

CITY OF TSHWANE
**CLIMATE
RESPONSE
STRATEGY**

for a prosperous capital city
through freedom, fairness
and opportunity.



Climate Response Strategy: Foreword

The City of Tshwane's commitment to addressing climate change started in earnest on the day that the City signed the former Compact of Mayors, now known as the Covenant of Mayors for Energy and Climate. Since then, the City has put all the essential building blocks in place to prepare a meaningful and well-informed response to climate change. This has included a climate risk and vulnerability assessment and a greenhouse gas emissions inventory (GHGEI) compliant with the Global Protocol for Community-Scale GHGEIs.

In close association with the signing of the covenant, City of Tshwane was accepted as the 70th member of the C40 Cities Climate Leadership Group (C40) in September 2014. C40 has been at the forefront of the global realisation that cities and regions are indispensable in the fight against climate change. Whilst countries may determine Nationally Determined Contributions (NDCs), it is cities that will be the critical role players in the achievement of the NDCs.

In supporting African cities to realise meaningful climate action, C40 is currently rolling out the African leg of its Global Climate Action Planning Programme. Launched in May 2018, the programme currently provides comprehensive technical support to 11 cities on the continent, including the City of Tshwane, to develop ambitious and equitable Climate Action Plans in line with the objectives of the 2015 Paris Agreement.

Since the drafting of this Climate Response Strategy preceded the selection of the City of Tshwane to participate in the C40 Climate Action Planning programme, we have decided to publish the Strategy in recognition of the efforts and stakeholder consultation undertaken to date. At the same time, we have decided to review the strategy to ensure that it is aligned with the C40 Climate Action Planning Framework. The strategy should therefore be regarded as a precursor to the City of Tshwane's Climate Action Plan to be developed under the C40 Cities Programme and in close consultation with its internal and external stakeholders.



Contents

1.	Introduction	1
2.	Climate Change and the City of Tshwane - Rising to the Challenge	4
	2.1 Current and projected changes to regional and local climate	4
	2.2 International and National Commitments	5
	2.3 Gauteng City Region Climate Change Strategy, 2018	7
	2.4 City of Tshwane Policy and Management Response	8
	2.5 City Sustainability Programme	10
3.	Baseline studies to support evidence-based planning	14
	3.1 Vulnerability assessment and adaptation planning	14
	3.2 Baseline GHGEI 2014/15 and Emissions Reductions Targets	15
4.	Climate Response Priority Programmes and Projects	19
	Intervention 1: Enhance and protect the City's natural ability to buffer climate change impacts	19
	Intervention 2: Develop an integrated approach to water management in the City	21
	Intervention 3: Building climate resilient communities	22
	Intervention 4: Promote mixed used densification and transit oriented development	24
	Intervention 5: Promote cleaner mobility	26
	Intervention 6: Retrofit existing buildings and build green buildings	27
	Intervention 7: Promote energy efficiency	28
	Intervention 8: Promote cleaner and renewable energy	30
	Intervention 9: Divert waste from landfills and find innovative uses for waste	32
	Intervention 10: Pursue sustainability support mechanisms	34
5.	Means of Implementation	35
	5.1 Institutional Commitment	35
	5.2 Partnerships, Sustainability Profiling and Resource Mobilisation	36
	5.3 Building Knowledge	38
	5.4 Communication and Behaviour Change	38
6.	Monitoring and Evaluation	40
7.	Conclusion and Way Forward	41
8.	Annexures	42



1 Introduction

The City of Tshwane (“the City”) is a democratic developmental metropolitan government that is people-centred and places the needs of the most vulnerable at the centre of the development agenda.

The City, however, recognises anthropogenic climate change as a significant challenge facing the world today; it is currently affecting, and will increasingly affect, all aspects of human life, from an economic, social and environmental perspective¹. The City therefore aims to be an exemplary African municipality, leading the charge towards improved resilience to climate change impacts, whilst systematically reducing the city's contribution to global warming.

The City of Tshwane will achieve this objective by becoming a sustainable city - a global example of a city taking climate change seriously while ensuring that its residents receive access to the services they need, and reducing poverty and joblessness. This progressive and ambitious agenda aligns well with the City's slogan – “Igniting Excellence”².

The City, under leadership from its Executive Mayor, is also aligning its climate change response with international peers, having signed the **Compact of Mayors' Declaration** in 2014 (now known as the **Covenant of Mayors for Climate and Energy**) and becoming a member of the **C40 Cities Climate Leadership Group (C40)**, an international group of megacities committed to addressing climate change. The C40 organisation supports cities and their Mayors to collaborate effectively, share knowledge and drive meaningful, measurable and sustainable action on climate change.

