



CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

City of Cape Town Climate Change Strategy

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1. Purpose of this Strategy

Climate change is globally understood to pose the greatest risk yet to socio-economic stability and growth¹, and is increasingly affecting Cape Town. This strategy recognises that responding to climate change and dealing with its impacts will be difficult and that significant changes will be necessary. It provides a framework for the City of Cape Town ('City') to transform the way it thinks and operates and to ensure alignment of key City policies, strategies and plans with climate change concerns.

The people of Cape Town are very familiar with recent shock events, including one notable climate shock event that attracted international headlines. Cape Town navigated an extreme multi-year drought between 2015 and 2019, during which there were fears that the city may come close to running out of water. Working together, Capetonians reduced consumption by almost 50% in record time and avoided a worst case scenario. Now, with lessons learnt, the City is building back better to ensure even greater resilience in the water system. There has understandably been a large amount of effort in Cape Town in recent times to manage the impacts of drought, but there are a range of other climate shocks that can manifest in frequency and intensity going forward.

Having a clear climate change strategy enables the City to take action to reduce and prepare for these risks (adaptation). The strategy also outlines how and why the City is pursuing heightened ambition in reducing greenhouse gas (GHG) emissions (mitigation) to approach carbon neutrality by 2050. The strategy aims to ensure that the co-benefits of climate change adaptation and mitigation - including job creation, improved health, reduced risk, improved energy and water security, and a range of other benefits – are maximised in the implementation of the strategy.

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. Agreeing on what is needed is not easy and responding to climate change in an effective manner therefore requires partnerships, deliberation, negotiation, learning and leadership.

This strategy requires the City to work differently and more collaboratively and is, therefore, designed to provide a framework to encourage and assist directorates and departments to do this more effectively. The strategy further enables the City to take an integrated approach to its climate change response and recognise that climate change is a key risk to the economy, society, and environment.

The City recognises that it does not exist in isolation from the surrounding region, but rather is dynamically related to the surrounding region with respect to water, food and energy supply, tourism, and other economic activities², and therefore needs to engage with partners beyond its borders, including national and provincial government as well as other municipalities. The City also acknowledges that in order for this strategy to be effective, the City must work closely in partnership with residents, businesses, NGOs, academia, other spheres of government, and other partners across Cape Town. As such, this strategy provides clarity on the City's policy position and priorities with regard to climate change.

It is recognised that, while this strategy lays out the City's vision for responding to climate change, it will require a long-term and phased approach to ultimately achieve this vision. This strategy is a key step in taking the City towards the vision. Future revisions of this strategy will be informed by evolving climate science, tracking of implementation progress and global best practice. It should

¹ World Economic Forum (2017)

² Climate Systems Analysis Group (2016)

be noted that climate change response is not a new area of work for the City of Cape Town. The City has a long history of responding to climate change through policy, planning, and programme and project implementation. Annexure B provides an overview of the timeline of climate change strategy, policy, and planning undertaken by the City of Cape Town.

Finally, it is acknowledged that this strategy is published during the midst of a global health pandemic, COVID-19, that has caused both loss of life and economic hardship across the globe, including in South Africa during 2020. This strategy is an important component of Cape Town's own emotional, ethical and economic recovery from COVID-19.

2. Problem Statement and Consequences of Failure

2.1. Problem Statement

The Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment report (2014), as well as the IPCC Special Report on Global Warming of 1.5 degrees (2018) state that warming of the climate system is now undeniable. Over the past several decades, unprecedented changes to global climate systems have been observed. According to the IPCC, "Human activities are estimated to have caused approximately 1.0 °C of global warming above pre-industrial levels, with a likely range of 0.8 °C to 1.2 °C. Global warming is likely to reach 1.5 °C between 2030 and 2052 if it continues to increase at the current rate³. The atmosphere and oceans have warmed, amounts of snow and ice have diminished, sea levels have risen and oceans become more acidic as they absorb excess CO₂.

Anthropogenic Greenhouse Gas (GHG) emissions are now higher than ever⁴, with atmospheric concentrations of carbon dioxide, methane, and nitrous oxide at their highest levels within the last 800 000 years; the rate and extent of climatic changes are greater than previously projected by climate models⁵. However, the greater than expected rate and extent of climate changes, coupled with thermal inertia within the global climate system are quickly closing the window of opportunity for averting catastrophic global warming. This heightens the urgency with which all of society needs to act to reduce emissions and to respond to climate impacts.

The climatic changes that Cape Town is facing are:⁶

- A significant decrease in mean annual rainfall
- Changed seasonality of rainfall;
- A significant increase in mean annual temperature and increased maximum temperatures
- More high heat days⁷, and more frequent and intense heat waves⁸;
- An increase in wind strength
- A rise in mean sea level and increased coastal erosion

It is not currently anticipated that the incidence of severe storm events will increase, and it is possible that these may decrease slightly over the long term, however major storm events remain a key risk based on current incidence and severity. It is also important to note that this assessment may change in the future based on new scientific developments.

³ IPCC (2018 b)

⁴ IPCC (2014 a)

⁵ IPCC (2014 b)

⁶ Petrie, B. et al (2019)

⁷ A high heat day is defined as hotter than 35°C

⁸ A heat wave, within the context of Cape Town, is defined as three or more days in a row of 32 °C or hotter

Climate change will have direct physical and economic impacts on the city. However, the global response to climate change is having profound indirect economic and political impacts, which will only increase into the future. Currently, global investment in low carbon technologies is creating markets for disruptive technologies such as small scale embedded generation. With electric vehicles now heavily subsidised in many developed markets these can also be expected to scale globally. As low and zero-carbon technologies scale and become economically viable, corporations are increasingly being regulated or are self-regulating to report and manage the emissions across their supply chains. South Africa, with its coal intensive grid electricity seems poorly positioned to trade in a world where emissions are tracked, reported, and increasingly a key component of the value proposition of goods and services. The City of Cape Town is however in many respects well placed to seek opportunities in a global green economy and this strategy seeks to give policy direction in this respect.

2.2. Consequences of Failure

The consequences of failing to adapt to and mitigate climate change will be significant. Therefore, it is in the City's best interests to take bold action now to prevent the worst climate change impacts, both through adaptation and mitigation. For mitigation this also means that Cape Town must do its fair share to contribute to the global effort. Climate impacts in Cape Town are projected to potentially be severe, while the city's emissions contribute only a small share to global emissions. However, a mitigation commitment to carbon neutrality is critical in order to allow the local economy to trade competitively in a world that is rapidly rejecting carbon intensive goods and services, and to contribute fully to the mitigation effort required to avoid catastrophic climate change.

While the timing and magnitude of impacts will always remain somewhat uncertain due to limitations in climate modelling at the scale of a city, there is little uncertainty regarding the types of impacts that Cape Town is facing and will increasingly face. Various studies⁹ have shown that the costs of early and proactive action will be far less than delayed action or inaction. Therefore, proactive planning and implementation to address anticipated impacts will be more cost effective and practical in the long term. In addition, actions taken to reduce emissions have numerous co-benefits. They will increase social and economic resilience and productivity, ensure better access to public transport, promote a healthier urban environment, and ensure a more economically viable and cleaner energy system.

If steps are not taken to adapt to the predicted impacts of climate change and contribute to global efforts to mitigate climate change, there are a number of impacts that will be experienced with increasing intensity, severity, and frequency, as well as a number of missed opportunities. These impacts and missed opportunities include:

- Drought and associated water shortages;
- Flooding and associated impact on people and infrastructure;
- Heat stress and associated health impacts;
- Coastal erosion and sea level rise and associated impacts on coastal infrastructure;
- Damage to infrastructure and property due to severe storms and strong winds;
- Increased risk of fire, affecting both the natural environment and urban areas;
- Loss of biodiversity and associated loss of ecosystem goods and services;
- Loss of agricultural productivity in the region and associated impacts on food security;

⁹ Department of Environmental Affairs (2011)

- A lapsed window of opportunity to facilitate an inclusive green transition and thus deliver essential services in a more sustainable manner while creating employment opportunities in a new economy;
- Increased vulnerability to volatile oil prices and economic risks associated with investments in coal, fossil fuels and associated infrastructure that could see taxes or embargoes imposed on Cape Town's goods and services by trade partners;

These projected impacts have the potential to affect all forms of service delivery, with impacts likely to be more severe in areas and sectors that are at a higher risk due to high levels of vulnerability and low levels of resilience and adaptive capacity.

