status of action:</p>  <p>New (concept)</p>	

GOAL 29: SUPPORT THE DEVELOPMENT OF A CLIMATE-RESILIENT AND CARBON-NEUTRAL GREEN ECONOMY THROUGH CITY OPERATIONS

<p>Lead department(s):</p> <ul style="list-style-type: none"> Environmental Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> Supply Chain Management Sustainable Energy Markets <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 29.1 Mainstream the implementation of climate-responsive sustainable procurement in the City's supply chain management processes and decisions</p> <p>Description The City of Cape Town has substantial buying power due to its consumption of a large number and diversity of goods and services. This can be leveraged to not only stimulate local economic development but to also drive the green economy, climate change mitigation, and adaptation, and resource efficiency. The City recently finalised a Green Procurement Action Plan which seeks to consolidate and mainstream the implementation of green procurement in the City. The Green Procurement Action Plan outlines the specific actions required to effectively transition towards green procurement in all of the City's operations and purchasing decisions.</p> <p>(Note: This action originates from the Cape Town Resilience Strategy and some of its sub-actions originate from the Green Procurement Action Plan. It is included here as it is a key climate change response action.)</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Implement the Green Procurement Action Plan, particularly priority items that support the City's climate response Ensure that administrative tools and procedures, including specifications for recycled content, are in place to support green procurement Support and institutionalise closed-loop procurement systems⁴² Maximise the sourcing and purchasing of green goods and services, with a particular focus on small, micro and medium-sized enterprises Monitor and evaluate the City's performance in terms of green procurement in general, and in relation to supporting the goals of the Climate Change Action Plan in particular Ensure effective internal and public-focused communication Participate in local, regional, national and international initiatives, networks and partnerships related to climate-responsive sustainable procurement, including the Global Lead City Network on Sustainable Procurement.
<p>Lead department(s):</p> <ul style="list-style-type: none"> Environmental Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> Water and Sanitation Recreation and Parks Urban Management Human Settlements Directorate <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 29.2 Continue the implementation of the City's green jobs programmes, with a focus on climate resilience and risk reduction</p> <p>Description The City of Cape Town has adopted green jobs programmes as a key means of implementing environmental sustainability and climate-resilience actions. This programme is shared across a number of functions in the City and is implemented through a range of methods. This includes the Expanded Public Works Programme (EPWP), contracted services and MOUs with implementing agencies.</p> <p>The City's green jobs programmes play a significant role in on-the-ground implementation of actions. These support climate resilience while also reducing climate risk, which poses a threat to the city's economy. These green jobs initiatives also support the management and maintenance of Cape Town's natural assets, improve urban sustainability and assist in addressing various social challenges the city faces.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Prioritise the implementation of green jobs initiatives that support the City's climate change response Continue and expand the existing EPWP and other green jobs initiatives Prioritise infrastructure and green infrastructure development, maintenance, rehabilitation, upgrading and restoration that supports the creation of green jobs Prioritise skills development and training linked to green jobs programmes Leverage employment opportunities related to heritage resources and assets, including opportunities to connect heritage features in order to grow the tourism market in the city Develop a business case for increased investment in natural assets and green infrastructure, in order to attract more funding for environmental management and to expand the creation of green jobs and skills programmes.

7.3. CCWA 3: BUSINESS MODELS, REVENUE AND FINANCING CLIMATE CHANGE RESPONSE

Although decarbonising to mitigate increasing climate change will contribute to long-term risk reductions, this will not reduce the need for proactive investment in climate-resilient infrastructure and other forms of adaptation. Developing countries with vulnerable populations therefore face difficult choices. Finance flowing from developed to developing countries is an increasing focus of the multinational effort on climate change. South Africa, as an upper middle-income country,⁴³ is likely not first in line for highly concessional loans or direct grant finance for infrastructure. Nevertheless, it still has significant social, economic and income disparities to contend with.

“Green” and “climate” finance are therefore an increasing focus of institutional efforts to drive urgent climate action supported by the growing popularity and profile of Environmental, Social

and Governance (ESG) investing. Competition can, however, give rise to “greenwashing” in the financial sector and empirical evidence for green finance that delivers effective outcomes different to conventional finance is still emerging.⁴⁴

National legislation and governance arrangements also frame regulatory and fiscal considerations for local government participation in financial markets and partnerships with the private sector in climate action. This is usually best navigated by financial experts at a city level.⁴⁵ In order to ensure that these considerations are brought into the financing of the climate change response, financial experts at the city level must therefore be involved in considering approaches. Cape Town remained an investible municipality through a long period of national economic downturn but was still downgraded by Moody’s with other South African metropolitan municipalities in July 2021 and now faces fiscal constraints following Covid-19 which compounded many trade-offs. Given the existing strong financial governance and systems, in addition to experience in green finance through a green bond, the focus of climate finance actions will be as follows:

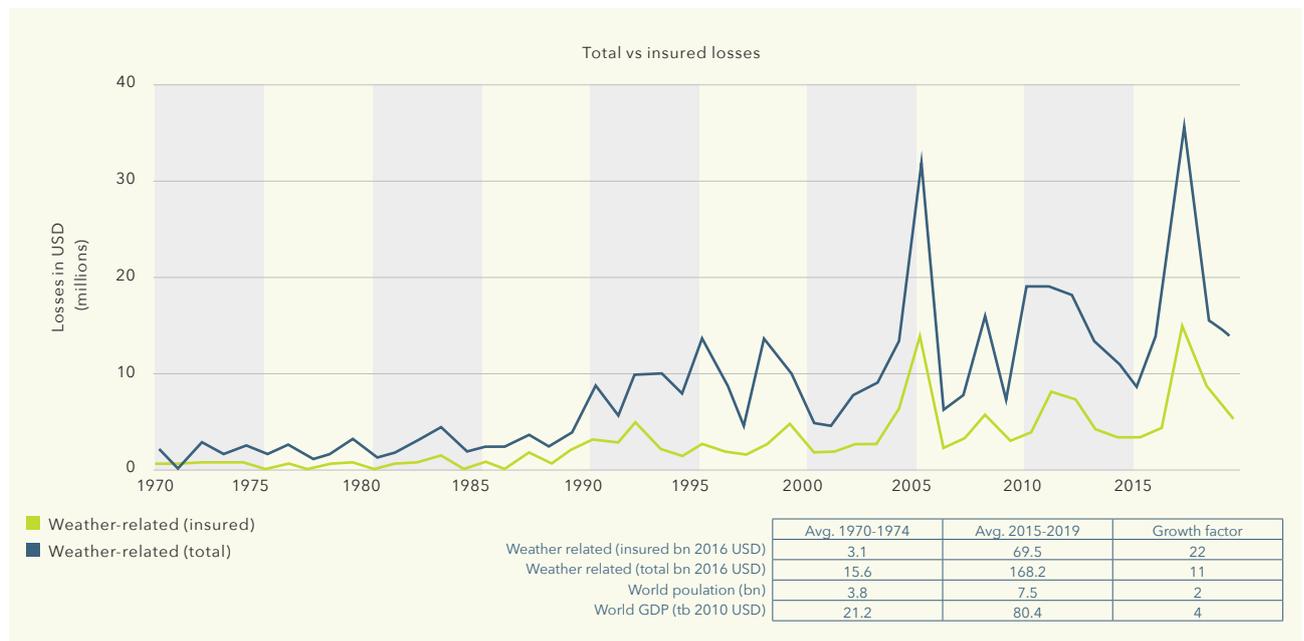


Figure 14: Climate change is causing increasing financial impacts; industry data show that global weather-related insurance losses between 1970 and 2019 have grown in the region of 22-fold compared to only four-fold GDP growth⁴⁶

42 In the closed-loop system, materials are returned and reused by the same originator, as suppliers or manufacturers bring products back in and remanufacture or refurbish them before resale to the secondary market.

43 The World Bank (2021). Data: Upper middle income. Available at: <https://data.worldbank.org/income-level/upper-middle-income>

44 Clark, R., Reed, J. & Sunderland, T. (2018).

45 UNFCCC (2019). Climate Finance and Sustainable Cities. 2019 Forum of the Standing Committee on Finance.

46 Sources: Swiss Re Institute, sigma explorer (<https://www.sigma-explorer.com>); world population and GDP data from World Bank Development Indicators (<https://www.data.worldbank.org>). Five years of data were averaged at either end of the four-time series.

- Project identification and readiness to access the City's budget
- Maximising the climate response benefits of existing and planned service delivery programmes and using taxonomy development and budget project tagging to help track actual climate spend across projects
- Maximising external funding opportunities through funder engagement and strengthening technical capacity and quality data
- Exploring new and innovative sources of finance and funding.

In addition to planning the direct financing of climate actions, the City will assess the various business models of its services in light of the disruption to electricity income that is likely to occur due to the increased uptake of SSEG and the impact of new and disruptive technologies. Furthermore, where the City invests its money has implications for its financial sustainability, and the City's cash investment strategy needs to take account of the risks associated with unsustainable investments - particularly assets that are likely to be affected by climate change, and those that are related to the causes of climate change. Divestment is motivated by greater responsibility and greater long-term returns.

LOCAL GREEN FINANCE CASE STUDY: THE CITY OF CAPE TOWN GREEN BOND

The City issued a green bond in July 2017, which was listed on the Johannesburg Stock Exchange's green bond segment, accredited by the Climate Bonds Initiative and awarded a GB1 rating - the highest rating achievable for a green bond.

The issue, which was four times oversubscribed, quickly raised R1 billion and cleared at 133 basis points above the R186 government bond. It is being used to partially fund a set of eligible projects identified by the City in its capital programme that were already significantly delivered. These include water management initiatives, sewerage effluent treatment, and the rehabilitation and protection of coastal structures.

Key lessons:

- Green bonds are a tool for funding projects in a city budget plan,⁴⁷ and the issuance needs to be timed appropriately as it is unwise to pay interest on unallocated capital over a protracted period of project implementation. Any unallocated funds may also require ring-fencing in terms of its investor mandate, which may not be possible in a green fund of the required credit quality for a short period.
- The green bond framework and a process for clearly defining qualifying project areas (taxonomy) allowed the City to identify a number of projects as green projects, especially those that might have been previously overlooked as green projects.
- In addition, it allowed the City to establish credibility and demonstrate its sustainability commitment to audiences that wouldn't ordinarily consider it important in their investment decision.
- Additional indirect costs associated with reporting was a challenge.
- In the long term, green finance opportunities need to demonstrate a clear financial benefit relative to conventional public finance to justify their additional governance.

47 In Cape Town's case, the Medium Term Revenue and Expenditure Framework (MTREF).

GOALS AND ACTIONS:

GOAL 30: INVESTIGATE SOURCES OF CLIMATE FINANCE AND THE USE OF INNOVATIVE FINANCIAL MECHANISMS TO SUPPORT CLIMATE CHANGE RESPONSE, AND IMPLEMENT WHERE FEASIBLE

<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) <p>Supporting department(s):</p> <ul style="list-style-type: none"> Valuations Environmental Management Legal Services <p>External stakeholder(s):</p> <ul style="list-style-type: none"> CSO/NGO <hr/> <p>Status of action:</p>  <p>New (in planning)</p>	<p>Action 30.1 Investigate the viability of special rating areas as a means of financing climate change resilience in high-risk areas and determine a way forward</p> <p>Description Special rating areas are defined geographical areas where property owners (including residential and business) contribute additional rates to fund “top-up” services for those specific areas, based on an agreed business plan.</p> <p>Special rating areas have been used in a variety of suburbs in Cape Town, but have to date been focused on crime reduction, or maintenance and upkeep issues (generally known as improvement districts). However, it is possible that special rating areas could be used to partially or wholly fund climate adaptation actions that will specifically benefit areas at high risk of climate change-related impacts. This is especially important where climate risk poses a significant threat to property values, and property owners are concerned about ensuring that their properties are protected from damage.</p> <p>More research is required to determine if this would be a viable source of funding, both in terms of acceptability to the public and in terms of sufficient revenue being raised.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Investigate the viability of special rating areas as a means of financing climate change response within those areas If deemed viable, put in place a pilot project in a high-climate risk area Plan how to evolve from the pilot project to a programme.
<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) <p>Supporting department(s):</p> <ul style="list-style-type: none"> Finance Directorate <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Research institutions <hr/> <p>Status of action:</p>  <p>New (in planning)</p>	<p>Action 30.2 Investigate options for accessing national and international climate change and sustainability funding and develop into a shared database</p> <p>Description International funding for climate change is provided by a range of organisations, most notably the Green Climate Fund and Global Environmental Facility. However, accessing funding is challenging and requires significant feasibility and pre-feasibility studies and applications through the relevant national accredited entity (e.g. the South African National Biodiversity Institute [SANBI] or Development Bank of Southern Africa [DBSA]). Accessing funding at scale through the development of suitable bankable projects requires a high level of skill and understanding of business, legal and financial structures and practices in this area, coupled with proposal and business case development skills.</p> <p>In addition, developing a database and landscape view of all relevant climate funds available is an important first step towards accessing this funding.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Investigate options for accessing local and international climate change funding and develop a shared database to evaluate opportunities with the Finance Directorate Compile a plan for engaging with international funders to secure additional climate change funding where such funding is materially more attractive than traditional sources.

<p>Lead department(s):</p> <ul style="list-style-type: none"> Policy and Strategy <p>Supporting department(s):</p> <ul style="list-style-type: none"> Environmental Management Disaster Risk Management Resilience Treasury <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Research institutions Private sector 	<p>Action 30.3 Conclude an initial investigation and assessment of innovative insurance mechanisms for addressing climate change adaptation and resilience</p>
	<p>Description</p> <p>The use of innovative insurance mechanisms has been identified as one potential means of addressing the cost implications of implementing climate adaptation and resilience actions.</p> <p>Although many of the current innovative insurance products have been aimed at large-scale shock events, the City is likely to face more lower intensity and chronic stresses related to climate change challenges, which also need to be considered.</p>
	<p>Status of action:</p>  <p>Implementation</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Identify an internal work group to be tasked with finalising and, where appropriate, developing actions and recommendations to reduce the financial risk exposure to climate change by the end of 2022 Conclude a high-level review of the current and emerging climate-related risks that the City is exposed to, which are not covered by insurance products and would require additional insurance cover Continue working with external academic and development agency partners engaged on City resilience work to determine the viability of innovative insurance products Frame and quantify risk projections for City amenity and infrastructure loss, as well as for potential revenue loss (through lost tax revenue) for future shock types. In addition, engage with the private sector to request assessments and quotations to obtain cost estimates for innovative insurance products, if this is deemed viable Develop a decision-making tool focused on navigating the trade-offs associated with procuring insurance versus investing in initiatives that reduce vulnerability and/or exposure to risk.