As a signatory of the Compact of Mayors' Declaration and a member of C40, the City is afforded an opportunity to be recognized as a leader in local climate change. To do so, the City must comply with the planning and reporting requirements set out in Figure 1, and develop a climate change response strategy aimed at responding to the findings of both its annual Greenhouse Gas (GHG) Emissions Inventory ('carbon footprint')³ and its Climate Change Vulnerability Assessment (2015).



1. City of Tshwane Vulnerability Assessment 2015

2. CoT 2015-16 IDP Review.

3. City of Tshwane Greenhouse Gas Emissions Inventory, 2012/2013 (GHGEI)

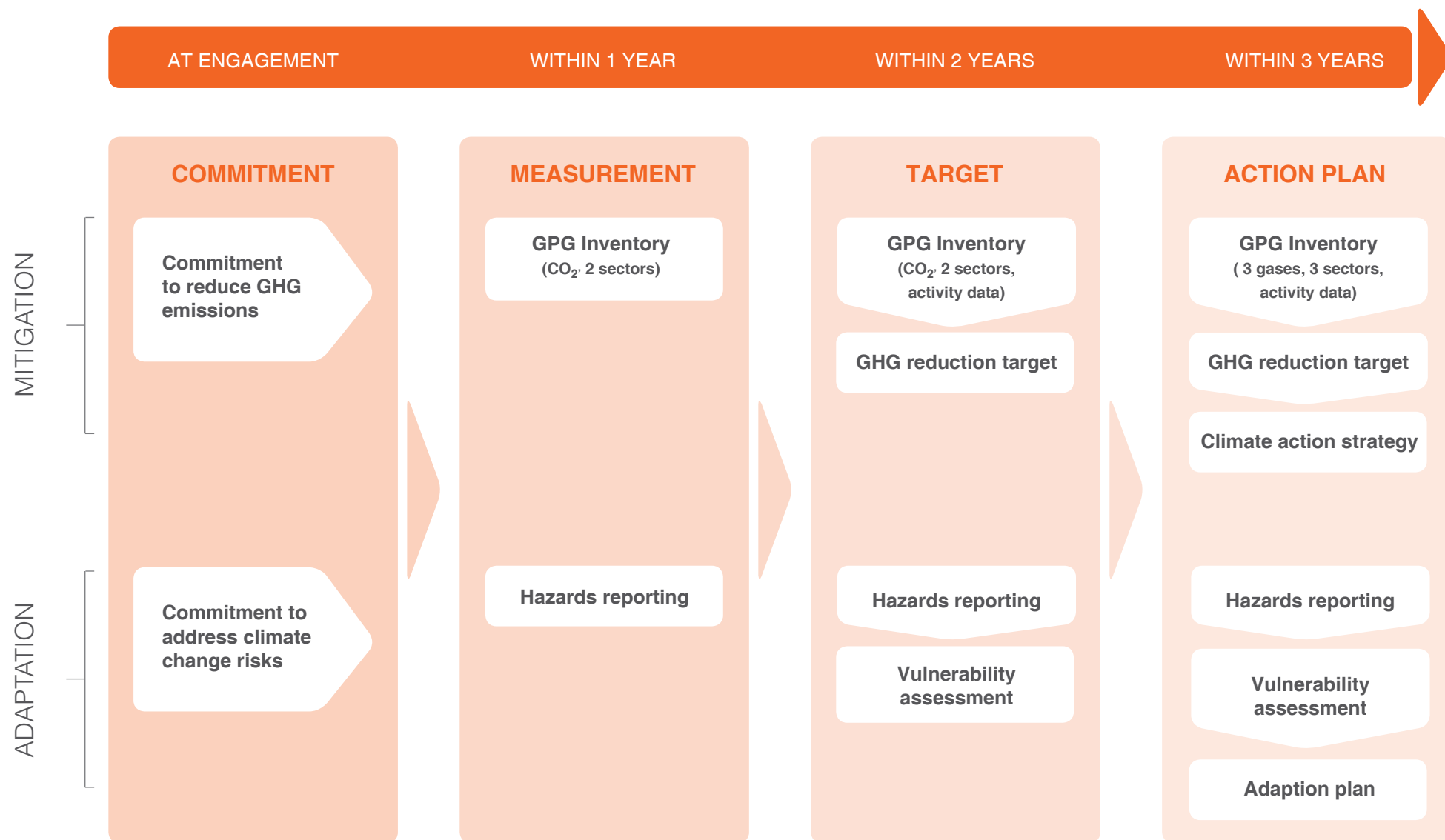


Figure 1: Planning and reporting requirements for signatories of the Compact of Mayors

1 Introduction



The GHG inventory is required to be compliant with the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) jointly supported by ICLEI-Local Governments for Sustainability (ICLEI), the World Resources Institute (WRI) and C40.