This strategy aims to address these identified impacts within the City's mandates and spheres of influence and to ensure that the City is able to address the challenges posed by climate change and avoid locking itself into unsustainable investments or development pathways.

3. Framing the Strategy

3.1. Cape Town's climate context¹⁰

Cape Town exists within a unique environmental context that makes the city particularly vulnerable to a number of climate-change related challenges. The city is located within the Cape Floristic Region – a global biodiversity hotspot – and is surrounded by 307 km of coastline. The city is also home to 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.

Additionally, as a city within a developing country, Cape Town struggles with a number of socio-economic challenges, including high levels of unemployment, poverty and informality; as well as numerous health challenges due to both communicable and non-communicable disease.

All of these factors combine to create high levels of climate vulnerability in the city. Vulnerability can be categorised as follows:

- physical vulnerability is due to geographic factors such as elevation, proximity to watercourses and wetlands, drainage, proximity to the coastline, proximity to areas of fire-prone vegetation, and urban form
- socio-economic vulnerability is due to low levels of adaptive capacity within communities. This is caused by a range of factors including poverty, unemployment, low levels of education, poor social cohesion, and lack of access to services. Economic sectors that are reliant on the natural environment, such as agriculture and tourism, are at higher risk than other sectors.
- the legacy of past planning decisions causes vulnerability due to the location of various infrastructure and the built environment in high risk areas that are not suitable for development due to environmental factors that are exacerbated by climate change.

Vulnerability exacerbates the impacts of climate change and increases the risk that an area of community will be severely impacted by climate hazards.

¹⁰ For more information on key economic, social, and environmental indicators, please see the [State of Cape Town Report \(2018\)](#)

3.2. Cape Town's greenhouse gas emissions

Cape Town – in common with all cities in South Africa – is a significant emitter of greenhouse gases (GHG) that contribute to global climate change. The City has a well-established and credible sector-based GHG inventory which is updated on an annual basis and is a key element in reporting annually to the Carbon Disclosure Project¹¹. It complies with international best practice and emissions are assessed in accordance with the Global Protocol for Community Scale Greenhouse Gas Emission inventories (GPC). As GHG emissions are a consequence of activities taking place within the city boundary, this data is a valuable knowledge base that serves a variety of purposes beyond emissions accounting; it also provides the City with tools to assess and manage the sustainability of energy supply and consumption, waste, and transportation.

It is important to note that the emissions pathways are based on a “BASIC¹²” reporting level inventory that includes the main contributors to the city's inventory (energy consumption, transportation, organic waste and wastewater), but excludes emissions from inventory sectors industrial process and product use (non-energy), and agriculture, forestry and land-use. While these sectors do contribute to Cape Town' emissions, their contribution is greater in cities which have significant industrial, forestry and farming activities taking place within the city boundary.

A historical view of Cape Town's GHG inventory is presented below in figure 1. The best available data indicate that total emissions are stable. This stabilisation is most likely due to a combination of energy efficiency (especially evident in residential electricity demand) and suppressed energy demand due to a period of low economic growth and dropping per capita incomes.

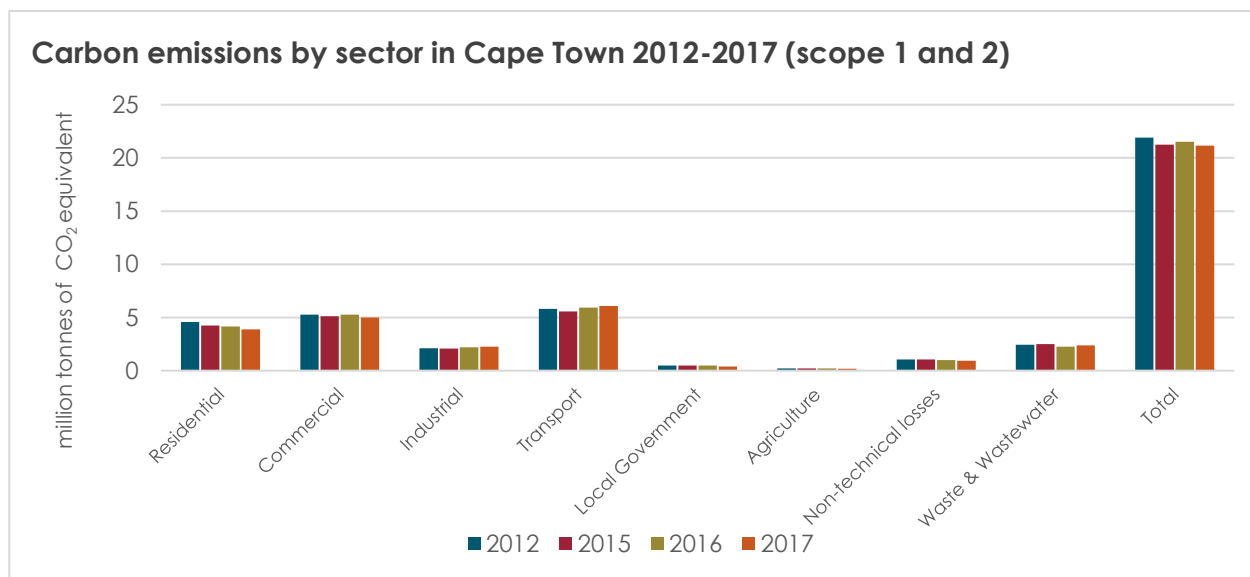
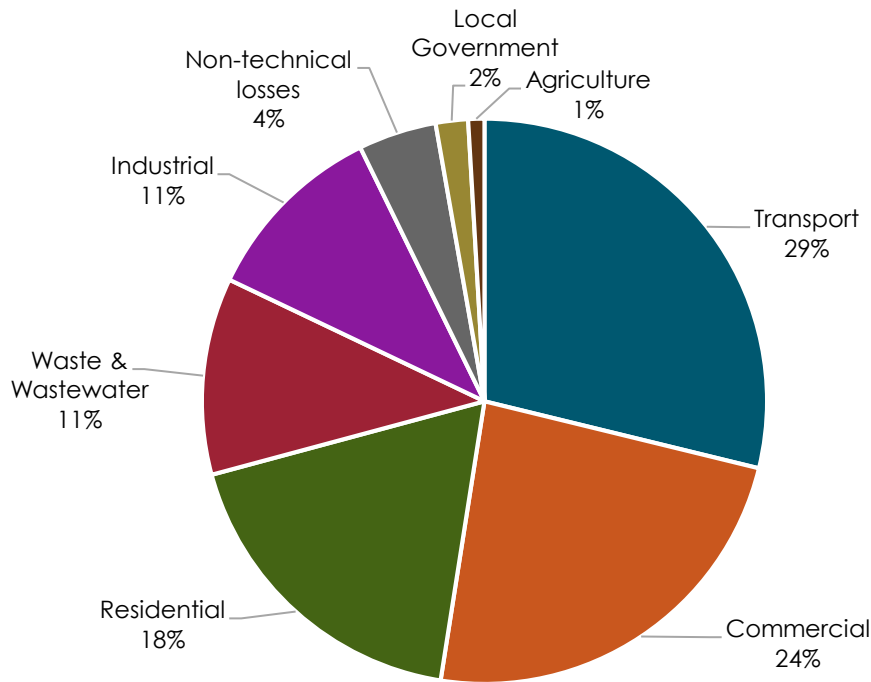


Figure 1. Historical sectoral greenhouse gas emissions for Cape Town

¹¹ <https://www.cdp.net>

¹² The BASIC reporting level for cities covers scope 1 and scope 2 emissions from stationary energy and transportation, as well as 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.

Carbon emissions by sector, Cape Town, 2017



*excluding aviation, marine, waste, and electricity losses

Figure 2. Sectoral emissions contributions for Cape Town (2017)

Figure 2 provides a sectoral breakdown of emissions for 2017, the latest year for which comprehensive information is available. Although transport uses 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 carbon intensity of transport fuels such as petrol and diesel.

The transport system is also a significant contributor to emissions, but Cape Town - like all South African cities - does not have the densities and spatial form 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 both the rail operator (state owned enterprise PRASA) and the city's rail infrastructure has been experiencing significant dysfunction over the past decade. The City operates a relatively new bus utility - MyCiTi - which offers a high quality service but in mode share terms remains small. Transport is therefore dominated by private cars and minibus taxis.