GOAL 31: USE FINANCIAL MECHANISMS, INCLUDING BUSINESS MODELS, TARIFFS, INVESTMENT AND DIVESTMENT TO RESPOND TO CLIMATE CHANGE IMPACTS AND MITIGATION OPPORTUNITIES

<p>Lead department(s):</p> <ul style="list-style-type: none"> Climate Leadership Review Action (Triennial assessments by SEM – see section 5.2) <p>Supporting department(s):</p> <ul style="list-style-type: none"> Finance Directorate Resilience Policy and Strategy Electricity Generation and Distribution Solid Waste Management Transport Directorate Water and Sanitation <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal Research institutions 	<p>Action 31.1 Consider climate change impacts and opportunities in the City's business, revenue and operational model</p>
	<p>Description</p> <p>Municipal revenue is under pressure across the country as electricity demand drops due to technology disruption, de-industrialisation and tepid economic growth. Environmental issues, resource scarcity and regulatory pressures on other utility sectors such as solid waste, wastewater and water supply place upward pressure on tariffs as willingness to pay is diminished by falling incomes.</p> <p>Against this backdrop, technology offers opportunities for cost reductions in service delivery. Cape Town has several advantages as a centre for a regional green economy, supported by a strong academic base that offers the potential to benefit from transition through collaboration on new models of service delivery. Understanding the cost of supply and affordability of services will be key to sustainable service delivery.</p> <p>Unbundling functions institutionally, for instance electricity distribution from retail and generation (see action 13.2), can ensure that the costs of services continue to be recovered as sectors transition rapidly.</p>
	<p>Status of action:</p>  <p>New (in planning)</p> <p>Review assessment areas include:</p> <ul style="list-style-type: none"> Tariff and social support transparency and the building of a social compact The quality, accessibility and coverage of key engineering, financial and socio-economic data Use of Requests for Information (RFI) on novel technology and systems solutions for utilities, particularly those that support the green economy Use of academic research on local government business models to deliver social and climate services State of sectoral Hazard, Vulnerability and Risk assessments Legal, regulatory and governance approaches Infrastructure strategy and project pipeline development.

<p>Lead department(s):</p> <ul style="list-style-type: none"> Treasury <p>Supporting department(s):</p> <ul style="list-style-type: none"> Environmental Management Sustainable Energy Markets Policy and Strategy <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Businesses/industrial associations <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 31.2 Support the call for responsible divestment by taking steps where possible to divest financial assets from fossil fuels, or reinvest in climate-friendly activities</p>
	<p>Description</p> <p>In June 2017, the Investor Committee resolved that “steps be taken to divest from all investments held on behalf of the City in instruments associated with companies associated with the release of unmitigated high levels of carbon dioxide into the atmosphere in favour of investments which are deemed to be at least climate neutral”.</p> <p>In 2020, the City signed up to the C40 Divesting from Fossil Fuels, Investing in a Sustainable Future declaration, which aligns with the commitment that was made in the City’s 2017 Climate Change Policy (now replaced by the City’s new 2021 Climate Change Strategy) and the City Cash Management and Investment Policy (2018 amended version). Although the City has taken this step, it does not have control over the staff pension funds (which is the case for other global cities making similar pledges).</p> <p>Fossil fuel industries may in future raise funding for climate-friendly activities, for instance blue or green hydrogen, and the City may wish to support such initiatives on a case-by-case basis.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Maintain the provisions in the mandates of fund managers looking after City assets to ensure that they adhere to the Principles for Responsible Investment (PRI) standards and do not hold any interest in stocks that are dependent on use or extraction of fossil fuel to realise their value Communicate its divestment decisions to all investment partners and broader stakeholders Encourage fund managers to develop products that meet the requirements of the City’s Cash Management and Investment Policy while ensuring liquidity of the City’s Money Market investments.

7.4. CCWA 4: COMMUNICATION, COLLABORATION AND SKILLS DEVELOPMENT

Few human crises have been as contested as climate change; the world has witnessed that even a threat as immediate as a pandemic can create unexpected extremes in views. Nevertheless, a solution requires profound economic and social change. Communication and collaboration within and between the different spheres of society and the economy are therefore a critical pillar in responding to climate change and ensuring all sectors are part of the journey to strengthen Cape Town's climate resilience and become carbon-neutral by 2050.

From a mitigation perspective, communication and education are important in changing behaviours related to energy consumption and emissions production, as well as providing support for transitioning to new technologies or ways of living. From an adaptation perspective, it works to support action to improve resilience and protect against climate shocks and stresses. Effective communication is also an important part of disaster management to ensure that people receive clear and up-to-date information about how to lower their risks or receive assistance during a climate shock.

Although the need to communicate is clear, climate change and the urgent action required can feel overwhelming to many. A climate change perception study undertaken by the City showed it is critical to cut through the scientific jargon, represent the facts on impacts simply and truthfully, and ensure that the solutions and actions being presented are accessible and inclusive. It is also important to ensure that messaging is not overly negative or anxiety provoking as this tends to discourage engagement. Targeted, high-quality communication and education programmes can produce real results by being on message, relevant and in volume, consistently over time.

Globally, cities have stepped up to the challenge of stemming the climate crisis by acknowledging their climate action levers through their mandate to deliver services and influence outcomes through regulation and policy. Although the City is committed to lead, drive and enable the implementation of this Climate Change Action Plan, much of it is outside the direct control of the City administration. It therefore requires action from other stakeholders, most notably National Government, national utilities like Eskom and

PRASA, the private sector, civil society organisations and residents. The City recognises the critical role they play and, in its role as a citywide climate change action planner, it needs to use what convening power it has to support collective action. Collaboration with international organisations and with other cities committed to addressing climate change also forms an essential part of the City's response to learn from best practice and benefit from knowledge sharing.

“Climate change is usually framed as a looming disaster, bringing losses, cost and sacrifice. That makes us fearful. But after the first fear is gone, my brain soon wants to avoid this topic altogether. After 30 years of scary climate change communications, more than 80 percent of media articles still use disaster framings, but people habituate to and then desensitize to doom overuse. So many of us are now suffering a kind of apocalypse fatigue ...”

- Per Espen Stoknes (2017), *How to transform apocalypse fatigue into action on global warming*⁴⁸

⁴⁸ Stoknes, P. (2017). How to transform apocalypse fatigue into action on global warming at TEDGlobal NYC. Available at: https://www.ted.com/talks/per_espen_stoknes_how_to_transform_apocalypse_fatigue_into_action_on_global_warming/transcript?language=en

UNDERSTANDING THE PERCEPTION OF CLIMATE CHANGE IN CAPE TOWN

To successfully embark on a climate change communication campaign, the City needed to gain insight into Capetonians' perceptions of climate change, specifically the differences between audiences, identifying what engenders credibility and drivers that can unlock behaviour change. This was conducted in mid-2020 across a diverse resident base.

Key outcomes from the study:

- There was a mix of levels of awareness on climate change or environmental issues, with higher economic groups and younger individuals in lower economic groups showing greater levels of awareness. The experience of the drought has heightened the awareness of Capetonians to the real impact of climate change-related issues.
- Scientists and academics are seen as the most trustworthy sources of information, while there are mixed feelings about information from government. However, there is a strong focus on government being the player to take responsibility and guide residents.
- Although the City needs to play a key role in addressing climate change, many feel there are far more pertinent basic service delivery issues to be dealt with.
- Money/cost emerged as a key factor in determining the success of a campaign, whereas convenience and accessibility are likely to be key factors in adopting climate actions.

Based on this, the study made the following recommendations:

- The City can use the power of local government to bring about change through implementing legislation, assisting industry and business to comply, educating communities on the problems and actions, addressing service delivery by focusing on areas where there is overlap and creating a relationship where the City and communities can work together.
- The City should make behaviour change easier for residents by starting to build on existing positive behaviour. This can be achieved through incentivising behaviour, ensuring that taking action is convenient, providing access to facilities, focusing on the health benefits of climate action and making climate change a priority in the work being done.
- A differentiated approach according to Living Standards Measure (LSM) categories is relevant for accurate targeting.

It is important to note that the City's climate change campaign is being developed during the global Covid-19 pandemic and therefore needs to be sensitive to the context that residents, businesses and organisations are facing. It will need to be aligned with the City's recovery plans and associated communication.



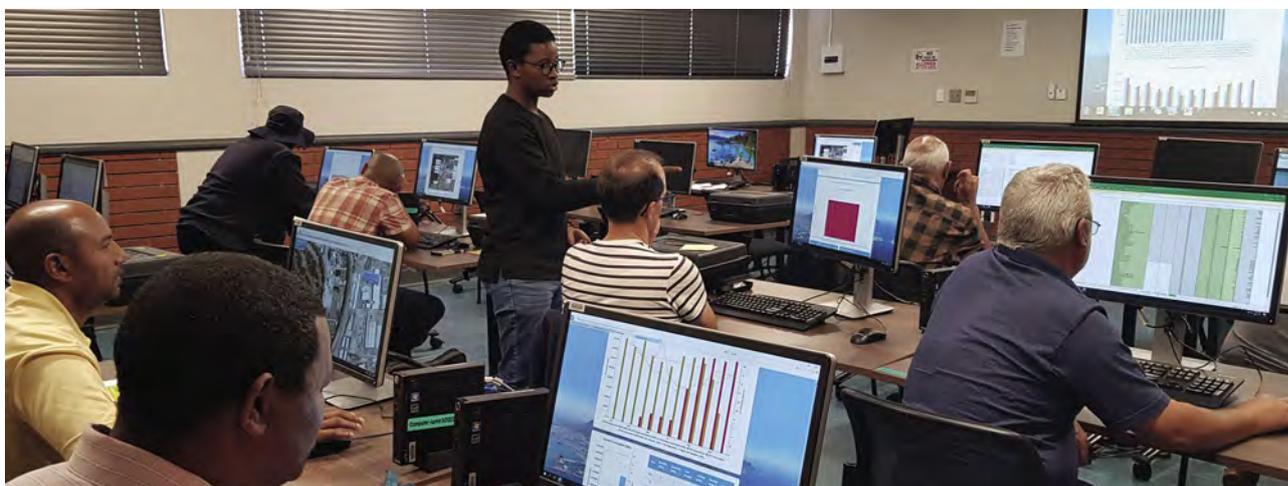
GOALS AND ACTIONS:

GOAL 32: ENSURE THAT CAPE TOWN'S RESIDENTS, BUSINESSES, VISITORS AND CITY OFFICIALS RECEIVE TIMELY, EFFECTIVE AND APPROPRIATE CLIMATE CHANGE EDUCATION, COMMUNICATION AND TRAINING

<p>Lead department(s):</p> <ul style="list-style-type: none"> • Communications <p>Supporting department(s):</p> <ul style="list-style-type: none"> • Sustainable Energy Markets • Environmental Management • Resilience <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • Business/industrial associations • CSO/NGO • Residents <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 32.1 Develop and implement a climate change response communication and education plan with a strong focus on community outreach and collaboration</p> <p>Description The communication and education plan will take the form of advocacy for taking action and the development or updating of guidelines or handbooks, which aim to help residents to become more resilient and make sustainable living choices.</p> <p>Existing work on the City's new climate change communication campaign (under development) includes: Stakeholder research into the perceptions that residents of Cape Town have of climate change (see CCWA introduction); the development of a campaign platform or identifier (Let's ACT. For a stronger Cape Town); and the soft launch of the campaign.</p> <p>Education programmes are generally considered more formal and focused than communication campaigns, and target specific audiences with the necessary knowledge to take specific actions. Education can also include training and skills development initiatives that often take place in the workplace and outside of formal education settings. It is therefore important that communication and education happen in a coherent, integrated and deliberate manner to ensure that correct information is disseminated, a coherent message is conveyed by the City and the designed outcomes are achieved.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> • Further development of the broad communication strategy to guide the roll-out of the various elements of the communication campaigns and education plan • Test the efficacy of the campaigns and adjust and refine where necessary. Driving the necessary behaviour change through citizen action communication will require significant effort over a number of years, with each successive communication and education plan building on the last. It is therefore critical to ensure that the communication and education activities being undertaken have the desired effect.
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<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) <p>Supporting department(s):</p> <ul style="list-style-type: none"> Environmental Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal Provincial Government Businesses/industrial associations Research institutions CSO/NGO <hr/> <p>Status of action:</p>  <p>New (concept)</p>	<p>Action 32.2 Support climate change-related skills and knowledge development in the City and across Cape Town</p>
	<p>Description</p> <p>Enabling climate change action in the City will require regulatory and practice support, improved GHG inventory and modelling skills, and a broader base of technical skills to support low-carbon and climate-resilient technologies.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Produce technical and regulatory guidelines, where appropriate, to augment those already produced for SSEG and buildings Propose programmes to address capacity building gaps of the City and engage grant funders if required Support the skills development needed for improved GHG inventory compilation across City departments Broaden the transversal participation of capacity building support offered by external partners Support the climate change skills development programmes of NGOs, where appropriate



<p>Lead department(s):</p> <ul style="list-style-type: none"> Disaster Risk Management Communications <p>Supporting department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal (SAWS) <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 32.3 Use social media effectively to communicate early warnings of climate shocks and extreme weather events</p>
	<p>Description</p> <p>The effective communication of early warnings of climate shocks and extreme weather events, such as heatwaves, high-heat days and severe storms, is important to provide people with the opportunity to take action in advance of climate shocks and extreme weather events. Many people obtain much of their news from social media, either firsthand (directly from information sources) or secondhand (through forwarded messages from other platforms). The City already uses a variety of social media platforms to inform the public about various City operations, such as the maintenance of water or electricity infrastructure. This action will therefore build on the City's existing social media approach and be within the social media guidelines of the City.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Use social media to relay official weather warnings received from the SAWS Use social media to provide information on steps that people can take to protect themselves from forecasted climate shocks before they occur Use social media to provide the public with updates on events related to climate shocks as these happen, e.g. providing updates on the status of wildfires Use social media to direct members of the public to sources of aid during the occurrence of a climate shock, e.g. providing information on emergency shelters or cooling centres Continue to consult with the City's Winter Readiness Task Team.