The City has thus far complied with all the Compact's reporting requirements and now the final milestone is the setting of a greenhouse gas reduction target and the publication of a Climate Response Strategy, which combines a climate action (mitigation) plan and adaptation plan. Adaptation refers to dealing with the impacts of climate change (e.g. dealing with increasing severity of heat waves, associated with the global rise in temperature). Mitigation refers to dealing with the cause of human-induced climate change; reducing the emission of greenhouse gases or enhancing the storage of these gases (for example, harnessing alternative sources of energy such as solar or wind power reduces the GHG emissions of the use of energy).

This, the City's first Climate Response Strategy, is time-bound and aligned to the five-year political cycle that will conclude in 2020/21. It is the forerunner to a detailed implementation plan that will be developed in close consultation with internal and external stakeholders and interested and affected parties.

The Strategy aims to set the context for climate response based on our current emissions profile and climate hazards and risks as well as determining the emissions we need to reduce should we wish for our emissions not to exceed our 2014/15 baseline.

The Strategy also sets out 10 key intervention areas for the medium term as the City departments are urged to take up the mantle and incorporate climate response actions in their departmental plans. Lastly, the Strategy also explores the means of implementation which is dependent on partnerships, resource mobilisation and communications. As the City's first Climate Response Strategy, addressing mitigation and adaptation efforts, it is modest in its attempts to ramp up city-wide climate response commitments as climate change becomes everyone's responsibility and remains subject to annual review as an iterative process of improvement and refinement. Assurance of its implementation will be determined through the subsequent development of an implementation plan.

2 Climate Change and the City of Tshwane Rising to the Challenge

2.1 Current and projected changes to regional and local climate

Climate change is not a vague futuristic concept that may manifest in the future; the effects of climate change are real and are already being experienced in the City. The most notable indicator is rising temperatures. In the Tshwane region these have been increasing significantly over recent decades – at about twice the global rate. Although there are as yet no significant changes in rainfall, there is a downward trend in the maximum number of consecutive wet days per year.

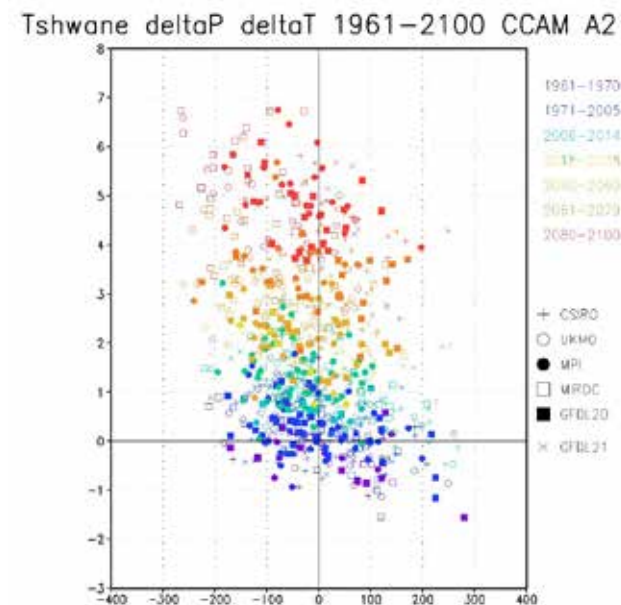
How these climate patterns will develop in the future is described by the outputs of computer models of the global climate system called global circulation models or 'GCMs'. The models are used to predict how regional climate systems will respond to changes in the troposphere resulting from an intensified greenhouse effect. A 60 km x 60 km resolution downscaling of six different GCMs is used for the purposes of understanding how the climate of the Tshwane region will develop up to the year 2100. Each of the models are run

under the assumption that coordinated global efforts at mitigating carbon emissions will remain limited and that CO₂ concentrations double (as compared to pre-industrial values) by about the mid-21st century – also known as the A2 scenario of the IPCC Special Report on Emission Scenarios (SRES)⁴.

The model outputs confirm that temperatures will continue to climb, with a rise of up to 2°C for the near-future period (2015-2035), between 1 and 3°C for the mid-future period (2040-2060), and 4 to 7°C projected over the region for the period 2080-2100. Rainfall anomalies exhibit a clear pattern of drying, which strengthens over time, although the scale of drying will be limited.

Extreme weather also becomes a concern. The climate model ensemble shows a drastic increase in the number of very hot days (days with maximum temperatures exceeding 35°C) in the second half of this century. Whereas the current annual average is 40 very hot days per year, the annual number of very hot days will range between 100 and 180 days by 2100. This implies that it is plausible for almost all days during the summer half-year to have maximum temperatures exceeding the 35°C threshold.

Extreme rainfall events (>20 mm of rain falling within 24 hours over an area of 50x50 km²) are of less concern, although the climate models point towards an increased frequency of extreme events in future. These events typically exceed the capacity of infrastructure to deal with the runoff, leading to flash floods or general flooding of low-lying areas.