3.3. Evidence base

3.3.1. Hazard, Vulnerability and Risk Assessment Study

In 2018/19 a Climate Change Hazard, Vulnerability and Risk Assessment was conducted for the City of Cape Town¹³ based on a low climate change mitigation scenario, in line with current global trends. This assessment included the following components:

- mapping of climate hazards;
- identification of areas of vulnerability (both spatially and across sectors);

¹³ Petrie, B. et al (2019)

- an economic risk analysis;
- identification of key risk areas (both spatially and across sectors) based on the combination of hazards and vulnerability; and
- a set of recommended adaptation options

This study forms the evidence base for the City's Climate Change Strategy as it relates to climate change adaptation and climate resilience. The key findings of the study, as it relates to Cape Town's climate change risk, are described in Section 2 of this strategy. More details of the methodology and results of the study are provided in the forthcoming City of Cape Town Climate Change Action Plan.

3.3.2. Carbon Neutral 2050 Scenario Modelling

A data collection, stakeholder engagement and emissions modelling¹⁴ exercise was undertaken in-house with the assistance of an embedded C40 advisor during 2018-2020. The emissions modelling for the various scenarios builds on the previous energy and emissions modelling carried out by the City, the most recent being the Energy2040 Goal emission reduction targets adopted by Council in 2015. The new scenarios present a significant ramp up in ambition from Energy2040, acknowledging the need to align with the goals of the Paris Agreement.

While the City is best placed to lead, drive, and enable a local carbon neutral transition, achieving city-wide carbon neutrality is not wholly within the control of the City administration. This transition requires action from other stakeholders including national government, national utilities like Eskom and PRASA, the private sector, and residents. There are also a number of uncertainties related to growth in the local economy, types of economic activities, population and technological transition.

For these reasons, updated scenario modelling was carried out to identify priority focus areas under alternative possible futures. Emissions were projected as a baseline based on current technologies and development patterns and two scenarios of ambitious mitigation, as follows:

- **Baseline Projection:** This projection shows that under a modest economic recovery to a growth rate of 1.6%, emissions could be expected to grow significantly - to over 50% more than 2016 emissions - by 2050.
- **Green Economy Future:** In this scenario mandates and markets favour ambitious mitigation. Early and steady procurement of renewable electricity nationally and locally enables electrification of transport. Transport is also able to use less energy due to a more efficient spatial form that supports high quality public transport and local economic opportunity. By 2050 emissions are reduced to less than 10% of 2016 emissions.
- **Limited Mandate and Opportunity:** In this scenario, various challenges remain unresolved. The City is unable to procure electricity independently, the local automotive and oil industries resist transport electrification, and spatial transformation fails, hampering public transport development. Even though the City acts on ambition, city-wide emissions can only be reduced to 40% of 2016 emissions.

A full analysis of the scenarios and a more detailed breakdown of the outputs and description of the approach to developing the scenarios is provided in the forthcoming City of Cape Town Climate Change Action Plan.

¹⁴ Using C40's 1.5 Degrees Pathways Tool

3.4. Cape Town's commitments to addressing climate change

3.4.1. City of Cape Town Climate Change Policy

In 2017, Council adopted the first City of Cape Town Climate Change Policy. This policy followed approximately fifteen years of work on both climate change mitigation and adaptation, and several previous action plans. The adoption of the Climate Change Policy in 2017 was an important milestone, marking the point at which it was recognised that climate change is a significant threat to Cape Town and thus required a dedicated policy and strategy approach.

In 2019, the City of Cape Town Climate Change Policy was reviewed and it was determined that the policy should be upgraded to a strategy in order to ensure that climate change is addressed and integrated at the highest level within the organisation. This strategy therefore builds on the commitments of the 2017 Climate Change Policy and includes new commitments and a more ambitious programme of action.

3.4.2. International Commitments

The City of Cape Town is a member of C40 – a global climate change leadership organisation aimed at promoting climate change response action at the local government level. Cape Town, along with 3 other metropolitan municipalities in South Africa and a wide range of cities worldwide, has signed up to C40's Deadline 2020 programme which aims to put cities on track to meet the goals of the Paris Agreement and achieve carbon neutrality and climate resilience by 2050. Cape Town also has an important role to play in helping South Africa meet its Nationally Determined Contributions in terms of the Paris Agreement.

The carbon neutrality component of the Deadline 2020 commitment includes a parallel commitment to attain net zero carbon emissions from the City's own buildings (both existing and new) by 2030, for all new buildings in Cape Town by 2030, and for all existing buildings in Cape Town by 2050.

For more details of what carbon neutrality means for the city, see Annexure A.

3.5. Theory of change and approach to implementation

Theories of change for adaptation and mitigation are provided in more detail in the following sections. However, it is important to note that while theories of change are necessary to develop strategy and direct actions and programmes, they can have drawbacks if implemented inflexibly. It is therefore necessary for an ongoing process of evaluation and assessment to take place to determine if actions being taken are having the desired effect, and making necessary changes if this is not the case. As such, these theories of change should be seen within an ongoing cycle of monitoring that re-informs planning and implementation.

3.5.1. Adaptation

It is very important to emphasise that many areas in Cape Town are not well adapted to existing climate hazards. As such, adaptation must be focused on ensuring that the City is adapted to both the current climate and the projected future climate. Climate adaptation should be seen as a long-term and evolving process towards climate resilience, and not necessarily a specific end-point or set of actions or targets. In order to ensure long-term climate resilience, it is necessary to put

systems in place that are responsive and adaptable to climate change; this will allow for flexibility of response in the context of long-term uncertainty.

Figure 3 (below) shows a conceptual approach to climate adaptation, highlighting four different types of actions that are required to put the City on a pathway to achieving climate resilience. These can be summarised as follows:

- **Governance:** Adapting leadership, policy, regulations, laws and strategies, and institutional arrangements for climate adaptation mainstreaming and enhancing the enabling environment for climate resilient development.
- **Planning:** Climate adaptive and transformational planning, strategy development and incentives that are jointly conducted and integrated across relevant sectors and departments to provide strategic direction for climate resilient infrastructure development and behaviour change.
- **Infrastructure:** 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:** Changing behaviour for climate adaptive decision making, planning and management by all stakeholders and social partners (government, labour, industry and civil society) through education, mobilisation and sensitisation toward the realisation of a social contract for climate resilience.