GOAL 33: ESTABLISH AND MAINTAIN PARTNERSHIPS WITH LOCAL, REGIONAL AND INTERNATIONAL ORGANISATIONS TO SUPPORT CLIMATE ACTIONS

<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) <p>Supporting department(s):</p> <ul style="list-style-type: none"> International Relations Unit <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal Provincial Government Businesses/industrial associations CSO/NGO Other: C40 SA metros and C40 <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 33.1 Work to facilitate non-partisan collaborative planning and action for carbon neutrality and climate resilience with C40 partner cities</p> <p>Description As signatories of the C40 Deadline 2020 programme, the four large South African metros of Cape Town, Tshwane, Johannesburg and eThekweni have developed comprehensive, cross-sectoral climate change action plans in 2020/21. These aim to achieve the mitigation and adaptation goals in line with the Paris Agreement - joining with many other major cities around the world. These plans will be updated every five years to ensure the metros meet interim emissions and adaptation goals by 2030, aiming to be climate resilient and carbon neutral by 2050.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Ensure a unified message in relation to support needed from other spheres of government and achieve strong alignment between local and national targets Identify or develop approaches and platforms for all spheres of government to support the implementation of the Climate Change Action Plan Strengthen relationships and continue to engage with common external partners (such as business and civil society) to drive climate change mitigation or adaptation ambitions Facilitate improved data and knowledge sharing Influence provincial and national planning frameworks and restructuring instruments Lead by example and share learning with other C40 and non-C40 cities in South Africa Work with C40 to convene rotating workshops on the status of action plan implementation, the regular sharing of information and supporting the work of the C40 Vertical Integration Work Group.
<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) <p>Supporting department(s):</p> <ul style="list-style-type: none"> International Relations Unit Resilience Environmental Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal Provincial Government Businesses/industrial associations Research institutions CSO/NGO <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 33.2 Partner with local, regional and international organisations that support climate change response and explore new partnerships with key stakeholders</p> <p>Description The City recognises its responsibility to show climate leadership and drive ambitious climate change action. However, as a single entity in a dynamic system, where certain actions are not wholly within the control of the City administration, engaging and partnering with key stakeholders involved in climate change work will enhance buy-in, build relationships (existing and new), address complex challenges or barriers and invigorate interventions. This is critical to ensuring the Climate Change Action Plan is effective. Ongoing engagement will keep the plan flexible and dynamic, allowing for adaptive learning.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Identify key partners, strengthen existing relationships and invite others to contribute ideas and join the transition. City partners will include Cape Town communities, development agencies, grassroots organisations, NGOs, businesses, academic institutions, and Provincial and National Government Work with leadership from civil society groups to galvanise city-scale climate action, making sure that the action plan addresses the needs of the most vulnerable residents, and builds their resilience. This will go a long way to build a working relationship with communities and establish trust between the parties Drive continued stakeholder engagement through the revitalisation of the Cape Town Climate Change Coalition or the creation of a new, similar type of platform Continue to actively participate in the City's regional, national and global networks for knowledge, best practice and peer-to-peer learning exchanges. This network membership also offers solidarity, encourages more ambitious action and confers recognition upon local achievements.

GOAL 34: WORK WITH NATIONAL GOVERNMENT TO COLLABORATIVELY REFORM OR DEVOLVE DECISION MAKING TO SUPPORT INCLUSIVE CLIMATE CHANGE ACTION

<p>Lead department(s):</p> <ul style="list-style-type: none"> Climate Leadership Review Action (Triennial assessments by SEM – see section 5.2) <p>Supporting department(s):</p> <ul style="list-style-type: none"> Electricity Generation and Distribution Transport Planning Water and Sanitation Urban Catalytic Investment Safety and Security Directorate <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal Provincial Government <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 34.1 Support government entities across all tiers to reform and improve state enterprises and planning functions in key sectors such as electricity, transport and water</p> <p>Description Climate change response efforts in key sectors such as energy, transport and water need to be highly vertically integrated as they are only partly within the control of local government. Government stakeholders (particularly utilities) therefore need to forge collaborative working relationships and sound institutions to secure public infrastructure and optimally functioning systems. This action identifies several areas in key sectors where leadership and practice excellence are needed to continue with existing efforts or to re-invigorate previous collaboration.</p> <p>Review assessment areas include:</p> <ul style="list-style-type: none"> Participation in intergovernmental policy working groups and specialist technical working groups Sharing of methodologies, models and data⁴⁹ used in operations, planning and decision support Collaboration on the development of technical standards and regulations needed to modernise and progress these sectors and participate in integrated planning with national institutions Proactive management of the urban environment and assets in City-owned areas adjoining or integrated with rail interchanges Engagement with key stakeholders to support the establishment of rail precincts as high-functioning integration zones The state of the national, regional and local evidence-based policy dialogue on pressing transport issues such as utility oversight, transport subsidies and intermodal integration The promotion of public support for utilities and infrastructure through demonstrating the value they bring to society The status of factual and transparent communication concerning the challenges and responses in the various sectors.
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49 Within the provisos of POPI legislation.

7.5. CCWA 5: PROMOTE, PROTECT AND ENHANCE HUMAN AND ECOSYSTEM HEALTH

Cape Town is situated within a global biodiversity hotspot, creating a unique environment that brings with it the challenges of conservation and biodiversity management in a rapidly developing urban context. However, Cape Town's natural environment also provides a range of important ecosystem goods and services, including "provisioning services such as food, water, timber, and fiber; regulating services that affect climate, floods, disease, wastes, and water quality; cultural services that provide recreational, aesthetic, and spiritual benefits; and supporting services such as soil formation, photosynthesis, and nutrient cycling", as described in the Millennium Ecosystem Assessment (MEA).

The MEA emphasises the interrelatedness of human and ecosystem health and the significant contribution that ecosystem health makes to human well-being, as follows: "Human well-being is assumed to have multiple constituents, including the basic material for a good life, such as secure and adequate livelihoods,⁵⁰ enough food at all times, shelter, clothing, and access to goods; health, including feeling well and having a healthy physical environment, such as clean air and access to clean water; good social relations, including

social cohesion, mutual respect, and the ability to help others and provide for children; security, including secure access to natural and other resources, personal safety, and security from natural and human-made disasters; and freedom of choice and action, including the opportunity to achieve what an individual values doing and being."⁵¹ The conceptual framework for the MEA posits that people are integral parts of ecosystems and that a dynamic interaction exists between them and other parts of ecosystems, with the changing human condition driving, both directly and indirectly, changes in ecosystems and thereby causing changes in human well-being.

Human health challenges related to air and water pollution have been identified as posing an increased risk in the context of climate change. Cape Town's food systems have also been identified as a source of significant risk - both in terms of their vulnerability to climate change as well as the negative impact that food and nutritional insecurity has on residents' vulnerability to climate hazards. The City of Cape Town therefore recognises the need to address human and ecosystem health in an integrated manner in this Climate Change Action Plan.



50 Millennium Ecosystem Assessment (2005).

51 Ibid.



GOALS AND ACTIONS:

GOAL 35: DEVELOP AND IMPLEMENT A GREEN INFRASTRUCTURE PROGRAMME THAT SUPPORTS CLIMATE CHANGE RESPONSE, PROTECTS BIODIVERSITY, AND ENHANCES ECOSYSTEM GOODS AND SERVICES

<p>Lead department(s):</p> <ul style="list-style-type: none"> Environmental Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> Recreation and Parks Transport Planning Water and Sanitation Sustainable Energy Markets (Climate Change Team) <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal Provincial Government Residents CSO/NGO <hr/> <p>Status of action:</p>  <p>Expansion of existing programme</p>	<p>Action 35.1 Continue to implement the Cape Town Bioregional Plan, Biodiversity Network, and Local Biodiversity Strategy and Action Plan (LBSAP)</p> <p>Description The Cape Town Bioregional Plan was adopted by Council in 2015 as a policy. The Bioregional Plan includes the Biodiversity Network (Cape Town’s fine-scale conservation plan) and accompanying land-use planning and decision-making guidelines. The LBSAP is an operational plan that gives effect to the Bioregional Plan and Biodiversity Network on a practical level.</p> <p>The Bioregional Plan aims to ensure that Cape Town’s ecosystems remain intact; to continue to deliver high-quality and sustained environmental goods and services to the municipality’s residents; and to provide various opportunities to the local community such as recreation, tourism, environmental education and job creation. By conserving critical biodiversity areas and restoring degraded areas, the plan aims to increase (and secure on a long-term basis) the sustainability of these ecosystem goods and services, as well as mitigate the impacts of climate change by improving biotic adaptation to climate change. The plan also includes climate change corridors such as the Dassenberg Coastal Catchment Partnership (DCCP).</p> <p>Climate change considerations have already been incorporated into the Bioregional Plan, Biodiversity Network and LBSAP. Climate change adaptation parameters were included in the planning of the Biodiversity Network in order to ensure that adequate climate change refugia were incorporated into the plan. The City also recognises the important role that protected areas play in sequestering carbon dioxide, and therefore mitigating climate change.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Continue the implementation of the City of Cape Town Bioregional Plan, Biodiversity Network and LBSAP, and update these documents as required Conduct research into the carbon sequestration potential of protected areas, including a focus on the effects of restoration, in order to quantify the contribution to the City’s climate change mitigation efforts.
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<p>Lead department(s):</p> <ul style="list-style-type: none"> Environmental Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> Recreation and Parks Water and Sanitation Urban Planning and Design Transport Directorate Human Settlements Directorate Development Management Resilience Sustainable Energy Markets (Climate Change Team) <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal Provincial Government Research institutions CSO/NGO Other (professional associations) <hr/> <p>Status of action:</p>  <p>New (in planning)</p>	<p>Action 35.2 Develop and implement a City of Cape Town green infrastructure programme, including a focus on supporting a climate change response</p> <p>Description Green infrastructure can be defined as a “strategically planned, designed and managed network of multifunctional natural open spaces and ‘engineered’ ecological systems, with other environmental features that provide ecological, community and infrastructure services”. It can also be defined as “natural and engineered ecological systems that integrate with the built environment to provide the widest possible range of ecological, community and infrastructure services”.</p> <p>The City of Cape Town recognises that with the increasing development of the city, approaches need to be sought and promoted where “softer” green infrastructure options can be utilised alongside more traditional “hard” or grey engineering. These approaches are for managing and ameliorating impacts of urbanisation and mitigating climate change, while improving liveability in the city and its ability to adapt to future climate change impacts.</p> <p>Accordingly, the City recognises the need to have in place a comprehensive green infrastructure programme, which:</p> <ul style="list-style-type: none"> is a structuring element of City planning, included in strategic planning documents, such as the MSDP and DSDFs provides guidance for land-use decision making and appropriate urban development through, for example, spatial and policy frameworks entrenches green infrastructure approaches as a key mechanism for dealing with issues relating to urbanisation, and is integrated with traditional grey approaches in the amelioration of urbanisation impacts helps to address equity by promoting access to quality safe green spaces throughout the city and, in so doing, promotes the reconnection of people and nature, and helps to improve community health and well-being. <p>Sub-actions</p> <ul style="list-style-type: none"> Develop and implement the Green Infrastructure Programme (GIP) Ongoing monitoring, refinement and updating as required.
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<p>Lead department(s):</p> <ul style="list-style-type: none"> Sustainable Energy Markets (Climate Change Team) Environmental Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> Recreation and Parks Water and Sanitation <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Research institutes <hr/> <p>Status of action:</p>  <p>New (concept)</p>	<p>Action 35.3 Develop a database of Cape Town-specific nature-based solutions and best practices for climate change response, and promote their implementation</p> <p>Description Nature-based solutions are recognised globally as offering an alternative to more traditional engineering approaches to addressing climate change. The International Union for Conservation of Nature (IUCN) defines nature-based solutions as “actions to protect, sustainably manage, and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits”. Nature-based solutions can also have climate change mitigation co-benefits, through increasing the ability of natural systems to sequester carbon.</p> <p>Nature-based solutions are frequently locally specific and cannot necessarily be generalised across locations. Although the City of Cape Town can learn from the experiences of other cities, it is necessary to develop a set of locally specific nature-based solutions for addressing climate challenges specific to Cape Town.</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Develop a database of case studies of nature-based solutions currently being implemented in Cape Town Develop new nature-based solutions to address identified environmental and climate change challenges and implement them as required Monitor the outcomes of nature-based solutions projects to determine factors that influence success or failure.
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GOAL 36: ENSURE THAT PHYSICAL HEALTH AND MENTAL WELL-BEING ARE ADDRESSED THROUGH THE CITY'S CLIMATE CHANGE RESPONSE

<p>Lead department(s):</p> <ul style="list-style-type: none"> • City Health • Transport Planning • Scientific Services Air Quality Labs <p>Supporting department(s):</p> <ul style="list-style-type: none"> • Sustainable Energy Markets (Climate Change Team) • Scientific Services Air Quality Lab <p>External stakeholder(s):</p> <ul style="list-style-type: none"> • National Government or parastatal • Provincial Government • Businesses/industrial associations 	<p>Action 36.1 Take action to address air pollution as part of the City's climate change response</p>
<p>Status of action:</p>  <p>Implementation</p>	<p>Description</p> <p>The City of Cape Town has long prioritised addressing air quality as a significant public health concern. This has included:</p> <ul style="list-style-type: none"> • drafting and implementing the City's Air Quality Management Plan (2005, currently under review) • implementing its legal mandate in terms of regulating Listed Activities and Controlled Emitters declared as such in terms of the National Environmental Management Air Quality Act, 2004 • enforcing the City of Cape Town Air Quality Management By-law (2016, as amended). <p>The relationship between air quality and climate change is clear: Activities that lead to the emission of carbon dioxide and other GHGs also promote the emission of other air pollutants. In addition, poor health associated with exposure to poor air quality lowers resilience to climate shocks and stresses. Increased temperatures may also lead to the increased formation of ground level ozone, which has an impact on the health of those exposed to this pollutant.</p> <p>The City has committed to meeting the National Ambient Air Quality Standards (2009), as required by the National Environmental Management Air Quality Act (2004). These standards set limits for the concentrations of key criteria pollutants in ambient air, namely sulphur dioxide, nitrogen dioxide, particulate matter (PM10 and PM 2.5), ozone, benzene, lead and carbon monoxide, and set timeframes for achieving these limits.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> • Continue to implement the City's Air Quality Management Plan and By-law • Continue to enforce compliance with the prescribed minimum emission standards of licensed Listed Activities and Controlled Emitters • Continue to monitor criteria pollutants • Plan for and establish new monitoring stations for ambient air quality and additional pollution analysers • Continue to implement projects and programmes aimed at meeting the National Ambient Air Quality Standards and upscaling these if required • Investigate options for utilising sensor-based pollution monitoring technology of transport-related emissions and the impacts on ambient air quality, implementing the technology if deemed feasible • Undertake transport emissions scenario modelling to inform policy • Re-establish the Vehicle Emissions Working Group for the implementation of interdepartmental cross-cutting strategies as a response to climate change • Verify the actual fuel consumption of larger fuel-burning entities on the Air Quality Management database through direct survey and/or an intergovernmental data exchange agreement with DEFF, achieved through Reference Energy Data Group membership or other avenue.