4. Roughly equivalent to the 8.5RCP (Representative Concentration Pathway) projections trajectories subsequently adopted by the IPCC for its fifth Assessment Report (AR5) in 2014

Climate Change and the City of Tshwane

Rising to the Challenge

2.2 International and National Commitments

This Tshwane Climate Response Strategy outlines the overall climate change response intervention strategies for Tshwane, in alignment with a number of important local, national and international agreements and commitments.

The climate change policy arena has changed significantly post the 'Paris Agreement' tabled at the 21st Conference of the Parties (COP21) of the United Nations Conference on Climate Change (UNFCCC) in Paris at the end of 2015. The Paris Agreement entered into force on 4 November 2016, 30 days after the critical threshold was reached of at least 55 Parties to the Convention accounting in total for at least an estimated 55% of the total global greenhouse gas emissions ratifying the agreement. In total, 175 nations have now ratified it, including South Africa. Important points contained in the agreement are: It endorses a long-term goal to limit global warming to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C;

- It sends a clear signal to all stakeholders that a shift away from fossil fuels is needed;

- For the first time, a global goal for increasing climate resilience and reducing climate vulnerability is put forward⁵; and
- Recognition of the importance of subnational governments in the fight against climate change.

At COP21, local government leaders met in solidarity at the Paris City Hall for the **Summit for Local Leaders**. The key outcome of the Summit was a solid commitment to reduce greenhouse gases at local government level as contained in the Paris City Hall Declaration. The essence of this Declaration is a set of commitments by local government leaders to:

- Produce and implement participatory resilience strategies and action plans to adapt to the rising incidence of climate related hazards by 2020;
- Deliver up to 3.7 giga tons of urban greenhouse gas emissions reductions annually by 2030 — the equivalent of up to 30% of the difference between current national commitments and the 2-degree emissions reduction pathway identified by the scientific community;
- Support ambitious long-term climate goals such as a transition to 100% renewable energy in our communities, or an 80%

- greenhouse gas emissions reduction by 2050;
- Engage in partnerships among themselves and with global organizations, national governments, the private sector, and civil society to enhance cooperation and capacity-building programmes, scale-up climate change solutions, develop metrics and promote innovative finance mechanisms and investments in low-emission projects across the world.

C40 Deadline 2020

- Emissions peak at 5% above 2017 levels
- 5 tCO₂e per capita today reduced to around 2.9 tCO₂e per capita by 2030
- Wealthier, high-emitting cities require an immediate and steep decline in emissions
- Pioneering by C40 cities and uptake by peers can deliver 40% of the Paris Agreement emissions reductions

2 Climate Change and the City of Tshwane Rising to the Challenge

Further to the Paris City Hall Agreement, the C40 has developed its 'Deadline2020' report that outlines the plan of achieving the Paris Agreement at the City-level and sets out the plan of action over the next 5 years.

South Africa ratified the Paris Agreement on 1 November 2016 and pledged to limit GHG emissions, including those related to land use, land use change and forestry (LULUCF), to between 398 and 614MtCO₂e over the period 2025–2030. Prior to this Nationally Determined Contribution (NDC), the South African Government gazetted the **National Climate Change Response Policy** in 2011 as a White Paper, supported by the **Long Term Mitigation Scenarios** (2011) and the **Long Term Adaptation Scenarios** (2013).

The national policy outlines South Africa's principles, approach, priorities and responses to climate change. Its position on climate change is also supported by the **Third National Communication** to the UNFCCC which describes the local understanding of climate change impacts, progress in responding to the impacts and commitments to reducing national greenhouse gas emissions.

Expectations of local government's role in climate change response are captured at a high level

in the national policy and includes participation in core structures and processes to driving and monitoring progress of climate response efforts (vertical integration); the implementation of energy efficient and renewable energy plans (mitigation measures); and building climate resilience through the planning of human settlements and urban development, municipal infrastructure and services; water and energy demand management; and local disaster response. The expectation is that this will be incorporated into (or mainstreamed) into all local government planning efforts.

Whilst acknowledging that the local government plays an important role in implementing adaptation and mitigation actions, it notes that some of these actions "*extend beyond the existing Constitutional and legislative mandate of local government.*"



Principles of the National Climate Change Response Strategy

- Mitigate and adapt to climate change in alignment with our national circumstances.
- Make a fair and equitable contribution to the abatement of climate change.
- Focus our attention on the most vulnerable (the poor, women, children, elderly and the disabled).
- Uplift the poor and vulnerable.
- Manage our resources for the benefit of present and future generations.
- Apply a risk-averse and cautious approach.
- Hold those responsible for environmental degradation to account.
- Enhance public awareness and understanding of climate change.
- Promote sustainable development and its interconnected economic, social and ecological pillars.