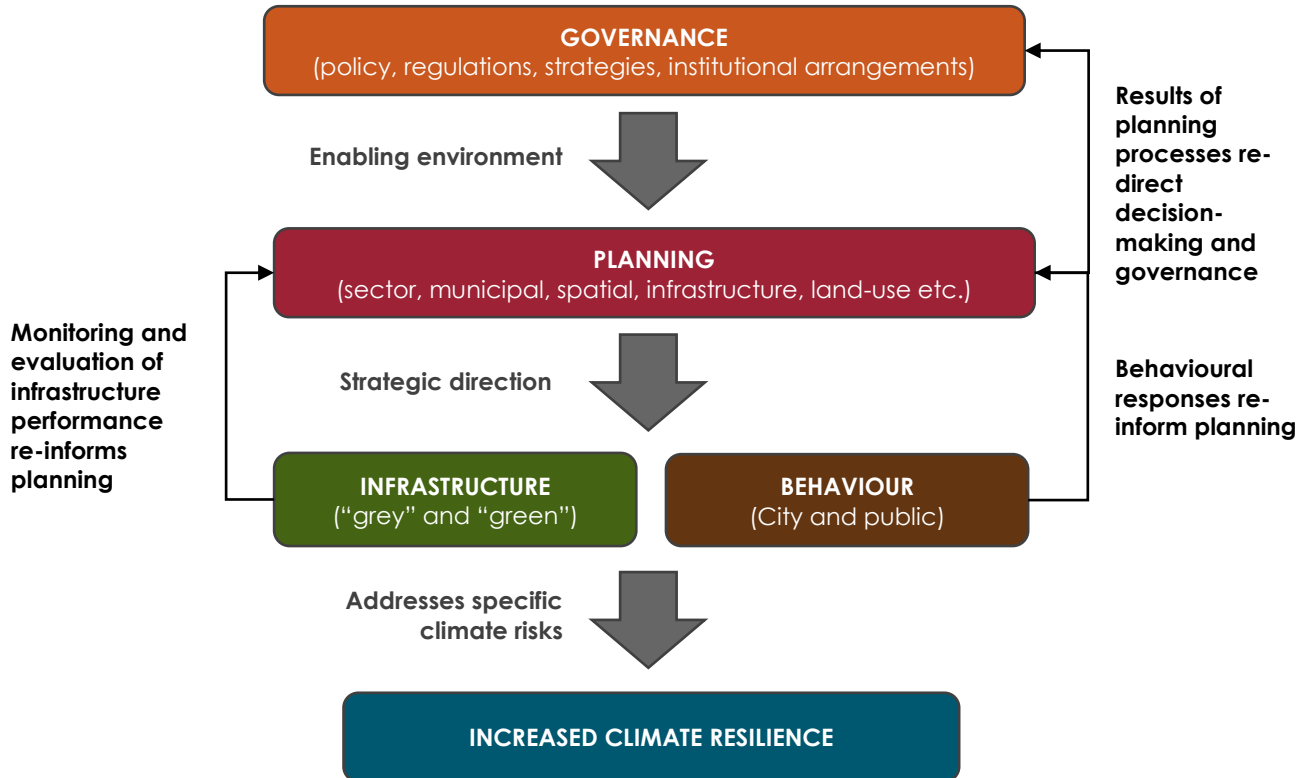


Figure 3. Types of adaptation actions and interlinkages

3.5.2. Mitigation

Although the City's own operations only account for around 4% of City-wide greenhouse gas emissions, it has a customer relationship with residents and businesses across the entire city and provides utilities that impact on a far wider footprint than its own direct emissions. Despite its varying level of direct control, the City has the potential to lead change through actions of the following types:

- Data science and research
- Planning and visioning
- Regulation
- Development of partnerships
- Greening of City infrastructure and assets
- Communication and outreach

Stakeholder engagement will be a key enabler of success in all of these types of actions. Indeed, even where the current national legislative framework may be an apparent obstacle, the City and its partners have shown that Cape Town's technical and financial capacity makes it a good candidate for testing new regulations and approaches bringing about incremental change.

A theory of change for planning carbon neutrality in the City of Cape Town is shown below in Figure 4. A carbon neutral green economy is realised in three broad sectors where emissions are concentrated by means of applying the above types of actions through seven priority levers which will work to shift the value chains in these sectors.

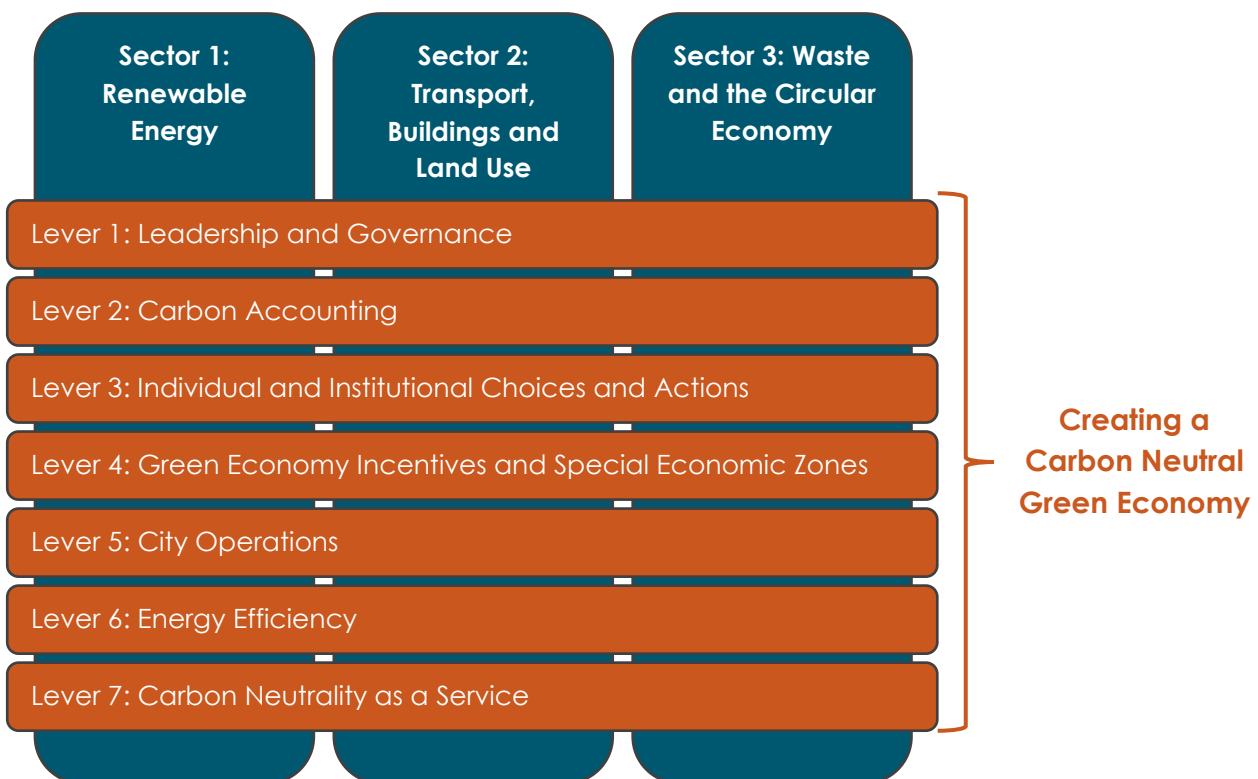


Figure 4. Achieving Carbon Neutrality in the City of Cape Town - The Levers of Systemic Change

The City of Cape Town will seek to achieve the following broad goals in the sectors shown above:

- **Renewable Energy:** The City will take active steps to expand zero carbon electricity provision in both the retail and supply sectors through direct procurement from Independent Power Producers. This will enable distributed generation, tariff and business model development, and technical preparation for an inverter-based grid. In the long term the City aims to support the development of a hydrogen economy that can supply molecular fuel for industry, transport fuel for heavy vehicles, and storage for curtailed wind and solar capacity.
- **Transport, Buildings and Land-Use:** The City aims to achieve clean and efficient urban transport through continued improvement of non-motorised and public transport. This is supported by improved transport governance, road space allocation, infrastructure investment, improved spatial form, efficient land use, and improved urban management. Public investment will be prioritised and private investment incentivised within the existing built footprint and infrastructure deficits addressed inside the city's Urban Inner Core (UIC). Key to reduced emissions is a switch to electro-mobility and emergence of net-zero carbon buildings off the back of clean energy.
- **Waste and the Circular Economy:** Recovering and deriving value from Cape Town's waste stream is a key element in the shift towards a circular economy, with multiple co-benefits with respect to cleanliness of the city, and reduced littering and illegal dumping. Improved resource efficiency through material recycling, reduced waste, and diversion of organic waste from landfill to productive uses will be combined to reduce greenhouse gas emissions.

The City of Cape Town, in collaboration with partners, will act on the following levers of systemic change in the three key sectors:

- Exercise **leadership and governance** through planning, regulation, public data and engagement of stakeholders.
- Promote climate responsive **individual and institutional choices and actions** through communication campaigns.
- 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.
- Promote corporate **carbon accounting** as a global trade imperative and actively seek out trade partners wanting to pilot carbon neutral industries, systems and technologies.
- Lead by example and create a market through greening the City's **own operations** and services.
- Reduce the cost of transition and maximise economic co-benefits through ongoing residential, commercial and industrial **energy efficiency** programmes, with a focus on achieving carbon neutrality in buildings.
- Promote the concept of '**Carbon neutrality as a service**'¹⁵ or similar approaches to 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 3) compelling and attractive product labelling underwritten by credible verification agents.

¹⁵ Many jurisdictions, for example Paris, are opting for consumption-based accounting, which requires 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.

3.6. Challenges for the implementation of this strategy

A number of challenges for the implementation of this strategy have been identified. It is important to identify and acknowledge these challenges so that measures can be put in place to address these. These challenges also shape the City of Cape Town Action Plan; many actions have been formulated specifically to address or respond to these challenges.