<p>Lead department(s):</p> <ul style="list-style-type: none"> Water and Sanitation <p>Supporting department(s):</p> <ul style="list-style-type: none"> Environmental Management <p>External stakeholder(s):</p> <ul style="list-style-type: none"> National Government or parastatal Provincial Government <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 36.2 Take action to address water pollution as part of the City's climate change response</p>
	<p>Description</p> <p>Water quality and the pollution of inland water bodies and the coastal environment lower resilience to climate shocks and stresses due to both ecosystem degradation and negative impacts on human health.</p> <p>The pollution of groundwater bodies is of particular concern because of the role that this water resource is increasingly playing in providing clean drinking water for the City's population. Similarly, pollution of the coastal environment creates further challenges for desalination projects by necessitating costly additional treatment. These challenges have the potential to have a direct impact on the City's resilience in terms of water security. Furthermore, the pollution of inland water bodies and coastal waters generally lowers the resilience of populations who come into contact with this water, by increasing the likelihood of contracting water-borne illness and therefore reducing overall health.</p> <p>The Water Quality Improvement Programme (WQIP) is a strategic intervention by the City to rehabilitate and restore Cape Town's water bodies and to meet Cape Town's commitment to becoming a water-sensitive city by 2040. The overall objective of the programme is to progressively improve ambient water quality in all rivers and water bodies across the city. This will also have a downstream positive impact on coastal water quality.</p> <p>The scope of the WQIP is to:</p> <ul style="list-style-type: none"> identify sources and causes of pollution develop catchment-based pollution abatement plans to address sources and causes of pollution and establish appropriate medium- and long-term goals develop and implement prioritised action plans to direct short- and medium-term mitigation, and monitor their effectiveness assess stormwater systems that discharge into areas of poor coastal water in order to identify and control contaminant sources. <p>The actions in the WQIP include capital projects, maintenance and operations, specialist tasks, communications, and compliance and enforcement.</p>
	<p>Sub-actions</p> <ul style="list-style-type: none"> Continue to implement the WQIP Continue the functions of the Inland and Coastal Water Quality Committee Continue to implement the sewage pollution incident protocol with the aim of rapidly responding to pollution incidents when these occur and implementing appropriate remediation measures.





<p>Lead department(s):</p> <ul style="list-style-type: none"> Disaster Risk Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> Environmental Management Communications Sustainable Energy Markets (Climate Change Team) <p>External stakeholder(s):</p> <ul style="list-style-type: none"> CSO/NGO <hr/> <p>Status of action:</p>  <p>Implementation</p>	<p>Action 36.3 Continue to implement disaster risk education and awareness initiatives focused on household safety and preparedness, and expand these initiatives where required</p> <p>Description The City currently implements various awareness initiatives related to disaster risk education, which focus on household safety and preparedness. These initiatives support health by working to prevent injury and death due to climate- or weather-related disasters or extreme events.</p> <p>These include the following initiatives:</p> <ul style="list-style-type: none"> Fire and Flood Wise Programme: Focused on education and aimed at improving residents' awareness of the risks associated with the hazards of fires and floods, preparedness and mitigation measures, as well as emergency responses Women and Girls Invisible Force of Resilience Programme: Aims to train girls and women in vulnerable communities in disaster first response such as first aid and fire safety. The programme extends further to cover topics like biodiversity, climate change, food security, leadership and career goals Community-based risk assessment workshops: Sets out a participatory approach by all stakeholders and wide consultation with communities at risk. It seeks to consolidate disaster reduction measures and initiatives that will mitigate the impact of hazards such as fires, floods, severe weather, disease and hazards relating to climate change Heatwave preparedness: Education and awareness materials and communication provided to communities, schools, businesses, civil society organisations, retirement homes and other institutions Various other initiatives aimed at increasing disaster preparedness for residents Training commerce and industry in climate change adaptation strategies. <p>Sub-actions</p> <ul style="list-style-type: none"> Continue with the implementation of disaster risk education and awareness initiatives, focused on household safety and preparedness Expand initiatives where required.
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<p>Lead department(s):</p> <ul style="list-style-type: none"> Climate Leadership Review Action (Triennial assessments by SEM - see section 5.2) <p>Supporting department(s):</p> <ul style="list-style-type: none"> Communications City Health Resilience Environmental Management Sustainable Energy Markets (Climate Change Team) <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Provincial Government <hr/> <p>Status of action:</p>  <p>New (concept)</p>	<p>Action 36.4 Ensure that mental health is adequately addressed as part of the City's climate change response</p>
	<p>Description</p> <p>The effects of climate change on mental health should not be underestimated. According to the United States Centers for Disease Control and Prevention (CDC), "Extreme weather events can affect mental health in several ways. Following disasters, mental health problems increase, both among people with no history of mental illness, and those at risk ... These reactions may be short-lived or, in some cases, long-lasting."⁵²</p> <p>According to the CDC, research has found that people experience high levels of anxiety and post-traumatic stress following major climate events such as severe storms, flooding, heatwaves and wildfires. All of these hazards are anticipated to increase due to climate change. These stress-related conditions can cause a number of other negative health outcomes. In addition, people who already suffer from mental illnesses tend to be more negatively affected by heatwaves.</p> <p>(Note: This action aligns with specific actions in the Cape Town Resilience Strategy and is included here as it is a key climate change response action.)</p>
	<p>Review assessment areas include:</p> <ul style="list-style-type: none"> Ensure that mental health is considered in climate change response and that it is addressed in the implementation of projects and programmes where possible Ensure that communication and messaging related to climate change is sensitive to mental health concerns and does not exacerbate feelings of anxiety or despair Work towards and support the implementation of actions identified in the Resilience Strategy to expand the City's contribution to have a positive impact on mental health where these intersect with climate change response.



52 Centers for Disease Control and Prevention (2020).

GOAL 37: PROMOTE FOOD SECURITY AS WELL AS LOW-CARBON AND CLIMATE-RESILIENT FOOD SYSTEMS IN CAPE TOWN

<p>Lead department(s):</p> <ul style="list-style-type: none"> Urban Management <p>Supporting department(s):</p> <ul style="list-style-type: none"> Resilience Lab <p>External stakeholder(s):</p> <ul style="list-style-type: none"> Research institutions CSO/NGO <hr/> <p>Status of action:</p>  <p>New (in planning)</p>	<p>Action 37.1 Implement the City of Cape Town Food System Programme</p>
	<p>Description</p> <p>Food insecurity can be defined as a lack of secure access to sufficient amounts of safe, nutritious and culturally appropriate food that ensures normal human growth, development and an active and healthy life (World Food Programme, 2020). The lack of income to access food forces many Capetonians to skip meals and to consume less nutrient-dense foods that are detrimental to health, both in the short and long term. This can cause stunting, malnutrition, obesity and non-communicable diseases while also affecting the body’s ability to fight off infectious diseases. The accumulative result of these effects has a further negative impact on the economy.</p> <p>Supplying sufficient food in a food region where water and land resources are scarce is also a growing challenge. Food production is a large contributor to carbon emissions and therefore towards climate change; this in turn is affected by the effects of climate change.</p> <p>The City’s draft Cape Town Food System Programme therefore envisions a sustainable and resilient food system, which includes the following features:</p> <ul style="list-style-type: none"> The recognition of Cape Town’s role in the food region and seeking capacity to draw on food sources from multiple geographical regions, including global, national and regional sources, without being dependent on any one source, while also stimulating local and neighbourhood food production and markets Diversified food supply chains consisting of conservation agriculture; low-carbon and large- and small-scale production and distribution systems; and commercial and community-based sources The protection of land that is less affected by climate change and suitable for agriculture The capacity to divert organic waste from landfill (wastewater, food waste and organic waste) and, where appropriate, input this into food production, energy generation and community food schemes The capacity to create synergies and achieve multiple benefits across a range of policy objectives, for example, increasing access to nutritious food and creating jobs The programme is people centred and inclusive, placing people at the heart of the food system and ensuring that they benefit from increased access to healthy, sustainably sourced food and employment. The programme intends to offer opportunities to engage actively with the food system as citizen consumers. <p>(Note: This action originates from the Cape Town Resilience Strategy and is included here as it is a key climate change response action.)</p> <p>Sub-actions</p> <ul style="list-style-type: none"> Implement the City of Cape Town Food System Programme Monitor and evaluate the implementation of this programme and update the actions as required.

8. MONITORING, EVALUATION, LEARNING AND REPORTING: A LIVING PLAN

Monitoring, evaluation, learning and reporting (MELR) is the final step (step 7) in the cycle of planning, doing, evaluating and re-planning, as depicted in [Figure 7](#). Monitoring progress and evaluating the outcomes and impacts of climate actions are essential in achieving the City's vision of becoming carbon neutral and climate resilient. In turn, learning and reporting are fundamental to the transparency required for credibility and strong partnerships, as well as being able to respond to change with re-planning to ensure a living plan. This section provides a high-level overview of the intended MELR framework. It also describes the planned reporting processes, and the frequency of revisions and updates to the plan. The following are important considerations:

- Governance (e.g. institutional arrangements and working groups)
- Partnerships (e.g. national and international reporting)
- Knowledge management mechanisms (e.g. City data and information management).

The MELR approach depends on the type of action. Some actions are duplicated in other City strategies or plans, and others may already be in an implementation phase. As a result, the MELR component of this plan needs to harmonise with existing MELR approaches to avoid creating additional reporting burdens. The City's Organisational Performance Management Department will be engaged in the development of the MELR framework and the overall indicators of the plan.

As part of the MELR component of this plan, the City will review various metrics related to climate change, which are already being tracked using existing City MELR mechanisms. The City will also consider guidance on best practice in terms of the monitoring, evaluation and reporting of climate action such as C40's suite of tools: MER Indicator Matrix, Toolkit for Equitable Impacts, Indicator Matrix Manual for Climate Change Adaptation, and Inclusive Climate Action Indicators module and database.

All relevant departments will be consulted in order to develop an agreed set of indicators aligned with the goals and actions in the plan. Integration with the City's Service Delivery and Budget Implementation Plan (SDBIP) process will take place where necessary and appropriate.

8.1 CONCEPTUAL APPROACH TO DEVELOPING A MONITORING, EVALUATION, LEARNING AND REPORTING FRAMEWORK

In order to effectively monitor and evaluate the implementation of actions, indicators will be developed to track progress over time and identify areas for re-planning or support. These indicators will comprise a mix of the following types, based on the action that is being assessed:

- **Input indicators:** Does the City have the necessary resources in place to successfully implement an action? E.g. an approved plan, budget or staff resources.
- **Activity/process indicators:** Is there a process or activity that needs to be initiated to help achieve an output/outcome? E.g. formalising a registration process or initiating a project or programme.
- **Output indicators:** Has the City achieved its targets for climate change response outputs? E.g. capacity of rooftop and ground-mounted solar PV-embedded systems installed on City of Cape Town property, or a number of urban greening projects.
- **Outcome/impact indicators:** What medium- to long-term changes have been generated? E.g. has the City's carbon footprint reduced or have heat islands been effectively mitigated?
- **Action status:** Which actions have been completed, are currently in the implementation phase or have not yet commenced, and what are their associated timelines?

8.2 REPORTING ON PROGRESS OF THIS ACTION PLAN

The intention of an action plan is to ensure that projects are moved from ideation to action so that the strategic goals are achieved. However, circumstances and priorities change and so the Climate Change Action Plan is intended to be a living plan, with regular reviews that track action status but also high-level progress, flagging the need for re-planning or adjustments.

Action status and progress will be analysed through annual high-level reviews and triennial detailed assessments. These reviews and assessments will be presented to key oversight committees including the relevant portfolio committees (political oversight) and the Executive Management Team (administrative oversight). This process will include the identification of additional goals or actions that may be required to be included in future versions of the action plan. Public-facing and audience-specific reporting to communicate the findings of the progress report may also be provided as part of this process.