2 Climate Change and the City of Tshwane Rising to the Challenge

2.3 Gauteng City Region Climate Change Strategy, 2018

The Gauteng Department of Agriculture and Rural Development (GDARD) is in the process of reviewing the 2011 Gauteng Climate Change Response Strategy and Action Plan. This plan is due for completion in 2018, and includes a more refined GHG inventory as part of the overall study.

The revised strategy recognises that Gauteng will be exposed to higher temperatures and changing precipitation patterns in future. This will impact on the province in a cyclic manner, by affecting the functioning of the economy and socio-economic vulnerabilities, and by causing changes to ecosystem functioning and species distribution. It also shows that Gauteng has a significant carbon footprint - roughly 35% of national emissions. If South Africa is to meet its international obligations to reduce the national carbon footprint, much of the mitigation effort will need to manifest in Gauteng province. The new GHG inventory informs revised sector targets that are aligned with national GHG emissions reduction commitments, with the biggest abatement share allocated to the built environment (represented by commercial and residential buildings) and industrial activities.

The Gauteng Climate Change Response Strategy is premised on the idea that opportunities for GHG mitigation can be used to build a sustainable and resilient socio-economic system. The mitigation targets specified in the Strategy therefore tie into a range of adaptation actions, to detail ten sector-based response programmes for each of which a responsible sector department is identified and the role(s) of government, mitigation and adaptation targets and project types are detailed. Each project intervention is also assessed in terms of whether it addresses one or more of the four core strategy objectives, namely a functional ecosystem, improved quality of life, reduced disaster risk and a resilient low-carbon economy, as well as its general contribution to mitigation targets.

Gauteng Climate Strategy Objectives

- Functional ecosystem
- Improved quality of life
- Reduced disaster risk
- A resilient low-carbon economy



2 Climate Change and the City of Tshwane Rising to the Challenge

2.4 City of Tshwane Policy and Management Response

Commitment to addressing climate change is embedded in the City of Tshwane's sustainability journey, and anchored in a profound political commitment to elevate sustainability at an institutional level by locating a specialist unit in the Office of the Executive Mayor, namely the City Sustainability Unit (CSU) established in 2013. The CSU is currently mandated to address climate change and stimulate the green economy, which it does through policy development, resource mobilisation, research, awareness-raising and demonstration projects.

As its focal areas are multidisciplinary and transversal, the CSU is able to interface with many of the City's departments and ensure that issues of sustainability and climate change are engendered in subject specific policies, strategies and activities.

Its point of departure was the development of a **policy framework** to guide the transition to a green economy. The City published a **Strategic Framework for a Transition to the Green**

Economy in 2013⁶ that provides a strategic guide for low-carbon, equitable economic development that can enhance Tshwane's transition to a green economy and facilitate a sustainable development path.

Based on the climate change mitigation objectives outlined in this Framework, the City undertakes an annual greenhouse gas inventory (with the official baseline being the GPC-compliant 2014/15 inventory) in accordance with the **City of Tshwane Greenhouse Gas Inventory Management Plan**⁷, as well as a **State of Energy**⁸ study (that included an energy futures modelling exercise) and **Sustainable Energy Strategy**⁹. The State of Energy report considered energy-related emissions only, whilst the GHGEI includes greenhouse gas emissions from energy as well as other sources such as waste.

Furthermore, a **Climate Risk and Vulnerability Assessment**¹⁰ was completed to identify climate risks and adaptation options. The results of the GHGEI and climate risk and vulnerability assessment are presented in Section 3. Combined, these studies support **evidence-based planning** and have given rise to a City Sustainability Programme.

Strategic direction and operational planning for the City is provided by the recently adopted **Integrated Development Plan** (IDP) 2017/21. The Constitution commits government to take reasonable measures, within its available resources, to ensure that all South Africans have access to adequate housing, health care, education, food, water and social security¹¹.

In order to realise the above, the Chapter 5 of the Local Government: Municipal Systems Act (Act 32 of 2000) states that a municipality must undertake developmentally oriented planning, in the form of integrated development planning, to ensure that it achieves the objects of local government as set out in the Constitution. It must further give effect to its developmental duties as required by Section 153 of the Constitution.

The foundation of the IDP is five strategic pillars that anchor planning for the City until 2020/21 (Table 1). It is primarily the first and third pillars – 'A City that Facilitates Economic Growth and Job Creation', and 'A City that Delivers Excellent Services and Protects the Environment' – that need to be linked in pursuance of an inclusive economy that is resilient in the face of direct and indirect impacts of climate change, and household scale adaptation for social well-being.