The following challenges have been identified as potentially impacting on the City's climate change mitigation work:

- The City is currently dependent on coal intensive grid electricity acquired through 49 injection points in its distribution system or purchased directly by customers from the state utility (Eskom). Currently, the City does not have the mandate to influence the share of renewable electricity outside of small scale embedded generation, and projects between 1 and 10 MW need to go through a licensing process with the national regulator with licensees required to remain net consumers.
- The City only has a partial mandate in public transport and a great deal of spatial transformation of the city is required to make mass public transit economically viable for the entire metropole.
- Conversion to electric vehicles will only mitigate significant emissions if low carbon or carbon neutral electricity supply is made available.
- To fast track new and existing buildings towards carbon neutrality will require regulatory interventions that go beyond national requirements. The co-operation of national authorities is essential to get the necessary adaptation to their regulatory framework to accommodate leadership from the City.
- The City is partially reliant, like all South African municipalities, on the contribution to rates of the regulated margin on electricity revenues. Energy efficiency and small scale embedded generation have been growing organically due to an increasing bulk electricity price, but mitigation through active promotion of these technologies has a financial trade-off under the current municipal business model.

The following challenges have been identified as potentially impacting on the City's climate change adaptation work:

- Uncertainty regarding the timing and magnitude of climatic changes affecting Cape Town, creating difficulty for forward-planning.
- The high cost of certain adaptation interventions, especially those where significant infrastructure development or upgrading is required.
- The potential for maladaptation, which may occur if adaptation actions have unforeseen negative outcomes or increase local carbon emissions.

4. Vision, Principles and Desired Outcomes

4.1. Vision

To become a city that is climate resilient, resource efficient and carbon neutral, in order to enable inclusive economic and social development and environmental sustainability.

4.2. Principles

4.2.1. Resilience

The City will work to ensure that its actions and decisions increasingly and progressively strengthen resilience and reduce the vulnerability of Cape Town's environment, communities, and economy to climate change impacts and enhance their ability to prepare for, adapt to and recover from shocks and chronic stresses.

4.2.2. Economic inclusiveness

The City will work to ensure that its actions and decisions contribute towards addressing the socio-economic challenges and impacts of climate change and optimise the socio-economic opportunities that arise from adapting to and mitigating climate change in an inclusive manner. Thus enabling the City to use climate change as an opportunity to transform how it deals with issues such as poverty, inequality and the informal sector. The City will prioritise the well-being of the whole economy over that of one sector or entities within a sector. Where disruptive transition arises, consideration will be given to protecting vulnerable workers in a just transition for a time period sufficient for retraining and diversification.

4.2.3. Embedded sustainability

The City will work to ensure that its actions and decisions retain, restore, expand, and optimise sustainability, ecosystem functioning, and ecological infrastructure; and that such work is integrated into the City's development path in order to adapt to climate change impacts and enhance carbon sequestration.

4.2.4. Carbon neutrality

The City will work to ensure that its actions and decisions support carbon neutrality and carbon neutral development within the residential, commercial, industrial, transport and waste sectors; and within its own operations, thereby being a leader in the transition to a competitive, resilient and efficient green economy.

4.2.5. Health and wellbeing

The City will work to ensure that its actions and decisions support and promote human health and wellbeing and that the health impacts of both climate change and a carbon intensive economy are addressed; including communicable and non-communicable diseases, psychological distress, and the effects of environmental degradation and pollution.

4.2.6. Collaboration and integration

The City will work to ensure that its actions and decisions are informed by partnerships and collaboration with external organisations and entities focused on addressing climate change; including national and provincial government, international and local NGOs, academia, and the private sector, as well as consultation with the public. The City recognises that it is integrated into, and dependent on, the national economy, as well as other spheres of government. Where the City has higher ambition than national policy, it may choose to seek additional mandates in order to

fulfil this ambition and work towards benefiting the national interest by piloting new regulatory approaches and utility business models.

4.2.7. Climate responsive urban development

The City will facilitate and manage urban growth and development in a way that enables urban efficiencies, economic vitality, climate resilience and improved access to opportunities and quality of life.

4.2.8. Equitable service delivery

The City will ensure that its climate change response is implemented in an equitable manner that recognises the needs of the most vulnerable residents of Cape Town and prioritises interventions that aim to maximise sustainable service delivery. Direct subsidies or subsidised price signals to support carbon neutrality will only be considered if these support local employment and economic development.

4.3. Long-term desired outcomes

The following long-term desired outcomes provide a more detailed vision for the future in which this Climate Change Strategy has been fully implemented:

- 4.3.1. All City of Cape Town led policies, plans, programmes and projects have effectively incorporated climate change considerations into their design and implementation.
- 4.3.2. Climate change is seen as a shared risk to Cape Town and residents, businesses, visitors, and government work collectively to address climate change.
- 4.3.3. An electricity supply system that is supplied by renewable utility scale and embedded sources that is backed up by clean storage and demand side management.
- 4.3.4. A city with economically viable mass transit routes that support world class electric public transport used by the majority of commuters in preference to private transport.
- 4.3.5. A city where the cost of doing business is reduced and competitiveness maximised through responding to climate change by investment in infrastructure resilience and efficient technologies, structures, processes and spatial organisation.
- 4.3.6. A city with carbon neutral business hubs that include carbon neutrality as a quality assurance for their traded products and services and cause 'carbon neutrality as a service' to arise across value chains.
- 4.3.7. A city with a compact and efficient urban form, with development that is well located and well connected, in order to grow within the limits of available resources and enable social and economic inclusivity.
- 4.3.8. All infrastructure and the built environment in Cape Town is designed and built to be resilient to the impacts of climate change.

4.3.9. Cape Town's natural ecosystems are protected, managed and made resilient to enable these to act as effective buffers to climate change impacts and provide benefits of ecological infrastructure in support of current and future built infrastructure.

5. Overview of Strategic Focus Areas and Cross-Cutting Work Areas

Ten strategic focus areas and four cross-cutting work areas have been identified in order to give effect to the intent of this strategy. Figure 5 below shows how these strategic focus areas and cross-cutting work areas interact. The cross-cutting work areas should be seen as providing support to all of the strategic focus areas and necessary for the successful implementation of the strategic focus areas.

Within each strategic focus area and cross-cutting work area, a set of goals has also been identified which provide more detail of the City's strategic intent. More detail of the actions which support these goals can be found in the City's forthcoming Climate Change Action Plan.



Figure 5. Overview of strategic focus areas and cross-cutting work areas

6. Adaptation Strategic Focus Areas and Goals

These strategic focus areas have been identified as being critical to ensuring the implementation of the City's climate change vision and principles as it relates to climate change adaptation.

6.1. Strategic Focus Area 1: Heat, heat waves and high heat days

Projections show that heat in Cape Town will increase over time, with a significant increase in average, minimum and maximum daily temperatures, as well as an increase in heat waves (three or more days in a row of 32 °C or hotter) and high heat days (35 °C or hotter). Heat creates significant health risks for people, including heat stroke, heat exhaustion and increased mortality among elderly and vulnerable populations. Goals and actions within this focus area are focused on both adapting to the impacts of increased heat and putting in place measures to reduce (mitigate) heat where possible.

In order to address this challenge, the City commits to working towards achieving the following goals within this strategic focus area:

- Goal 1: Reduce immediate risks to health during heat waves and high heat days
- Goal 2: Proactively reduce heat impacts on the city through urban greening

6.2. Strategic Focus Area 2: Decreased rainfall, drought and water scarcity

Projections indicate that Cape Town will experience a significantly drier climate in the future. Since 2015, Cape Town has experienced a period of significantly below average rainfall, resulting in drought and associated water scarcity. During 2017 and 2018 this resulted in the emergence of the "day zero" crisis, in which Cape Town was at risk of running out of water. Concerted action by the City and the public to reduce water demand and implement water saving measures averted the crisis. It is now recognised that the City must take action to secure Cape Town's future water supply through a range of measures addressing both water supply and demand.

The City of Cape Town Water Strategy commits the City to taking bold action to reduce the risk of drought and water scarcity. 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."

In order to address this challenge, the City commits to working towards achieving the following goals within this strategic focus area:

- Goal 3: Reduce demand for water to protect water resources and ensure sustainability of supply
- Goal 4: Work to augment and increase water supplies to achieve 99.5% assurance of supply

6.3. Strategic Focus Area 3: Flooding, flood risk and storm damage

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 low pressure systems will either decrease or increase. It is also very important to note that flooding in Cape Town is largely related

to high levels of vulnerability rather than particularly extreme rainfall events. Vulnerability is related to a range of factors, including geographical location, infrastructure, and economic status.

Wind speed and strength is 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 as well as to infrastructure, such as overhead electricity cables either directly or due to tree damage.