The action plan's MELR framework will also be supported by and integrated with the following existing mechanisms:

City of Cape Town strategies, plans and reporting processes:

- IDP and Annual Report
- Monitoring and evaluation frameworks of the City of Cape Town sector plans
- Monitoring and evaluation frameworks of key City strategies and plans including, but not limited to, the Environmental Strategy, Resilience Strategy, Municipal Disaster Risk Management Plan, Water Strategy and (draft) Inclusive Economic Growth Strategy
- State of Cape Town Report
- State of the Environment Report
- State of Energy and Carbon Report
- The City's SmartFacility system, which tracks electricity and water consumption in municipal buildings, as well as on-site renewable energy generation
- The City's UDI, which contains several relevant metrics and indices
- SDBIPs, where appropriate and where there are opportunities for alignment.

National and global reporting systems:

- National Treasury Circular 88 reporting
- Annual Report to the CDP
- Voluntary local review of the progress towards meeting the Sustainable Development Goals.

8.3 ENSURING THE PLAN REMAINS RELEVANT AND UP TO DATE

The plan will undergo a full review and update on a five-yearly basis. The review and update of the evidence base that supports this plan will take place on the following basis:

- The City's GHG inventory details Cape Town's citywide carbon emissions and is therefore essential for monitoring the impact of mitigation-related actions and for evaluating the City's progress towards achieving energy and carbon reduction targets. The inventory is updated at a high level on an annual basis, with a comprehensive update taking place every five years. The detailed update is presented in the City's State of Energy and Carbon Report series.
- The Climate Change Hazard, Vulnerability and Risk Assessment identifies the City's cross-cutting adaptation challenges and evaluates the City's risk reduction. An updated assessment will be conducted every five years, while a full reassessment will take place every 10 years. Updates will be carried out more frequently if deemed necessary.

8.4 LEARNING

The MELR process will also include a focus on identifying areas for continued learning that could lead to transformative change. This process will involve internal and external City stakeholders in order to support more effective and inclusive future action. An established foundation of knowledge co-production and shared learning partnerships between the City of Cape Town, local universities and other national and international academic or research partners will serve as a useful foundation for future learning processes. It is hoped that academic partners will continue to work with the City of Cape Town to support these processes by facilitating multi-stakeholder engagements, evaluating approaches and methods, analysing data and disseminating findings. Such collaboration would complement the overall approach towards climate change response-related research, as outlined under goal 27.

9. STRATEGIC ALIGNMENT

Resilience and sustainability are included as integral to the guiding principles informing the City of Cape Town's overall masterplan, the IDP, which also includes a climate change programme and related projects.

On an institutional level, while the Climate Change Action Plan is predominantly the direct implementation plan of the Climate Change Strategy, it contributes towards the implementation of several key City policies and strategies. Each has its own unique intention, but all have a mutually supportive role to play to deliver a better and more climate-responsive city.

These include, but are not limited to:

Resilience Strategy (2019): To address a set of prioritised chronic stresses and acute shocks, including climate change

**City of Cape Town Water Strategy (2019):
Focused on water resilience**

**Inclusive Economic Growth Strategy (2019, draft):
For a sustainable, equitable and green economy**

**Municipal Spatial Development Framework (2018):
Spatial transformation**

**Municipal Disaster Risk Management Plan (2015): Focused on
preventing and managing the impacts of disasters**

**Environmental Strategy (2017): To enhance, protect and manage Cape
Town's natural and cultural resources for long-term prosperity in a way
that optimises economic opportunities and promotes access
and social well-being**

**TOD Strategic Framework (2016): A more sustainable,
compact and equitable urban form**

10. GLOSSARY

10.1 DEFINITIONS

For the purposes of this Climate Change Action Plan, the following definitions apply. Where appropriate, the official IPCC definition has been used:⁵³

Adaptation means, in human systems, the process of adjusting to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities; in natural systems, it means the process of adjusting to actual climate and its effects. Human intervention may facilitate adjustment to expected climate and its effects.

Adaptive capacity means the ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities or to respond to consequences.

Anthropogenic means resulting from or produced by human activities.

BASIC reporting means the current emissions reporting standard for local governments under the Global Protocol for Community-scale Greenhouse Gas Emissions Inventories (GPC) and includes scope 1 and scope 2 emissions from stationary energy and transportation, and scope 1 and scope 3 emissions from waste. Cities have the option of selecting between two reporting levels under the GPC city-induced framework: BASIC or BASIC+.

Business-as-usual, in the context of transformation pathways, refers to scenarios that are based on the assumption that no mitigation policies or measures will be implemented beyond those that are already in force and/or are legislated to be adopted.

Carbon neutral, in simple terms, means that after taking into account any potential carbon sinks (vegetation that absorbs carbon), the net greenhouse gas (GHG) emissions from all sources are zero (or as close as possible to zero). Progress towards carbon neutrality is tracked by measuring the city's carbon footprint on a regular basis.

Carbon sequestration means the process by which carbon sinks remove carbon dioxide (CO₂) from the atmosphere.

Circular economy is based on the principles of designing out waste and pollution, keeping products and materials in use and regenerating natural systems.⁵⁴

City means the City of Cape Town, a municipality established by the City of Cape Town Establishment Notice No. 479 of 22 September 2000, issued in terms of the Local Government: Municipal Structures Act, 1998 (Act No. 117 of 1998), or any structure or employee of the City acting in terms of delegated authority.

city means the greater metropolitan area of Cape Town in which the City of Cape Town has jurisdiction.

Climate change means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

Climate change refugia means areas that remain relatively buffered from climate change and therefore enable the persistence of critical biodiversity within those areas.

Council means the Municipal Council of the City of Cape Town.

Decarbonisation means the process by which countries, individuals or other entities aim to achieve zero fossil carbon existence. This typically refers to a reduction of the carbon emissions associated with electricity, industry and transport.

Ecosystem services means ecological processes or functions having monetary or non-monetary value to individuals or society at large. These are frequently classified as (1) supporting services such as productivity or biodiversity maintenance, (2) provisioning services such as food or fibre, (3) regulating services such as climate regulation or carbon sequestration, and (4) cultural services such as tourism or spiritual and aesthetic appreciation.

Energy efficiency refers to actions taken to save fuels, for example, better building design.

Eskom refers to the South African electricity public utility.

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

Fossil fuel means carbon-based fuels from fossil hydrocarbon deposits, including coal, oil, and natural gas.

⁵³ IPCC (2018a).

⁵⁴ Ellen MacArthur Foundation (2017). *What is the circular economy?*

Available at: <https://www.ellenmacarthurfoundation.org/circular-economy/what-is-the-circular-economy>

Green economy means expanded economic opportunities created through the provision of goods and services, and the use of production processes that are more resource efficient, enhance environmental resilience, optimise the use of natural assets and promote social inclusivity.

Green infrastructure means an interconnected set of natural and constructed ecological systems, green spaces and other landscape features that provides ecosystem services. It includes both indigenous and exotic trees, wetlands, parks, green belts and green open spaces, nature reserves and biodiversity sites, in addition to building and street-level design interventions that incorporate vegetation. Green infrastructure provides services and functions in the same way as conventional infrastructure.

Hazard means the potential occurrence of a natural or human-induced physical event, 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.

Impact means the consequences of realised risks on natural and human systems, where risks result from the interactions of climate-related hazards (including extreme weather and climate events), exposure and vulnerability. Impacts generally refer to effects on lives, livelihoods, health, well-being, ecosystems, species, services (including ecosystem services), infrastructure and economic, social and cultural assets. Impacts may be referred to as consequences or outcomes, and can be adverse or beneficial.

Maladaptation means actions that may lead to increased risk of adverse climate-related outcomes, including via increased GHG emissions, increased vulnerability to climate change or diminished welfare, now or in the future. Maladaptation is usually an unintended negative consequence.

Mean annual rainfall means the average total amount of rainfall recorded during a year in a particular place.

Mean annual temperature means the average air temperature recorded during a year in a particular place.

Mean sea level means the height of the sea surface averaged over all stages of the tide over a long period of time.

Mitigation means, in the context of climate change, a human intervention to reduce emissions or enhance the sinks of greenhouse gases.

Molecular fuels, also called power fuels, are gaseous or liquid fuels used in a combustion or electrochemical process, for example, methane, which may be in the form of natural gas or synthesised from green hydrogen and non-polluting carbon stock.

Nationally Determined Contributions are the commitments that each country has made on adaptation, mitigation and investment requirements towards the implementation of the Paris Agreement (2015).

Nature-based solutions means solutions that are inspired and supported by nature (ecosystem based), which are cost effective and simultaneously provide environmental social and economic benefit and help to build resilience.⁵⁵

Resilience means the capacity of individuals, communities, institutions, businesses and environmental systems to survive, adapt and thrive, no matter what kind of chronic stresses and acute shocks they experience.

Risk means the potential for adverse consequences where something of value is at stake and where the occurrence and degree of an outcome is uncertain. Risk results from the interaction of vulnerability (of the affected system), its exposure over time (to the hazard) and the (climate-related) hazard and likelihood of its occurrence.

Sink means a reservoir (natural or human, in soil, ocean or plants) where a GHG, an aerosol or a precursor of a greenhouse gas is stored.

Sustainability means a dynamic process in which individuals, communities, and society are enabled to reach their full potential, maximise quality of life, and meet their economic, social, and cultural needs, while simultaneously protecting, enhancing and managing the natural environment and optimising the economic benefits of ecosystem goods and services; which occurs through a framework of good governance and considered decision making that ensures that these assets, their current functions and future potential are not eroded.

Vulnerability means 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 and adapt.

⁵⁵ Glossary: Nature-based solutions, Urban agenda for the EU.

Available at: https://www.fondazioneinnovazioneurbana.it/images/NBS/Urban_Agenda_for_the_EU_-_ENGLISH-4_1.pdf

10.2 ABBREVIATIONS AND ACRONYMS

AFOLU

Agriculture, Forestry and Other Land Use

BNG

Breaking New Ground

C40

The C40 Cities Climate Leadership Group

CBD

central business district

CCWA

cross-cutting work area

CDC

Centers for Disease Control and Prevention

CDP

Carbon Disclosure Project

CO₂

carbon dioxide

CSIR

Council for Scientific and Industrial Research

DBSA

Development Bank of Southern Africa

GDP

gross domestic product

GHG

greenhouse gas

GPC

Global Protocol for Community-scale Greenhouse Gas Emission Inventories

GWh

gigawatt hours

IDP

Integrated Development Plan

IPCC

Intergovernmental Panel on Climate Change

IPP

independent power producer

IRP

Integrated Resource Plan

kWh

kilowatt hours

LSM

Living Standard Measures

MW

megawatt

NERSA

National Energy Regulator of South Africa

PPP

public-private partnership

PRASA

Passenger Rail Agency of South Africa

PV

photovoltaic

SDBIP

Service Delivery and Budget Implementation Plan

SDG

Sustainable Development Goals

SFA

strategic focus area

SSEG

small-scale embedded generation

WCWSS

Western Cape Water Supply System

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12. ANNEXURES

ANNEXURE A: HAZARD, RESILIENCE AND RISK MAPS

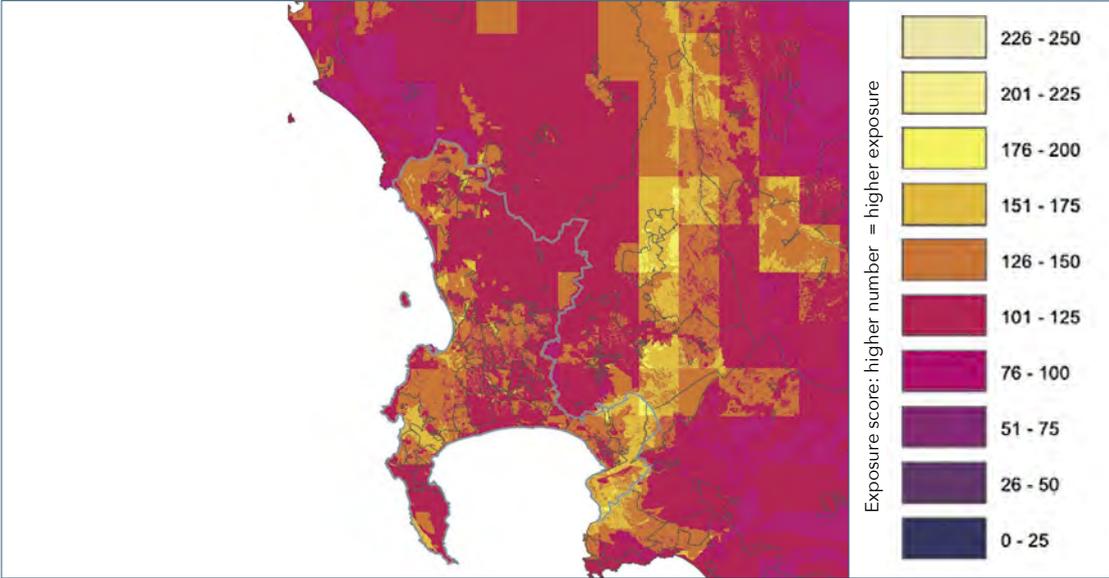


Figure 15: Climate hazard exposure - mid-future (2021-2050)