6. City of Tshwane Green Economy Strategic Framework 2013

7. City of Tshwane Greenhouse Gas Inventory Management Plan 2014/15

8. City of Tshwane State of Energy Report 2016

9. Appendix to the City of Tshwane Energy Futures Report 2016

10. City of Tshwane Vulnerability Assessment 2015

11. Report on the tabling of the 2017/21 Integrated Development Plan for adoption.

CITY OF TSHWANE • INTEGRATED DEVELOPMENT PLAN • 2016 - 2021

Development Strategic Pillars	Description
1. A City that Facilitates Economic Growth and Job Creation	The City's plan for the next five years will be creating a City of opportunity. The plan centres around five focus areas that will create economic growth which is labour absorbing, will provide many more residents with new employment opportunities and further the development of the City. Making it easier to do business, supporting entrepreneurship, empowering individuals, investing in infrastructure and encouraging new industries will lead to economic growth and employment.
2. A City that Cares for Residents and Promotes Inclusivity	The City of Tshwane is committed to redressing historical injustices and addressing the neglect of poorer communities by the previous administration. Many communities in the City of Tshwane do not have access to basic services and still experience the spatial legacy left by Apartheid on a daily basis. Although some gains have been made to improve service provision to poorer communities since 1994, too many people still do not have access to formal services, live far away from job opportunities and do not have access to basic health care services. There are more than 170 informal settlements in Tshwane with varying level of services. This has led to many people living in poor conditions without access to adequate sanitation, running water or electricity. Informal areas were left dirty without regular refuse removal or area cleaning. The City is committed to addressing these challenges over time in order to redress our hurtful past and provide people dignified living spaces.
3. A City that Delivers Excellent Services and Protects the Environment	City service delivery needs to be improved and expanded in a sustainable manner. Water and energy resources along with the environment needs to be protected. The City is committed to redressing historical unequal service provision and addressing inherited delivery backlogs. The City is working towards providing quality services to all residents, adopting innovative solutions to service delivery challenges, and reprioritizing resources to where they are needed most. The provision of services also includes the delivery of housing opportunities.
4. A City that Keeps Residents Safe	Ensuring the safety and wellbeing of residents is one of the key priorities of the City. Residents need to feel safe and be safe in the City they call home. Drug abuse and related crime is currently one of the biggest challenges faced by the City.
5. A City that is Open, Honest and Responsive	The City is committed to transparent and accountable governance with zero tolerance for corruption. City processes and systems will be run in an open and effective way and only the best officials will be retained and attracted to improve the City's performance. The City prioritises being responsive to residents, to work together on the issues that impact communities to find solutions.

Table 1: Strategic pillars for the City (IDP 2017/21)

Climate Change and the City of Tshwane

Rising to the Challenge

2.5 City Sustainability Programme

The City Sustainability Programme is comprised of three core elements: the mitigation programme, the adaptation programme and sustainability support programme. The following provides an overview of current foci and activities.

MITIGATION PROGRAMME

The aim of the mitigation programme is to reduce the City's production of and exposure to greenhouse gas emissions. The programme is aligned to areas that are within the municipality's sphere of influence and addresses four elements: sustainable energy, green buildings, low carbon mobility and sustainable waste management.

Sustainable Energy

The key focus is to diversify the energy mix since the bulk of Tshwane's electricity is derived from fossil fuels creating a significant carbon footprint for the City. Here there is scope for large-scale renewable energy generation facilitated through wheeling agreements and third-party offtake agreements. The second area is embedded generation which allows consumers to produce

electricity through renewable energy technologies. The third focus is to address suppressed demand and energy poverty through off-grid renewable solutions.

Green Buildings

The built environment is resource-intensive, especially in its use of energy. A global movement to 'green buildings' and sustainable urban development aims to use sustainable and innovative design to address water and energy conservation, minimise waste and enhance biodiversity. The City is the first in South Africa to have a green building by-law that encourages the uptake of green building principles and design measures.

The City is also a member of the Green Building Council of South Africa and advocates for the accreditation of green buildings. Apart from new-builds, the City also supports and demonstrates the retrofitting of existing buildings through the Building Efficiency Accelerator programme.

The programme also addresses the thermal efficiency of dwellings, the risk of associated heat impacts especially where dwellings are excessively hot and way to mitigate these heat impacts. There is a strong link between green buildings and the Adaptation programme.

Cleaner Mobility

After energy, transport-related GHG emissions are the next greatest source of emissions. The City of Tshwane's cleaner mobility strategy is comprised of three main components: the enhancement of mass mobility through the roll-out of a Bus Rapid Transit (BRT) system; the inclusion of low carbon vehicles in its fleet and the uptake of active mobility (including non-motorised transportation or NMT).

In the interest of creating sustainable transport and improving mobility for residents, Tshwane has published its **Comprehensive Integrated Transport Plan** which, amongst others, provides for a comprehensive non-motorised transportation network and integrated public transport with an emphasis on safety. Furthermore, the City is a signatory to the C40 Clean Bus Declaration which requires a 40% fuel switch in the bus fleet by 2020.