In order to address these challenges, the City commits to working towards achieving the following goals within this strategic focus area:

- Goal 5: Proactively reduce flood risk through the implementation of a water sensitive city strategy or plan
- Goal 6: Take action to reduce flood risk and storm damage through disaster mitigation approaches

6.4. Strategic Focus Area 4: Coastal erosion and sea level rise

Cape Town has a coastline of approximately 307 km, consisting of both rocky and sandy shores. Cape Town's coastline is an important asset for the city's economy, provides recreational and tourism opportunities, and supports important biodiversity assets. The coastline also provides an important buffer function by protecting coastal areas from storm surges during storm events. However, due to urban development the natural functions of the coast are threatened; encroachment on the coastline has interrupted natural sand movement dynamics, reduced or eliminated natural vegetation cover, and put in place fixed infrastructure that is vulnerable to impacts of wave action and windblown sand.

Climate change is projected to significantly negatively impact the coastline in two ways: 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 action; and 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 and poses a significant risk to infrastructure and property in those areas.

In order to address these challenges, the City commits to working towards achieving the following goals within this strategic focus area:

- Goal 7: Promote coastal resilience to the benefit of both coastal communities and coastal ecosystems
- Goal 8: Put in place effective co-operative and empowering mechanisms for addressing complex coastal management issues in the context of climate change

6.5. Strategic Focus Area 5: Fire and fire risk

Fire has been a feature of Cape Town throughout the city's history. The city's location within the Cape Floristic Region, which contains vegetation types that are both fire-prone and require fire to survive, means that wildfires have been a relatively frequent occurrence in the city. Wildfire poses a risk to people that live at the interface of urban and natural areas along the outskirts of the city. Wildfires are strongly associated with hot, dry, and windy conditions which predominate in the summer months. These conditions are projected to worsen in the future due to climate change.

Within the urban environment destructive fires are a significant risk in dense informal settlements causing both loss of life and loss of property, as well as physical injury and psychological trauma. The occurrence of fires in informal settlements has numerous complex underlying factors, but is driven by the use of unsafe fuels for heating, lighting, and cooking. There is a seasonal component to urban fire, with more frequent and destructive fires occurring during the summer months, indicating that hot, dry, and windy conditions also contribute to the spread of urban fires.

Goals and actions within this focus area are focused on reducing the incidence of both wildfires and urban fires, as well as reducing the spread and impact of fires when they do occur.

In order to address this challenge, the City commits to working towards achieving the following goal within this strategic focus area:

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

7. Mitigation Strategic Focus Areas and Goals

These strategic focus areas have been identified as being critical to ensuring the implementation of the City's climate change vision and principles as it relates to climate change mitigation.

7.1. Strategic Focus Area 6: Clean energy for work creation and economic development

Electricity accounts for around 30% of the energy consumed by the city's economy, but over 60% of energy-related emissions. This is because around 90% of South Africa's grid electricity is coal fired and highly carbon intensive. An initial clean energy policy focus on electricity is therefore justified while being cognisant that substitutes need to be found for industrial heating fuels and jet fuel in the longer term. Cape Town is home to a growing green economy as well as a number of industries that are currently exposed to trade risk due to high levels of embedded carbon in the electricity used to produce their goods and services. As corporate carbon accounting and global regulation becomes more prevalent, these industries and their workers stand to lose. South Africa's electricity system is centrally planned with a single state utility (Eskom) licensed to buy electricity and transmit to the national grid. Central planners determine the technology and build rate of new capacity, which is directly authorised by the Minister of Mineral Resources and Energy, through a process known as a Ministerial Determination. The City has challenged this process in the courts to realise its climate change plans, contribute to sector market reform and improve energy security.

Against a recent backdrop of industry upheaval, political uncertainty, mixed policy signals, and periods of economically devastating unreliable supply and load-shedding, the City faces a very challenging landscape. Ultimately, prosperity clearly lies with a globally integrated green economy; yet the city remains overwhelmingly reliant on the high carbon intensity coal-based electricity from Eskom. However, a balance must be struck between the independent procurement of renewable electricity required to reach carbon neutrality and collaborating responsibly, to support, reform and modernise the sector and its assets nationally.

In order to address this challenge, the City commits to working towards achieving the following goals within this strategic focus area:

- Goal 10: Move as quickly as prices and opportunities allow towards 100% clean electricity supply by 2050
- Goal 11: Get technologically and commercially ready to operate the grid of the future

- Goal 12: Minimise the economic cost of energy through maximising energy efficiency opportunities

7.2. Strategic Focus Area 7: Zero emission buildings and precincts

One of the major opportunities associated with ambitious climate targets is to transform the city through climate smart development, and this can be most effectively achieved through the built environment and urban form. Electricity consumption makes up the city's largest source of emissions, and most of this electricity is consumed in buildings. In Cape Town, residential and commercial buildings account for approximately 37% of energy consumption and are responsible for the largest proportion of carbon emissions (approximately 58%) due to poor energy efficiency and the high carbon intensity of South Africa's electricity production. Significant opportunities exist for decreasing emissions from buildings through reducing building energy demand and supplying remaining building energy needs from a renewable source of energy.

Building energy efficiency is in line with national policy directions, supported by the intentions articulated in the draft National Energy Efficiency and Climate Change Strategies (2015, 2011) and the National Development Plan (2012), which envisages net zero emission building standards by 2030. A multi-pronged approach is required to achieve net zero carbon buildings. This includes developing more stringent building efficiency regulations, increasing awareness and capacity for low carbon developments, considering possible incentive packages, developing financing mechanisms to support access to finance for the upfront additional capital costs of energy efficiency and renewable energy interventions; and enabling the purchase of large scale renewable energy from independent power producers (IPPs) to supplement the Cape Town grid. The success of the multi-pronged approach hinges on the City's ability to lead and drive the required changes, using policy and regulation to signal the direction of change. More resource-efficient building approaches will, very importantly, prevent the lock-in of long-lived and inefficient building investments.

In order to address this challenge, the City commits to working towards achieving the following goals within this strategic focus area:

- Goal 13: All new buildings (residential, commercial and municipal) to be net zero carbon by 2030
- Goal 14: All existing residential and commercial buildings to be retrofitted with energy-efficient technologies to be net zero carbon in operation by 2050
- Goal 15: All existing municipal buildings to be net zero carbon by 2030

7.3. Strategic Focus Area 8: Transport for quality of life and livelihoods

Spatial and economic inequity is apparent in all aspects of service delivery in our city, including energy, transportation, water, sanitation and waste services. In the case of transportation, this was highlighted by an analysis indicating that the 25% poorest households spend an average of 43% of their income on transportation¹⁶.

Despite efforts to address efficiency and quality of transport systems across the city, the combination of several factors continues to make Cape Town an increasingly congested city, negatively impacting residents across a wide range of geographical locations and income

¹⁶ City of Cape Town (2018)

brackets. The spatial form of the city obliges residents to travel long distances to reach their place of work and to return home. The backbone of the city's transportation network - the rail system - is ailing. This is exacerbated by increasing population growth and property development in outlying areas of the city, placing a higher demand on commuter services. At the same time, private vehicle ownership is increasing at approximately 3% per annum.

Overall, energy consumption in the city is dominated by road-based transport fuel consumption (around 50% of total energy consumed). Nearly all of our current mobility options are dependent on imported fossil fuels, which are a net drain on our economy, exposing our economy and residents to risk associated with volatile oil and fuel prices on the international market. From 2002 to 2014, petrol doubled in real term costs. Transport is the second biggest contributor to the carbon intensity of Cape Town's economy. This is exacerbated by urban sprawl and the long distances that freight has to travel over a country as large as South Africa. Increased congestion and inefficiencies do not only increase the city's greenhouse gas emissions; they worsen air quality and therefore contribute to adverse and costly health impacts on our residents.

The transport mitigation strategy will be to continue to build an efficient and ultimately electric transport network through the best practice EASIA framework (Enable, Avoid, Shift, Improve, Adapt). This entails promoting efficiencies in: transport governance, land-use, multimodal transport system, road space usage and vehicles, and that 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 the 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.