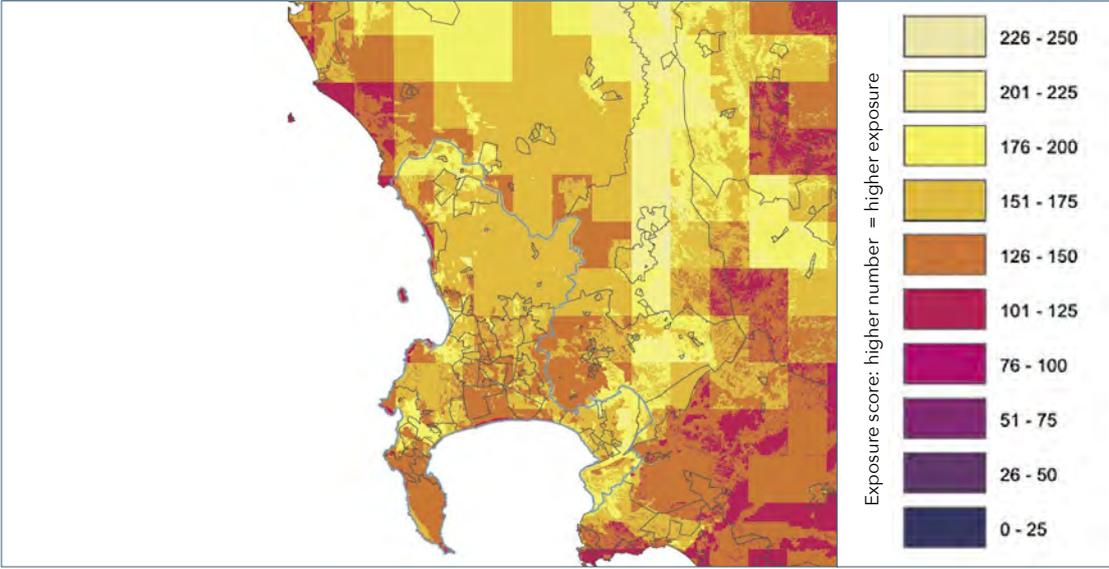


Figure 16: Climate hazard exposure - far-future (2070-2099)

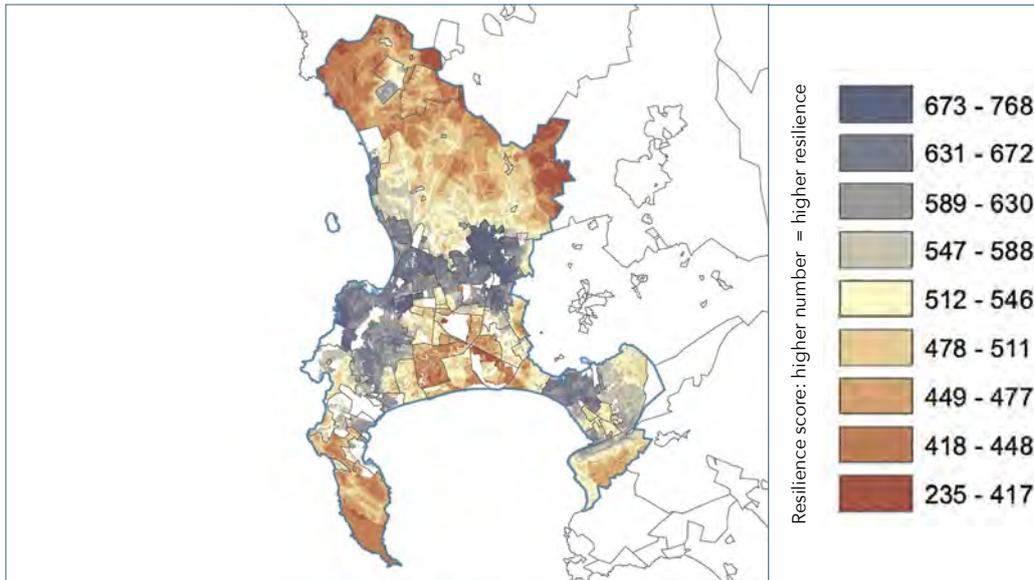


Figure 17: Resilience - current (red areas indicate areas of high vulnerability)

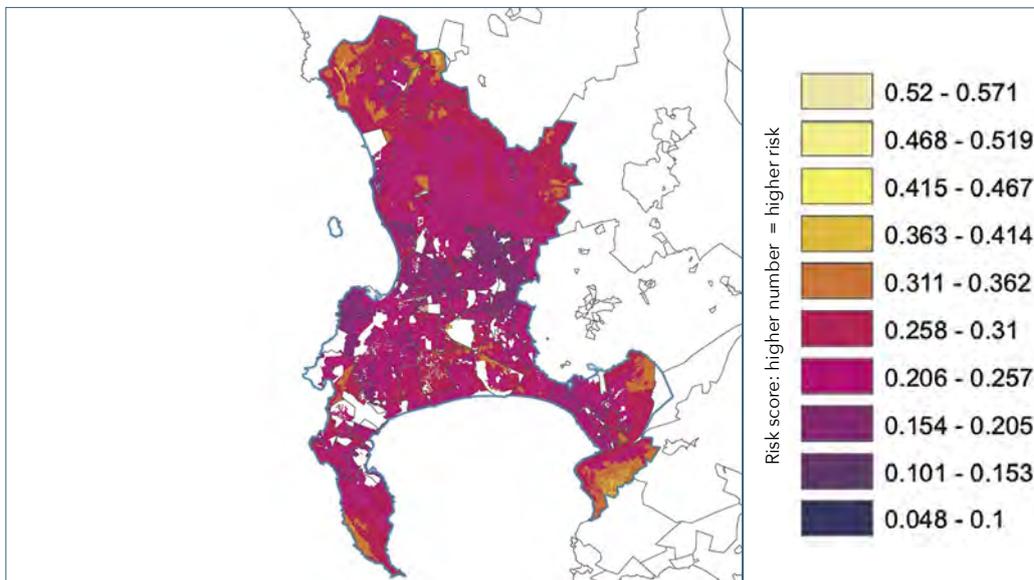


Figure 18: Climate risk - mid-future (2021-2050)

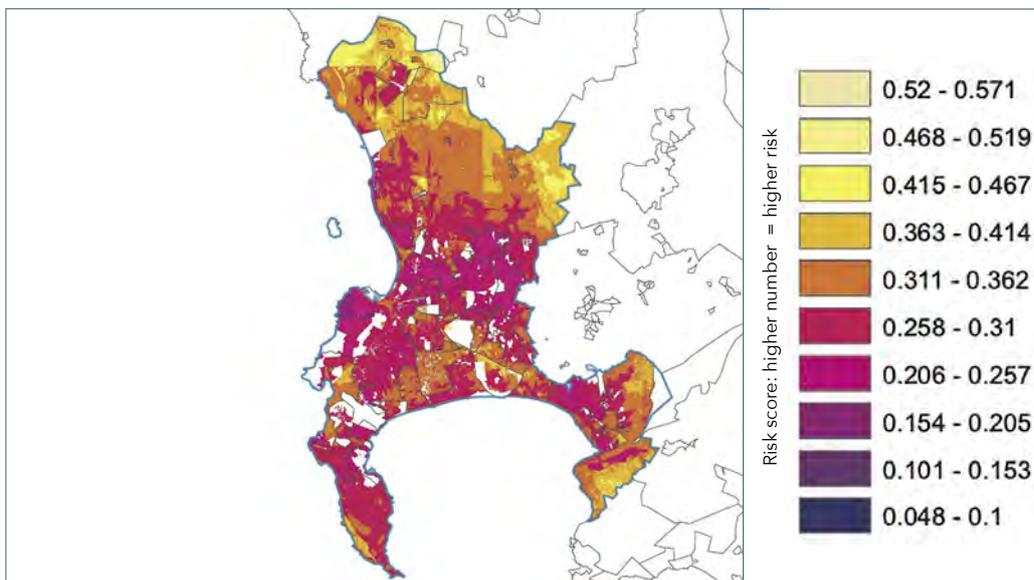


Figure 19: Climate risk - far-future (2070-2099)

ANNEXURE B: CARBON-NEUTRAL INTERIM TARGET DETAIL

In the C40 Deadline 2020 programme, the end point is defined (carbon neutrality) and a great deal of societal and technology change is between the present and that point. The primary consideration is therefore setting an interim target that needs to trade off a SMART⁵⁶ approach with a sufficiently ambitious political signal that also remains close to a viable path to carbon neutrality. While the developed scenarios on emissions pathways are useful in establishing mitigation potential in sectors, the great uncertainties mean that modelling, while an invaluable input, requires additional consideration of uncertainty to reach a realistic target in carbon terms, especially in the shorter term.

An important long-term consideration is the emissions remaining at the end point of scenario projections, which cannot be mitigated by anticipated changes in technology. These are called residual emissions. As a city in a developing country, the City of Cape Town is not expected, at this time, to plan for investments in offsetting or capturing these residual emissions. Currently, such technologies are extremely expensive and large-scale afforestation is unsuitable because forest ecosystems are not part of Cape Town's natural environment. This means that for the time being, a 2050 carbon target will be greater than zero but within the adequate emissions reduction envelope agreed upon for Cape Town's city typology: that of an early peak developing city.

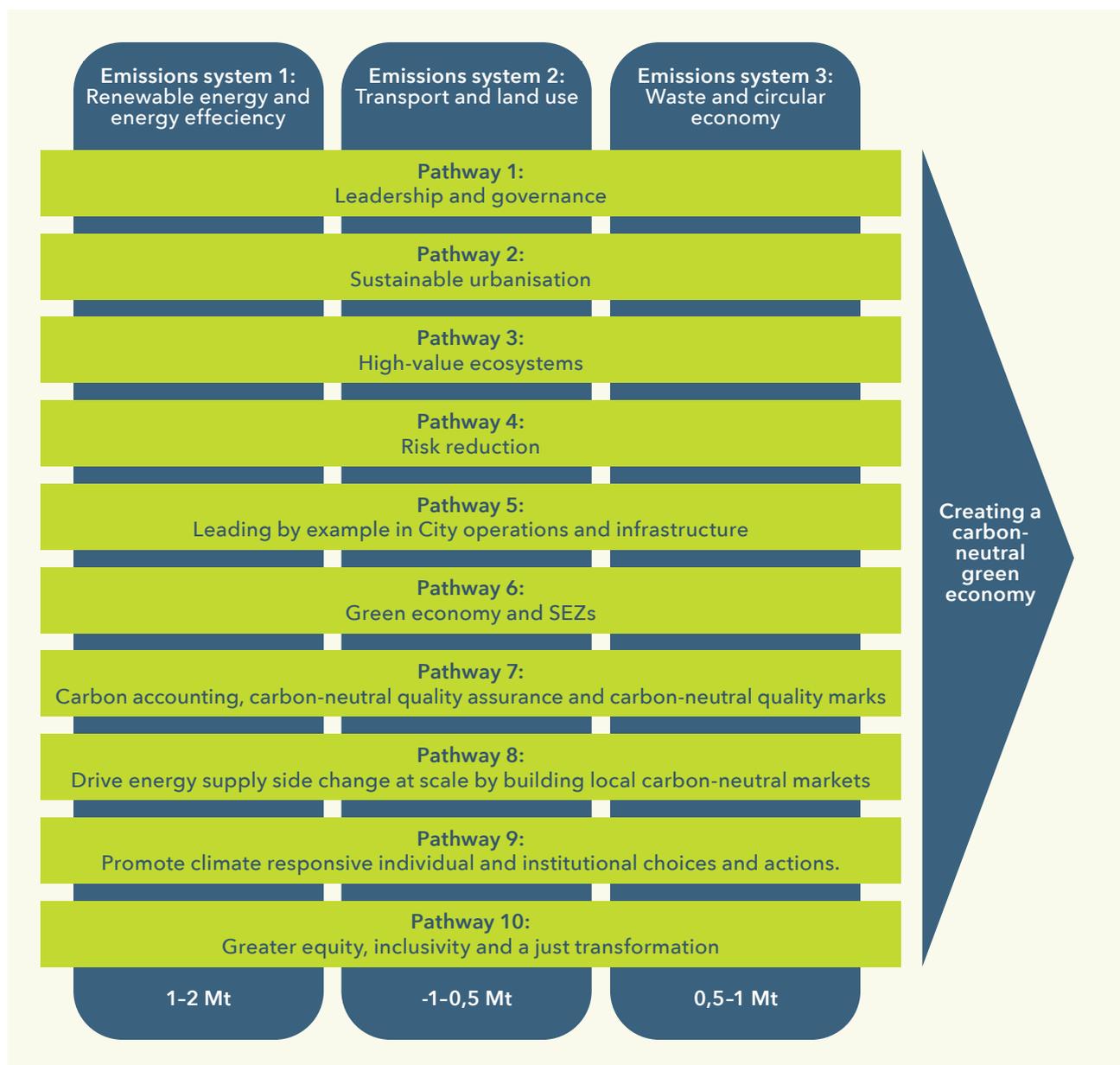


Figure 20: The range of absolute mitigation contribution below 2016 levels required from each emission systems by the 2030 interim target

The following approach to determining an interim target was taken:

- A scenario analysis, independent of the pathways modelling, on upper and lower scenarios for renewable electricity on the City of Cape Town grid by 2030, was used as a check for the mitigation potential of the electricity sector. This included upper and lower scenarios for national grid programmes and indicated that the total share of zero-carbon electricity supply in the City of Cape Town could rise to between 24% and 48% relative to around 10% today.
- For a 2030 interim target, the potential of sectoral contributions determined in the pathways modelling exercise for the more pessimistic ambition under limited mandate and opportunity scenario was adjusted by the perceived probabilities of these being realised.
- The adjusted sectoral contributions were added to estimate a target mitigation potential.
- The target was benchmarked against the rates at which emissions and GDP have decoupled historically in other countries.
- The interim target was reviewed and adjusted based on the benchmarking exercise and taking into account the need to set an aspirational target.

The following targets have been adopted based on this process:

- The evidence base suggests that net mitigation of two megatonnes CO₂ equivalent, relative to the 2016 base year, is possible by 2030 if the City commits to the actions in this plan and is mostly successful in its implementation. Benchmarking this against calculated base year emissions of 21,25 megatonnes CO₂ equivalent for Cape Town using the BASIC methodology, this translates to an emissions target of 19,25 megatonnes CO₂ equivalent by 2030. This is well within the carbon budget requirements for an early peaking developing city in the Deadline 2020 methodology.

- The 2050 target is 30 years hence, a time period during which significant changes to technology and associated costs can be expected. Risk arising from this target is therefore lower and a value between the ambitious and extended scenarios described in section 2.2, but within the adequate emissions reduction envelope of the commitment, was adopted. For the time being, subject to ongoing review, a 2050 emissions target of 4 megatonnes CO₂ equivalent has been proposed.