The Cleaner Mobility programme focuses on NMT advocacy where cycling is promoted as a viable mode of transport, promoting the uptake of mass mobility and promoting a fuel switch in the City's overall fleet coupled with supporting infrastructure such as solar-powered EV charging stations.

Climate Change and the City of Tshwane

Rising to the Challenge

Sustainable Waste Management

Waste-related emissions are the third greatest source of emissions in the City of Tshwane. This, coupled with diminishing landfill airspace, points to the importance of measures to divert waste from landfill and to benefitiate waste for further use. The primary focus of the sustainable waste management programme is the diversion of recyclable and organic waste through the provision of recycling infrastructure in a resource constrained environment and the harvesting of landfill gas to mitigate the City's landfilling legacy.

ADAPTATION PROGRAMME

The aim of the adaptation programme is to identify climate hazards and adaptive responses that assist the municipality in becoming more climate resilient and thus enhancing the City's overall resilience. Adaptation is wide-ranging (impacts most sectors and cuts across the functions of numerous City departments) and the current approach is mainly advocacy-based, ensuring that different role-players are aware of the climate risk and vulnerability study and are taking steps to include response measures in their planning. Three prominent themes emerging from the assessment is the correlation between poverty, social vulnerability and climate impacts, as well as disaster preparedness and the role of natural buffers in building City resilience. These then find

similar focus in programmes driven particularly by the City Sustainability Unit.

Resilient Planning

The City has prepared a **Bioregional Plan** to inform land-use planning, environmental assessment and authorisations, and natural resource management by providing a map of biodiversity priority areas, referred to as Critical Biodiversity Areas and Ecological Support Areas, with accompanying land-use planning and decision-making guidelines. The updating of the Open Space Framework will be largely informed by the Bioregional Plan as will the Capital Planning System (CAPS).

Resilient Communities

Communities are exposed to a myriad of risks, some of which are climate-related, and measures to build their resilience are in place within different departments. The **Department of Health** runs a food bank, located next to the Tshwane Fresh Produce Market, which ensures that both vulnerable households and institutions protecting vulnerable people have food security.

The **Department of Environment and Agricultural Management** runs a greening programme that oversees the planting of indigenous tree species throughout the city with

an annual goal of 10 000 trees. This programme both assists with carbon sequestration as well as tempering the urban heat island effect.

The **Department of Human Settlements** manages a programme to formalise informal settlements (currently around 170 informal settlements that densify daily) and this is key to addressing social vulnerability amongst the poorest of the poor.

The **Department of Roads and Transport** has a storm water management programme which ensures that storm water systems are developed and thus aim to reduce vulnerability to flooding particularly in low-lying areas.

A new and upcoming area of focus is Urban Health, and an **Urban Health Research Working Group** is being established jointly by the City Sustainability and Economic Intelligence Units in the Office of the Executive Mayor. This Working Group will provide critical intelligence to the Department of Health on key urban health challenges that are currently not directly addressed by the department, as well as identify and form partnerships and mobilise resources to conduct research and implement new initiatives.

Disaster Risk Reduction and Management

The City has a Local Disaster Management Advisory Forum whose mandate it is to address

Climate Change and the City of Tshwane Rising to the Challenge

key risks in the City as identified in the Disaster Management Plan (2014). The plan is being revised in accordance with the Disaster Management Amendment Act, 2015 (Act no 16 of 2015), and will be updated to take climate change into consideration. The forum has further agreed to establish a climate change task team to ensure appropriate responses to climate change hazards and risks.

Integrated Water Management

The Climate Change Vulnerability Study confirms that water scarcity is a reality for the City of Tshwane. Storm water, rainwater, groundwater and grey water resources remain at present largely untapped, but present a significant opportunity to diversify the water mix and reduce the City's pending water scarcity through reduced water demand.

A coordinated water demand management and water supply strategy will necessitate a multi-departmental forum to overcome the institutional silos that currently diminish an integrated approach to integrated water management. Currently, water is being managed and impacted by several different departments.

The primary department responsible for bulk water and reticulation is the **Department of Utility Services** whose chief concerns are to ensure a

reliable supply of potable water, the regulatory compliance of water and waste water treatment plants, and to minimise the quantity of water lost through ageing infrastructure as part of its Water Conservation and Demand Management Strategy.

The **Department of Environment and Agricultural Management** is the custodian of wetlands and riverine systems and surrounding nature-based areas. These systems augment the bulk supply from Rand Water but also provide beneficial ecosystem goods and services.

The **Department of Roads and Transport** is responsible for storm water management systems and these channel water to watercourses and wetlands (often presenting a source of pollution).

The **Department of Economic Development and Spatial Planning**, amongst others, manages the Tshwane Green Building By-law which makes provision for rainwater harvesting and potentially, in future, greywater recycling if it is deemed feasible for inclusion in a revision of the by-law.

SUSTAINABILITY SUPPORT MECHANISMS

This programme is wide-ranging and offers various support measures to enhance the impact of the mitigation and adaptation programmes.