In order to address this challenge, the City commits to working towards achieving the following goals within this strategic focus area:

- Goal 16: Restore and rehabilitate the rail system to a carrying capacity by 30% above 2010 levels, 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
- Goal 17: 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)
- Goal 18: Prepare for a scenario of complete transition to electric or alternative fuel-powered freight, bus, taxi and passenger vehicles by 2050
- Goal 19: Ensure that climate change and air quality monitoring and metrics for transport adequately support the assessment of actions and by-laws in the sector

7.4. Strategic Focus Area 9: Spatial and resource inclusivity

A citywide climate action plan driving transformative change must be inclusive. Inclusivity means addressing social and developmental needs and correcting historical legacy, while also tackling the global climate crisis. Vulnerable communities are also disproportionately impacted by climate change. The City's Resilience Strategy has proven that safe and affordable electricity services and transportation options, with amenities and employment opportunities in proximity to transport nodes, are critical to livelihoods and societal well-being. Applying a developmental lens to climate action, allows for a broader range of funding and financing options than actions that are purely about emissions reduction. Given that the majority of the city's growth is in the informal sector, it is critical that the City is able to instil spatial and resource efficiency at the outset; to avoid costly overlays of infrastructure in the long-term. Building smartly also has significant adaptation co-

benefits (through for example reduced heat exposure, rainwater harvesting and resilience to storms and flooding).

In order to address this challenge, the City commits to working towards achieving the following goals within this strategic focus area:

- Goal 20: Densify mass transit routes through mixed use developments that support public transport and include social housing
- Goal 21: Ensure equitable access to essential services for low-income residents

7.5. Strategic Focus Area 10: Circular waste economy

Landfilled organic waste is not only a contaminant of other potentially recoverable materials in the waste system, it is the major source of methane emissions in Cape Town. Solid waste contributes approximately 95% and wastewater contributes approximately 5% to the total combined emissions from solid waste and wastewater. Methane arising from landfilled organic waste and from wastewater treatment is a powerful greenhouse gas, that historically has resulted in the waste sector being responsible for 10-11% of citywide greenhouse gas emissions.

Recovering and deriving value from Cape Town's waste stream is a key element in the shift towards a green economy, with multiple co-benefits with respect to cleanliness of the city, and reduced littering and illegal dumping. A range of consistently implemented interventions will be required to stimulate the transition of the waste management system. Central to the transition is removal of organic waste from the general waste stream which enables the recovery of useful waste materials. However, efforts also need to be invested in advancing towards elimination of single-use packaging and materials in Cape Town's economy.

Transversal co-ordination and provincial collaboration are important for enabling the desired transition. The programme of interventions in this sector will serve to unblock challenges with respect to resourcing and financing, and to facilitate opportunities for collaboration and involvement of other waste sector stakeholders through the plan. This also requires additional work to better understand the costs and benefits of this transition, and the resources required to create a circular waste economy.

In order to address this challenge, the City commits to working towards achieving the following goals within this strategic focus area:

- Goal 22: Develop and implement a sustainable waste management strategy that is financially feasible, and maximises material efficiency by prioritising waste avoidance, reduction, treatment and recycling in line with provincial targets
- Goal 23: Reduce organic waste disposal to landfill by 50% by 2030 and 100% by 2050 through better waste separation, treatment and utilisation
- Goal 24: Increase diversion of recyclables from disposal to landfill by 40% by 2030 and 85% by 2050 through improved collection, waste separation, and providing support to informal workers
- Goal 25: Reduce the climate and environmental impact of disposal facilities by increasing landfill gas collection efficiency, treatment and utilisation

8. Cross-cutting Work Areas and Goals

In order to effectively address climate change, several cross-cutting work areas have been identified. These cross-cutting work areas support the implementation of strategic focus areas and are necessary to ensure that the appropriate governance measures are in place to enable an effective and integrated climate change response by the City of Cape Town.

8.1. Cross-cutting Work Area 1: Mainstreaming climate change

Mainstreaming is an essential area of work which ensures that there is a sound policy and evidence base for the City's climate change response, as well as ensuring that all relevant departments in the City are enabled to take appropriate action. This cross-cutting work area also includes a focus on establishing and building partnerships, and putting in place effective governance measures; both of which are essential for effective implementation.

The City therefore commits to working towards achieving the following goals within this cross-cutting work area:

- Goal 26: Mainstream climate change responses into City governance processes and key City strategies, policies, processes and plans
- Goal 27: Conduct and commission climate change related research and ensure that the City remains up to date with emerging research in the field

8.2. Cross-cutting Work Area 2: Addressing economic impacts

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 economic competitiveness should Cape Town not keep pace with international trends in carbon neutral processes, products and services.

Solutions to decarbonisation need to account for the highly integrated regional, national and global context. These solutions need to consider the greenhouse gas emissions embedded in local economic inputs and outputs, and the associated need to remain competitive in view of the regulatory environment, value chains and economic niches.

Goals and actions within this work area therefore focus on working with various economic sector bodies to reduce climate risk within their sectors, increase international competitiveness as it relates to carbon neutrality, and mainstream climate change adaptation and mitigation into the City's existing green economy approach. Additionally, food security has been identified as a key economic challenge that cuts across multiple sectors and City departments.

The City therefore commits to working towards achieving the following goals within this cross-cutting work area:

- Goal 28: Proactively work to reduce the economic impact of climate change on key economic sectors
- Goal 29: Proactively address climate change through the creation of green jobs and through the use of green procurement
- Goal 30: Promote food security, as well as low carbon and climate resilient food systems in Cape Town

8.3. Cross-cutting Work Area 3: Financing and financial mechanisms for climate change response

Responding to climate change can be costly, especially where significant infrastructure may need to be installed, replaced or upgraded in order to ensure climate resilience and carbon neutrality. Municipal budgets alone may be insufficient to cover these costs, and therefore innovative ways of financing this work is required. There is also a need to re-look at how the City assesses the costs and benefits of actions and decisions, and adopt new mechanisms for doing so; including life-cycle analyses and accounting for both positive and negative externalities. Additionally, the City will need to re-look at its business model in light of the disruption to electricity income that is likely to occur due to increased uptake of small scale embedded generation and the impact of new and disruptive technologies.

The City therefore commits to working towards achieving the following goals within this cross-cutting work area:

- Goal 31: Investigate novel sources of climate finance and the use of innovative financial mechanisms to support climate change response and implement where feasible
- Goal 32: Continuously review and improve business models and practices to respond effectively to the impacts of climate change and the threats and opportunities arising from new technologies

8.4. Cross-cutting Work Area 4: Communication and collaboration to support climate change response

Communication and education is a vital component of addressing both climate change mitigation and adaptation. From a mitigation perspective, communication and education is important to help change 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, communication and education programmes support people to take action to improve their resilience and protect themselves against climate shocks and stresses. An effective communication campaign 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.

Climate change response also cuts across all three spheres of government, and as such requires integration and collaboration to ensure effective implementation. Collaboration with international organisations such as C40, ICLEI, Global Resilient Cities Network, World Economic Forum: Systemic Efficiency Group, and with other cities committed to addressing climate change - both within South Africa and internationally - forms an essential part of the City's response by allowing the City to learn from best practice and benefit from knowledge sharing.

The City therefore commits to working towards achieving the following goals within this cross-cutting work area:

- Goal 33: Ensure that Cape Town's residents, businesses, visitors, and City officials receive timely, effective, and appropriate climate change education, communication and training
- Goal 34: Establish and maintain partnerships with local, regional and international organisations to support climate actions
- Goal 35: Work with national government to collaboratively reform/devolve decision making with reference to climate change implementation

9. Climate Change Action Plan

This Climate Change Strategy provides the broad and over-arching framework for decision-making regarding climate change as well as the strategic direction for action planning and programme implementation.

However, this strategy does not include detail on specific actions or programmes of action. This level of detail is captured within the forthcoming City of Cape Town Climate Change Action Plan, which should be read alongside this strategy.

The Climate Change Action Plan includes details on a range of actions across all of the strategic focus areas and cross-cutting work areas. These actions are programmatic in nature, and contain many sub-actions which will take the form of projects, detailed plans of action and operating procedures.