The implications of the interim target for emitting sectors are shown in Figure 20.

In Emissions System 1, national electricity generation capacity expansion programmes (IRP) play a large role, augmented by City utility capacity procurement and growth in private embedded generation. The degree of transport sector mitigation possible by 2030 is highly uncertain; however, stricter CO₂ limits on vehicles in the feeder EU market, combined with higher ad-valorem CO₂ tax in South Africa (since April 2020), and a possible permanent drop in peak travel demand due to increased working from home, will likely slow the growth of emissions relative to 2016 to one megatonne CO₂ (1% CAGR) or lower between 2020 and 2030, even if current modal patterns are intransigent. This additional one megatonne can be balanced out by industrial energy efficiency and mitigation in the waste sector if it achieves 65% of the potential modelled in the two scenarios. Waste is notable for both being an area where the City has direct control over most volumes and being driven harder by provincial targets of 100% diversion of organic waste by 2027 than by internal targets. The diversion of organic waste at this level is highly ambitious and has uncertain business models at this scale and can therefore be considered one of the biggest challenges in the City's Climate Change Action Plan.

56 Specific, Measurable, Attainable, Realistic and Time-based.

ANNEXURE C: ACTIONS OVERVIEW TABLE

FIELDS EXPLANATION/KEY:

GOAL NAME						
Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
The action name and number	<p>Classification that describes the focus of an action</p> <ul style="list-style-type: none"> Governance and regulations Planning and visioning Infrastructure and assets Collaboration and partnerships Behaviour change and communication Data science and research Training and skills development 	<p>Potential GHG emission reduction as a result of an action</p> <ul style="list-style-type: none"> High Medium Low Indirect Not applicable 	<p>Potential adaptation impact as a result of an action</p> <ul style="list-style-type: none"> High Medium Low Indirect Not applicable 	<p>The timeframe to get an action into implementation</p> <ul style="list-style-type: none"> Existing Short term (1-2 years) Medium term (3-5 years) Long term (5+ years) 	<p>The cost ranges involved to implement an action</p> <ul style="list-style-type: none"> High cost (R100+ mil) Medium cost (R10 mil - R100 mil) Low/no cost (< R10 million) Not known 	<p>The added benefits of a given action</p> <ul style="list-style-type: none">  Promotes innovation and a smart city  Potential cost savings, local investment and job creation  Enhances environmental quality  Potential to address equity  Enhances community resilience  Improves public health and safety  Leadership demonstrated through City operations

SFA 1: URBAN COOLING AND HEAT RESPONSIVENESS

Goal 1: Reduce immediate risks to health during heatwaves and high-heat days

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 1.1 Draft and implement a heatwave and high-heat day action plan and standard operating procedure (SOP)	Governance and regulations	Indirect	High	Short term	Low/no cost	
Action 1.2 Develop and implement a network of cooling centres	Infrastructure and assets	Not applicable	High	Medium term	Medium cost	
Action 1.3 Develop and implement an early-warning and real-time monitoring system for heat	Infrastructure and assets	Not applicable	High	Medium term	Medium cost	

Goal 2: Proactively reduce heat impacts on the city through urban greening

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 2.1 Devise and implement a focused tree-planting programme to reduce the heat island effect and provide shading	Infrastructure and assets	Low	High	Existing	Medium cost	
Action 2.2 Devise and implement an urban greening programme to reduce the heat island effect	Infrastructure and assets	Low	Medium	Existing	Medium cost	

SFA 2: WATER SECURITY AND DROUGHT READINESS

Goal 3: Reduce demand for water to protect water resources and ensure sustainability of supply

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 3.1 Continued implementation of the City's water conservation programme focused on demand-side management	Governance and regulation Planning and visioning Infrastructure and assets Behaviour change and communication	Not applicable	Medium	Existing	Medium cost	

Goal 4: Work to augment and increase water supplies to achieve 99,5% assurance of supply

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 4.1 Augment Cape Town's water supply to ensure the long-term sustainability of supply	Governance and regulation Planning and visioning Infrastructure and assets	Indirect	High	Existing	High cost	
Action 4.2 Remove invasive alien plant species in water supply catchment areas and aquifer recharge areas, and in natural areas across the city	Infrastructure and assets	Indirect	High	Existing	Medium cost	

SFA 3: WATER SENSITIVITY, FLOOD READINESS AND STORM MANAGEMENT

Goal 5: Proactively reduce flood risk through the implementation of a water-sensitive city strategy or plan

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 5.1 Develop and implement a water-sensitive city strategy or plan for Cape Town	Governance and regulations	Indirect	High	Long term	Medium cost	
Action 5.2 Restore and rehabilitate the City's rivers and wetlands to create liveable urban waterways	Planning and visioning Infrastructure and assets	Indirect	Medium	Long term	Medium cost	

Goal 6: Take action to reduce flooding and storm damage through disaster mitigation approaches

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 6.1 Improve the City's ability to address flood risk through improved flood-risk mapping and the implementation of early-warning systems	Planning and visioning	Not applicable	Medium	Long term	Medium cost	
Action 6.2 Continued implementation of the City's Winter Readiness Plan and expansion/scaling up where required	Infrastructure and assets	Not applicable	Medium	Existing	Low/no cost	

SFA 4: COASTAL MANAGEMENT AND RESILIENCE

Goal 7: Promote coastal resilience to the benefit of both coastal communities and coastal ecosystems

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 7.1 Initiate a process to ensure that coastal communities and ecosystems are resilient to the impacts of climate change-induced coastal pressures such as sea-level rise and coastal erosion	Planning and visioning	Not applicable	High	Medium term	Medium cost	
Action 7.2 Initiate the planning, development and execution of a coastal and sea-defence decision framework for Cape Town	Planning and visioning	Not applicable	High	Long term	High cost	
Action 7.3 On an ongoing basis, conduct necessary transdisciplinary research related to sea-level rise and other climate change-induced coastal pressures and hazards as the baseline informant in order to respond appropriately to such risks in the coastal zone	Planning and visioning	Not applicable	Medium	Medium term	Medium cost	
Action 7.4 On an ongoing basis, conduct necessary legal reviews and research, and put in place appropriate regulations to address the complex legal challenges surrounding property ownership and liability in the context of a receding coastline and risk exposure, respectively	Planning and visioning	Not applicable	Medium	Existing	Low/no cost	

Goal 8: Put in place effective cooperative and empowering mechanisms for addressing complex coastal management issues in the context of climate change						
Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 8.1 Put in place cooperative and collaborative mechanisms for addressing complex coastal management issues, including climate change, which engage the public, businesses, and other spheres of government, and ensure interdepartmental collaboration in the City on an "as and when" required basis	Governance and regulations	Not applicable	Low	Existing	Low/no cost	

SFA 5: MANAGING FIRE RISK AND RESPONSIVENESS

Goal 9: Proactively reduce fire risk and the impact of fires on communities and natural areas

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 9.1 Reduce urban fire risk and the impact of urban fires on communities	Behaviour change and communications Infrastructure and assets	Not applicable	High	Existing	Medium cost	
Action 9.2 Design and implement a programme and incentives for affordable, safe energy solutions for low-income and informal households	Governance and regulations	Low	High	Existing	Medium cost	
Action 9.3 Reduce wildfire risk and the impact of wildfires on urban communities	Behaviour change and communications Infrastructure and assets	Not applicable	Medium	Existing	Medium cost	

SFA 6: SPATIAL PLANNING AND RESOURCE INCLUSIVITY

Goal 10: Densify mass transit routes through mixed-use developments that support public transport and include social housing

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 10.1 Ensure that the Municipal Spatial Development Framework (MSDF) and District Spatial Development Frameworks (DSDFs) are climate responsive, enhance the effectiveness of the Transit-Oriented Development (TOD) Strategic Framework and support the long-term development of inclusive, climate-resilient, zero-emission precincts	Planning and visioning Collaboration and partnerships	Medium	Medium	Medium term	Low/no cost	
Action 10.2 Promote and support integrated human settlement development that is climate responsive	Governance and regulations	Medium	High	Medium term	Low/no cost	
Action 10.3 Ensure City catalytic sites prioritise the development of mixed-use and mixed-income inclusive housing along public transport corridors, and ensure that pilot projects on urban sustainability are net-zero carbon and minimise the cost of occupancy with energy efficiency	Planning and visioning Collaboration and partnerships	Medium	Medium	Medium term	Medium cost	

Goal 11: Ensure low-income residents are climate resilient and have equitable access to essential services

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 11.1 Alleviate energy poverty through energy efficiency and alternative energy interventions, education and communication, and address barriers to accessing clean and affordable energy sources	Infrastructure and assets	Low	Medium	Medium term	Medium cost	

SFA 7: CARBON-NEUTRAL ENERGY FOR WORK CREATION AND ECONOMIC DEVELOPMENT

Goal 12: Move as quickly as prices and opportunities allow towards 100% clean electricity supply by 2050

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 12.1 Promote and administer the uptake of renewable small-scale embedded generation (SSEG) across residential, commercial and industrial sectors	Governance and regulations	Medium	Not applicable	Short term	Low/no cost	
Action 12.2 Finalise and implement a framework and tariffs for the wheeling of renewable electricity	Governance and regulations	Medium	Not applicable	Short term	Low/no cost	
Action 12.3 City-level energy planning that incorporates the carbon-neutral goal	Data science and research	High; indirect	Not applicable	Short term	Medium cost	
Action 12.4 Develop a renewable energy roadmap and implement as and when economically viable	Planning and visioning	High; indirect	Not applicable	Short term	Low/no cost (but implementation is high)	
Action 12.5 Develop an electrical energy storage roadmap	Planning and visioning	High; indirect	Not applicable	Short term	Low/no cost	
Action 12.6 Local and regional electricity transition in a framework of mutual support with national programmes	Infrastructure and assets	High	Not applicable	Medium term	Medium cost	

Goal 13: Get technologically and commercially ready to operate the metropolitan distribution grid of the future

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 13.1 Invest in transitioning to the grid of the future	Governance and regulations	High; indirect	Not applicable	Medium term	High cost	
Action 13.2 Investigate, prepare and implement a new utility business model	Governance and regulations	High; indirect	Indirect	Medium term	Medium cost	
Action 13.3 Customer relations for a liberalising market	Governance and regulations	Medium; indirect	Not applicable	Medium term	High cost	

Goal 14: Minimise the economic cost of energy transition through maximising energy efficiency and developing a regional value chain for carbon-neutral molecular fuels						
Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 14.1 Devise and implement communication campaigns that promote energy efficiency	Behaviour change and communications	Medium	Low	Medium term	Low/no cost	
Action 14.2 Unlock transition with energy data	Data science and research	Low	Not applicable	Medium term	Low/no cost	
Action 14.3 Develop a regional value chain for carbon-neutral molecular fuels	Infrastructure and assets	High	Not applicable	Long term	High cost	

SFA 8: ZERO-EMISSION BUILDINGS AND PRECINCTS

Goal 15: All new buildings (residential, commercial and municipal) to be net-zero carbon by 2030

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 15.1 Develop and implement buildings energy efficiency and renewable energy mechanisms and relevant instruments that facilitate all new buildings (residential, commercial) to be net-zero carbon by 2030	Governance and regulations	High	Medium	Short term	Low/no cost	
Action 15.2 Develop and implement a support programme for influencing developer and market behaviour (informed by a strong evidence base)	Behaviour change and communications	Medium	Low	Existing	Low/no cost	
Action 15.3 Work to ensure that state-subsidised housing (including social housing, public-rental housing and Breaking New Ground (BNG) housing) is energy efficient and climate resilient and that low-income residents have equitable access to essential services	Planning and visioning Collaboration and partnerships	Low	High	Long term	Low/no cost	

Goal 16: All existing residential and commercial buildings to be retrofitted with energy-efficient technologies to be net-zero carbon in operation by 2050

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 16.1 Develop and implement innovative incentive mechanisms that may include financing, rewards, recognition or similar to encourage faster uptake/application to energy efficiency and renewable energy property upgrades	Governance and regulations (subsidies and incentives)	Medium	Medium	Medium term	Medium cost	
Action 16.2 Facilitate the development of a programme that aims to improve energy efficiency in all existing residential and commercial buildings, and facilitating the provision of renewable energy towards net-zero carbon (in operation) by 2050	Infrastructure and assets Training and skills development	High	Medium	Long term	High cost	

Action 16.3 Develop and implement voluntary and legal instruments or mechanisms aimed at improving the resource efficiency of existing residential properties through disclosing the residential building energy and water performance to potential homebuyers and/or tenants	Governance and regulations Behaviour change and communications	Medium	Medium	Long term	Low/no cost	
Goal 17: All new and existing municipal buildings (excluding industrial plants and utilities) to be net-zero carbon by 2030						
Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 17.1 Continue with municipal operations' energy efficiency retrofit, energy audit, and energy and water metering programmes, aiming to optimise energy demand and operational costs across municipal facilities by 2030	Infrastructure and assets	Medium	Low	Existing	High cost	
Action 17.2 Develop a programme plan to achieve net-zero carbon for all new and existing municipal buildings by 2030	Planning and visioning (feasibility studies)	Not applicable	Low	Existing	High cost	
Action 17.3 Facilitate the uptake of Energy Performance Certificates so that all relevant municipal buildings disclose their energy consumption data	Governance and regulations Behaviour change and communications	Medium	Not applicable	Existing	Medium cost	

SFA 9: MOBILITY FOR QUALITY OF LIFE AND LIVELIHOODS

Goal 18: Through the City's role as the transport planning authority and the contracting authority for Bus Rapid Transport (BRT) services, support the restoration, rehabilitation and expansion of the rail system to a carrying capacity of 30% above 2010 levels by 2030, and put in place a contingency for alternative mass transit infrastructure in the event that the rail system does not recover or ceases to be functional altogether

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 18.1 Support PRASA in restoring and rehabilitating the rail system, and expanding services where possible	Collaboration and partnerships	High	Not applicable	Long term	Medium cost	
Action 18.2 Develop legal, strategic and planning responses that define how the City can respond to the integrated transport planning challenge posed by the rail crisis	Governance and regulations	Low	Not applicable	Long term	Low/no cost	
Action 18.3 Explore contingencies for alternative mass transit options	Planning and visioning	Low	Not applicable	Medium term	Low/no cost	

Goal 19: Integrate transport modes to improve efficiency and fast-track a modal shift from passenger kilometres by private vehicles to other modes (decreasing from 58% in 2016 to 23% in 2050)

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 19.1 Use the Integrated Public Transport Network Plan (IPTN) 2032 and the non-motorised transport (NMT) network plans to maximise a change in modal shift away from private vehicles	Planning and visioning	Medium	Not applicable	Medium term	Low/no cost	

Action 19.2 Fast-track high-occupancy vehicle (HOV) lanes and complete the City of Cape Town Congestion Management Plan	Planning and visioning	Medium	Low	Medium term	Medium cost	
Action 19.3 Ensure that pedestrianisation programmes prioritise improved safety and increase the number of pedestrian/ cycling trips made	Infrastructure and assets	Medium	Not applicable	Medium term	Medium cost	
Action 19.4 Promote the citywide adoption of Travel Demand Management (TDM) measures, in particular measures that support flexible working and a shift to more sustainable transport modes	Collaboration and partnerships	Medium	Low	Short term	Low/no cost	

Goal 20: Prepare for a scenario of complete transition to electric or alternative fuel-powered freight, bus, taxi and passenger vehicles by 2050

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 20.1 Develop a procurement strategy for low-carbon emission vehicles and fuel technologies towards carbon neutrality	Infrastructure and assets	Low	Not applicable	Medium term	Medium cost	
Action 20.2 Develop the necessary policy and regulatory environment to promote the uptake of electromobility freight and electric passenger transport (including public and private vehicles and minibus taxis) and manage risks to the electricity grid	Governance and regulations	Medium	Not applicable	Medium term	Low/no cost (< R10 million)	
Action 20.3 Show City leadership and gather real-world data from EV pilot programmes such as the installation of publicly accessible demonstration chargers and the procurement of EVs for the City fleet	Infrastructure and/or assets	Low	Not applicable	Existing	Low/no cost	

Goal 21: Ensure that climate change and air quality monitoring and metrics for transport adequately support the assessment of actions and by-laws in the sector

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 21.1 Compile a baseline carbon footprint measurement for the operations of the City of Cape Town Transport, Spatial Planning and Environment, and Human Settlements directorates	Data science and research	Low	Not applicable	Short term	Low/no cost	
Action 21.2 Integrate GHG emissions and air quality metrics into the Urban Development Index (UDI)	Data science and research	Indirect	Indirect	Short term	Low/no cost	

SFA 10: CIRCULAR WASTE ECONOMY

Goal 22: Develop and implement an integrated waste management strategy that is financially feasible and maximises material efficiency by prioritising waste avoidance, reduction, treatment and recycling in line with national targets

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 22.1 Develop a funding strategy to fund waste diversion infrastructure and operating expenditure for waste minimisation and diversion from landfill	Infrastructure and assets	Low	Low	Short term	Low/no cost	
Action 22.2 In collaboration with the City departments and external stakeholders, develop and implement the Circular Economy Action Plan	Collaboration and partnerships	Low	Low	Short term	Low/no cost	
Action 22.3 Improve the waste management evidence base	Data science and research	Indirect	Not applicable	Long term	Low/no cost	
Action 22.4 Investigate options for the recovery of textile and fabric waste	Data science and research	Indirect	Not applicable	Short term	Medium cost	

Goal 23: Reduce organic waste disposal to landfill (in line with Provincial Integrated Waste Management Plan targets) by 50% by 2022, and 100% from 2027, through better waste separation, treatment and utilisation

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 23.1 Maximise the diversion of garden and food waste	Infrastructure and assets	Medium	Low	Medium term	Medium cost	
Action 23.2 Scale up the roll-out of composting containers	Infrastructure and assets	Medium	Not applicable	Medium term	Medium cost	

Goal 24: Increase diversion of recyclables from disposal to landfill to 40% by 2025, 55% by 2030, > 70% by 2035 and 85% by 2050 through improved collection, waste separation and providing support to informal workers

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 24.1 Plan and implement a scaling up of services to collect waste separated at source and increase the roll-out of Think Twice dry waste collection services	Infrastructure and assets	Low	Low	Long term	Medium cost	
Action 24.2 Carry out communication and marketing campaigns to promote behaviour change and to champion participation in the circular economy	Behaviour change and communications	Medium	Not applicable	Short term	Low/no cost	
Action 24.3 Implement mandatory segregation of recyclables and organics, and collection at all municipal buildings and facilities	Behaviour change and communications	Low	Not applicable	Short term	Medium cost	
Action 24.4 Maximise the crushing and reuse of builders' rubble	Infrastructure and assets	Low	Not applicable	Short term	Medium cost	

Goal 25: Reduce the climate and environmental impact of waste and wastewater disposal facilities by increasing biogas and landfill gas collection efficiency, treatment and utilisation						
Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 25.1 Complete landfill gas-to-energy projects at all major landfill sites	Infrastructure and assets	Medium	Not applicable	Medium term	High cost ⁵⁷	
Action 25.2 Continue efforts to implement and expand the beneficiation of wastewater sludges and associated recovery of biogas, heat and nutrients at City wastewater treatment works (WWTW)	Infrastructure and assets	Medium	Not applicable	Medium term ⁵⁸	High cost ⁵⁹	

CCWA 1: MAINSTREAMING, GOVERNANCE, RESEARCH AND KNOWLEDGE MANAGEMENT

Goal 26: Mainstream climate change responses into key City strategies, policies, processes and plans

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 26.1 Work towards the inclusion of climate responsiveness in City of Cape Town sector plans	Governance and regulations Planning and visioning	Indirect	Indirect	Existing	Low/no cost	All (indirectly)
Action 26.2 Ensure that climate change is adequately accounted for in the review and development of City strategies, policies, by-laws and implementation plans	Governance and regulations Planning and visioning	Indirect	Indirect	Existing	Low/no cost	All (indirectly)
Action 26.3 Integrate climate change response into City strategic infrastructure, budgeting and project management processes	Governance and regulations Planning and visioning	Indirect	Indirect	Short term	Low/no cost	
Action 26.4 Convene and maintain an active climate change transversal working group, including work streams focused on adaptation and mitigation	Governance and regulations	Indirect	Indirect	Short term	Low/no cost	

Goal 27: Conduct and commission climate change-related research and ensure that the City remains up to date with emerging research in the field

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 27.1 Put in place an ongoing comprehensive climate change response research programme	Governance and regulations Data science and research	Indirect	Indirect	Existing	Medium cost	
Action 27.2 Enhance climate change data, modelling and knowledge management in the City to support decisions	Governance and regulations Data science and research	Not applicable	Not applicable	Existing	Low/no cost	
Action 27.3 Work towards applying innovation in the City's climate change response through the continued use of innovation tools, methodologies and platforms	Planning and visioning Collaboration and partnerships	Indirect	Indirect	Existing	Low/no cost	

57 These figures could exceed R100 million if all three landfills are equipped, and if the future regional landfill is also equipped.

58 The first tender is scheduled to go out in Q1 2021. The completion of the entire BBF is programmed for 23/24, assuming there are no unforeseen delays. The second BBF installation project will kick off once the first is commissioned, and the third will be a future installation to be provided once the additional capacity is required.

59 Some of the upfront costs will be offset by long-term electricity savings and heat recovery.

<p>Action 27.4 Encourage co-production, learning, and knowledge exchange as a method of ensuring the effective mainstreaming of climate change response and research outputs</p>	<p>Governance and regulations Data science and research Training and skills development Collaboration and partnerships</p>	Indirect	Indirect	Existing	Low/no cost	
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CCWA 2: ECONOMIC IMPACTS AND GREEN ECONOMY OPPORTUNITIES

Goal 28: Advance the local green products and services market, and reduce the risks of climate impacts on local economic development

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
<p>Action 28.1 Facilitate investment in the local green economy</p>	Collaboration and partnerships	High	High	Existing	Medium cost	
<p>Action 28.2 Promote the development of South African green products and services to increase local demand and supply</p>	<p>Governance and regulations Collaboration and partnerships</p>	Medium	Medium	Existing	Medium cost	
<p>Action 28.3 Reduce the climate impact risk to the local economy</p>	<p>Governance and regulations Collaboration and partnerships</p>	Not applicable	High	Short term	Medium cost	

Goal 29: Support the development of a climate-resilient and carbon-neutral green economy through City operations

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
<p>Action 29.1 Mainstream the implementation of climate-responsive sustainable procurement in the City's supply chain management processes and decisions</p>	Governance and regulations	High	High	Existing	Medium cost	
<p>Action 29.2 Continue the implementation of the City's green jobs programmes, with a focus on climate resilience and risk reduction</p>	Infrastructure	Indirect	Medium	Existing	Medium cost	

CCWA 3: BUSINESS MODELS, REVENUE AND FINANCING CLIMATE CHANGE RESPONSE

Goal 30: Investigate sources of climate finance and the use of innovative financial mechanisms to support climate change response, and implement where feasible

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
<p>Action 30.1 Investigate the viability of special rating areas as a means of financing climate change resilience in high-risk areas and determine a way forward</p>	Planning and visioning	Indirect	Indirect	Short term	Low/no cost	All (indirectly)
<p>Action 30.2 Investigate options for accessing national and international climate change and sustainability funding and develop into a shared database</p>	<p>Governance and regulations (finance) Planning and visioning Data science and research</p>	Indirect	Indirect	Short term	Low/no cost	All (indirectly)

Action 30.3 Conclude an initial investigation and assessment of innovative insurance mechanisms for addressing climate change adaptation and resilience	Governance and regulations Data science and research	Not applicable	Indirect	Short term	Low/no cost	All (indirectly)
Goal 31: Use financial mechanisms, including business models, tariffs, investment and divestment to respond to climate change impacts and mitigation opportunities						
Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 31.1 Consider climate change impacts and opportunities in the City's business, revenue and operational model	Governance and regulations (municipal utility models)	Not applicable	Not applicable	Medium term	Not applicable	
Action 31.2 Support the call for responsible divestment by taking steps where possible to divest financial assets from fossil fuels, or reinvest in climate-friendly activities	Governance and regulations	Indirect	Not applicable	Existing	Low/no cost	

CCWA 4: COMMUNICATION, COLLABORATION AND SKILLS DEVELOPMENT

Goal 32: Ensure that Cape Town's residents, businesses, visitors and City officials receive timely, effective and appropriate climate change education, communication and training

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 32.1 Develop and implement a climate change response communication and education plan with a strong focus on community outreach and collaboration	Collaboration and partnerships Behaviour change and communication	Indirect	Indirect	Short term	Low/no cost	
Action 32.2 Support climate change-related skills and knowledge development in the City and across Cape Town	Training and skills development	Indirect	Indirect	Short term	Low/no cost	
Action 32.3 Use social media effectively to communicate early warnings of climate shocks and extreme weather events	Behaviour change and communications	Not applicable	Medium	Existing	Low/no cost	

Goal 33: Establish and maintain partnerships with local, regional and international organisations to support climate actions

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 33.1 Work to facilitate non-partisan collaborative planning and action for carbon neutrality and climate resilience with C40 partner cities	Governance and regulations Planning and visioning Collaboration and partnerships	Indirect	Indirect	Short term	Low/no cost	
Action 33.2 Partner with local, regional and international organisations that support climate change response and explore new partnerships with key stakeholders	Planning and visioning Collaboration and partnerships	Indirect	Indirect	Existing	Low/no cost	

Goal 34: Work with National Government to collaboratively reform or devolve decision making to support inclusive climate change action						
Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 34.1 Support government entities across all tiers to reform and improve state enterprises and planning functions in key sectors such as electricity, transport and water	Governance and regulations Collaboration and partnerships	High	Indirect	Existing	Low/no cost	All (indirectly)

CCWA 5: PROMOTE, PROTECT AND ENHANCE HUMAN AND ECOSYSTEM HEALTH

Goal 35: Develop and implement a green infrastructure programme that supports climate change response, protects biodiversity, and enhances ecosystem goods and services

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 35.1 Continue to implement the Cape Town Bioregional Plan, Biodiversity Network, and Local Biodiversity Strategy and Action Plan (LBSAP)	Infrastructure and assets Data science and research	Medium	High	Existing	High cost	
Action 35.2 Develop and implement a City of Cape Town green infrastructure programme, including a focus on supporting climate change response	Planning and visioning	Indirect	Medium	Short term	Low/no cost	
Action 35.3 Develop a database of Cape Town-specific nature-based solutions and best practices for climate change response, and promote their implementation	Planning and visioning Infrastructure and assets	Indirect	Indirect	Short term	Low/no cost	

Goal 36: Ensure that physical health and mental well-being are addressed through the City's climate change response

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 36.1 Take action to address air pollution as part of the City's climate change response	Planning and visioning Governance and regulations Data science and research	Medium	Indirect	Existing	Medium cost	
Action 36.2 Take action to address water pollution as part of the City's climate change response	Governance and regulations Planning and visioning	Not applicable	Medium	Existing	Medium cost	
Action 36.3 Continue to implement disaster risk education and awareness initiatives focused on household safety and preparedness, and expand these initiatives where required	Training and skills development	Not applicable	Medium	Existing	Low/no cost	
Action 36.4 Ensure that mental health is adequately addressed as part of the City's climate change response	Behaviour change and communications	Not applicable	Indirect	Medium term	Low/no cost	

Goal 37: Promote food security as well as low-carbon and climate-resilient food systems in Cape Town

Action title	Type	GHG reduction	Adaptation impact	Timeframe to implementation	Cost	Co-benefits
Action 37.1 Implement the City of Cape Town Food System Programme	Governance and regulations Planning and visioning	Low	High	Long term	Medium cost	

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