10. Strategy and Policy Linkages

10.1. City of Cape Town strategies

- **Resilience Strategy (2019):** The Resilience Strategy aims to put in place programmes and projects to address a set of prioritised chronic stresses and acute shocks, including climate change and related climate shocks and stresses, and therefore to increase Cape Town's resilience and reduce vulnerability into the future.
- **Environmental Strategy (2017):** The City of Cape Town Environmental Strategy recognises the risks posed by climate change and natural hazards and therefore commits the City to the following principle: "In taking decisions, implementing service delivery, operating, as well as planning for the future, the City will ensure a focus on resilience, enabling the city to withstand and mitigate the negative impacts of environmental hazards, proactively reduce Cape Town's vulnerability, and protect the city's economy."
- **Inclusive Economic Growth Strategy (2019, draft):** The Inclusive Economic Growth Strategy rests on six core principles: inclusivity, competitiveness, accessibility, resilience, sustainability, and collaboration. These principles encourage inclusive, sustainable, and resilient development and will contribute significantly to reducing vulnerability for those that are most at risk from climate hazards.
- **Transit-Oriented Development (TOD) Strategic Framework (2016):** The purpose of the City of Cape Town TOD Strategic Framework is to identify the tools and mechanisms to be employed by various role players who have a collective impact on development to ensure that they move progressively toward a more sustainable, compact and equitable urban form.
- **Municipal Spatial Development Framework (2018):** Cape Town's Municipal Spatial Development Framework (MSDF) sets out the spatial vision and development priorities to achieve a reconfigured, inclusive spatial form for Cape Town. Fundamental to the MSDF is ensuring spatial transformation via dense and transit-oriented growth and development, anchored by an efficient transport system.

10.2. Provincial strategies

- Western Cape Climate Change Strategy (2014): The Western Cape Climate Change Response Strategy is a coordinated climate change response that aims to guide climate change adaptation and mitigation programmes, plans and actions across nine focus areas in the Western Cape province.

10.3. National policies and legislation

- The National Climate Change Response Policy (2011): The National Climate Change Response Policy provides an overarching “vision for an effective climate change response and the long-term, just transition to a climate-resilient and lower-carbon economy and society”, and outlines ten near-term priority flagship programmes in key sectors to achieve this vision.
- National Climate Change Adaptation Strategy: The National Climate Change Adaptation Strategy aims to guide South Africa's journey towards a climate resilient society through adaptation, by outlining a set of strategic objectives, interventions and outcomes with associated actions for all key sectors and stakeholders in South Africa's adaptation landscape.
- Climate Change Bill (Draft): The Climate Change Bill will become the legal instrument that regulates the implementation of climate response, and outlines the development of specific adaptation and mitigation targets, plans, strategies and objectives; such as the development of a National Adaptation Strategy and a National Greenhouse Gas inventory.
- Carbon Tax Act (Act 15 of 2019): The Act gives effect to the polluter-pays-principle for large emitters and aims to ensure that firms and consumers take the negative adverse costs (externalities) into account in their future production, consumption and investment decisions. The current carbon tax is R120/tCO₂e. However, as per the tax design, a series of tax allowances have been introduced for the first phase (1 June 2019 – 31 December 2022), which will reduce the initial effective tax rate.
- SANS 204 and the National Building Regulations Part XA, 'Energy Efficiency' (2011): This document provides for the amendment of the National Building Regulations to include energy efficiency standards in all residential and commercial buildings. Importantly, it includes water heating, where at least 50% of heating needs must be met by non-electrical resistance means. The amendment has made provision for a building envelope, fenestration, passive solar heating and insulation.
- Green Transport Strategy (2018 – 2050): To address the significant contribution of transport to national GHG emissions, the Department of Transport has developed a Green Transport Strategy (GTS), which aims to minimise the adverse impact of transport on the environment; while addressing current and future transport demands. This is underpinned by sustainable development principles. The strategy aims to promote green mobility to ensure that the transport sector supports the achievement of green economic growth targets and the protection of the environment.

11. Monitoring and Evaluation

A monitoring and evaluation plan will be developed to ensure that the City is able to track progress regarding the implementation of this strategy and therefore make updates or changes as required.

This plan will include regular reporting to relevant City portfolio committees as well as integration with the City's service delivery and budget implementation plan (SDBIP) process.

12. Glossary

12.1. Definitions

For the purposes of this Climate Change Strategy, the following definitions apply. Where appropriate, the official IPCC definition has been used¹⁷:

“Adaptation” means, in human systems, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities; in natural systems, the process of adjustment 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.

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

“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 Cape metropolitan area in which the City of Cape Town has jurisdiction within its boundary.

“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.

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

“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.

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

¹⁷ IPCC (2018 a)

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

“Green economy” means expanded economic opportunities created through the provision of goods and services and 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 the interconnected set of natural and constructed ecological systems, green spaces and other landscape features. It includes planted and indigenous trees, wetlands, parks, green open spaces and original grassland and woodlands, as well as possible 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 and well-being; ecosystems and species; economic, social and cultural assets; services (including ecosystem services); and infrastructure. 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.

“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).

“Resilience” means the capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganising in ways that maintain their essential function, identity, and structure (where appropriate); while also maintaining the capacity for adaptation, learning, and transformation.

“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), as well as the (climate-related) hazard and the likelihood of its occurrence.

“Sink” means a reservoir (natural or human, in soil, ocean, and plants) where a greenhouse gas, 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.

12.2. Abbreviations

C40 – The C40 Cities Climate Leadership Group

GHG – Greenhouse Gas

ICLEI – Local Governments for Sustainability (formerly known as the International Council for Local Environmental Initiatives)

IPCC – Intergovernmental Panel on Climate Change

NGO – Non-governmental Organisation

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Annexure A. What does Carbon Neutrality Mean for Cape Town?

The commitment to carbon neutrality requires a profound social and economic shift over a 30-year period. However, there is a considerable risk, even under circumstances of high commitment and best efforts from stakeholders, of following a pathway that significantly reduces emissions but falls far short of carbon neutrality. Given the political, economic, and technological uncertainties involved, while substantial mitigation is technically and financially viable, it is not certain that Cape Town will be able to closely approach carbon neutrality by 2050 and interim milestones along the way. In the institutional and legislative status quo, many of the outcomes are beyond local government's direct control and require action from other stakeholders, most notably national government, national utilities like Eskom and PRASA, the private sector, and residents. The technical and financial expertise of the greater city, supported by political will, can however drive incremental change even in the face of such obstacles.

Given this challenge, the meaning and terms of Cape Town's commitment to carbon neutrality must be seen in the context of the following commitment guidelines that have been agreed to by the City's international partners:

- The carbon neutral commitment does not bind the City of Cape Town to fixed outcomes under the threat of penalties in the manner of a loan or treaty.
- As a city within a developing country, the City of Cape Town is not expected, at this time, to plan for investments in offsetting or capturing 'residual emissions' which are the emissions that cannot be reduced by 2050. Options for capturing residual emissions through technological means are extremely expensive and large scale afforestation is unsuitable because forest ecosystems are not part of Cape Town's natural environment.
- As a city within a developing country, Cape Town is still expected to 'peak' its emissions before 2030, while cities in developed countries are being asked to reduce emissions immediately. While Cape Town has an income per capita classified as lower middle income, and therefore might be expected to reduce emissions immediately, it is recognised that extreme inequality is a feature of our society and that current economic circumstances are challenging.
- Therefore, this commitment is about making ambitious low-carbon choices where these are economically and socially beneficial in Cape Town's own context, and being ambitious in terms of being a part of the emerging global green economy.
- Furthermore, much can be achieved by the sum of many individual citizen actions, which can and should generate additional local environmental, social and economic benefits.
- Cape Town is however expected to respond timeously, publically and actively with policy and actions when monitoring and evaluation indicates that the city is moving along a pathway that will not closely approach carbon neutrality.
- The commitment emphasises climate leadership and encourages diverse approaches. However, while Cape Town is allowed discretion as to the exact amount of residual emissions in the target projections, an upper limit of 20% of base year emissions by 2050 is considered a minimum acceptable contribution to the Paris Agreement under this commitment.

Despite the challenges, the target of carbon neutrality has notable advantages over previous 'low-carbon' targets in that it is more consistent with the requirements of science, it doesn't place temporally determined constraints on decarbonisation that quickly become obsolete, and is easier to comprehend and communicate. Furthermore, a commitment to carbon neutrality enables the City to join with other leading cities to signal a determination to take up the opportunities and long term benefits of a sustainable, equitable and green economy.

Annexure B. Timeline of City of Cape Town Climate Change Strategy, Policy, and Planning

The diagram below shows an overview of key strategies, policies and plans that the City of Cape Town has adopted as part of its climate change response. These strategies, policies and plans support and guide the implementation of key programmes and projects.