This includes sustainability financing and resource mobilisation, sustainability profiling, research and documentation, demonstration projects and outreach programmes.

The financing and resource mobilisation component of the City Sustainability Support Programme facilitates a swathe of interventions that ensure progress in sustainability. It includes sourcing of innovative funding solutions via the **Sustainable Financing Mechanisms Strategy**; feasibility studies where concepts or approaches are untested or hamstrung by limited knowledge; the facilitation of partnerships with relevant entities to support implementation; documenting and communicating of sustainability progress to engender further support; and conceptualising of outreach programmes which serve as drivers of behaviour change.

Lastly it drives sustainability mainstreaming with a major focus on **sustainable procurement** whereby City procurement is encouraged to consider its ecological footprint and make provision for sustainability criteria in its procurement specifications. The Sustainable Procurement Programme is anchored in the **Sustainable Procurement Strategy** developed in 2016 after the City became a member of the **Global Lead City Network on Sustainable Procurement** in 2015.

TSHWANE GREEN OUTREACH

The Tshwane Green Outreach Programme is a comprehensive programme that targets practically every city stakeholder and aims to inspire and engender sustainability thinking and behaviour change. June has been dubbed Sustainability Month and the CSU has an array of activities that reaches out to all its key stakeholders.



Tshwane Green Service Delivery – The City of Tshwane employs several thousand people and each one of these employees can play a role in effecting behaviour change. Greening actions can be applied to what is procured, operations and simply by leading by example. Actions include procuring greener goods and services, minimising the use of paper, separating waste at-source and use of public transport to commute to work.



Tshwane Green Communities – This targets communities of interest and finds innovative ways of encouraging behaviour change to promote healthier, alternative lifestyles. In October 2014, City of Tshwane, held its first every Green Bike Ride in Mamelodi and demonstrated that riding a bike is good fun no matter where you are. This will be an annual event for the City.



Tshwane Green Home – This is targeted at home owners and residents who have the power to reduce their household ecological footprint by consuming less energy, separating at-source, creating food gardens and rainwater harvesting, and buying local produce. The City will run programmes to support and incentivise these green practices and June will host a Green Home Fair a part of its Sustainability Week activities.



Tshwane Green Soul – Change boils down to the choices each individual makes and thus this component of the programme focuses on the individual and choices we face and make in our personal capacity. It's the smallest actions such as reporting or fixing a leaking tap that can make the world of difference. The programme aims to promote the power of individual choice, to develop a green consciousness and to reward individual effort to make our planet a better place to live on for now and in the future.



Tshwane Green Business – Businesses that just focus on the bottom line are not sustainable. The City of Tshwane wants to inculcate a culture of sustainable business practice with the motif 'people, planet, profit', also known as the triple bottom line. This aspect focuses on the business environment and encourages businesses to think green and operate their businesses in more environmentally-friendly ways. It also seeks to create strategic linkages and forge partnerships within business sector as a way of stimulating the green economy.



Tshwane Green Schools – Children learn behaviours quickly and are sponges for new ideas and concepts. This component directs its energies at the school environment and through smart partnerships introduces sustainability programmes that ensure that sustainability learning is both theoretical and practical. Sustainability is thus included in the school curriculum and learners are exposed to alternative and greener ways of doing things such as food gardening, waste recycling and rainwater harvesting in a practical manner.

3 Baseline studies to support evidence-based planning

3.1 Vulnerability assessment and adaptation planning

In 2015, The City commissioned a climate risk and vulnerability assessment to determine the City's risk and degree of exposure to climate hazards. This adaptation planning exercise, which was completed in 2015, was based on climate change projections produced by an ensemble of high-resolution regional climate models. In summary, the City is likely to get warmer and drier, with an increase in the number of very hot days (temperature above 35°C), with some evidence of increased extreme rainfall events.

The vulnerability assessment also considered **social vulnerability**, which took into account a number of factors (e.g. percentage of informal households) that are known to increase a community's vulnerability to changes, including climate change. Mapping the social vulnerability of the City's population is an important step in prioritising areas for intervention, in alignment with the national and local founding documents that advocate for the prioritisation of the most vulnerable. Not surprisingly, the most vulnerable areas of the City are located where a high percentage of the population resides in informal settlements. These settlements are often located in high risk areas (e.g. in flood plains), with limited access to services.

The heterogeneity of vulnerability both within and between the City of Tshwane regions highlights the need for **integrated planning** across regions. This especially applies to the management of green infrastructure, as the delineation between City regions is not in alignment with natural delineations related either to rainfall catchments or types/forms of natural areas.

The vulnerability assessment also considered the City's vulnerability from a sector perspective. It was found that although **agriculture** is a sector that has significant growth potential, based on land availability, the impacts of climate change on water

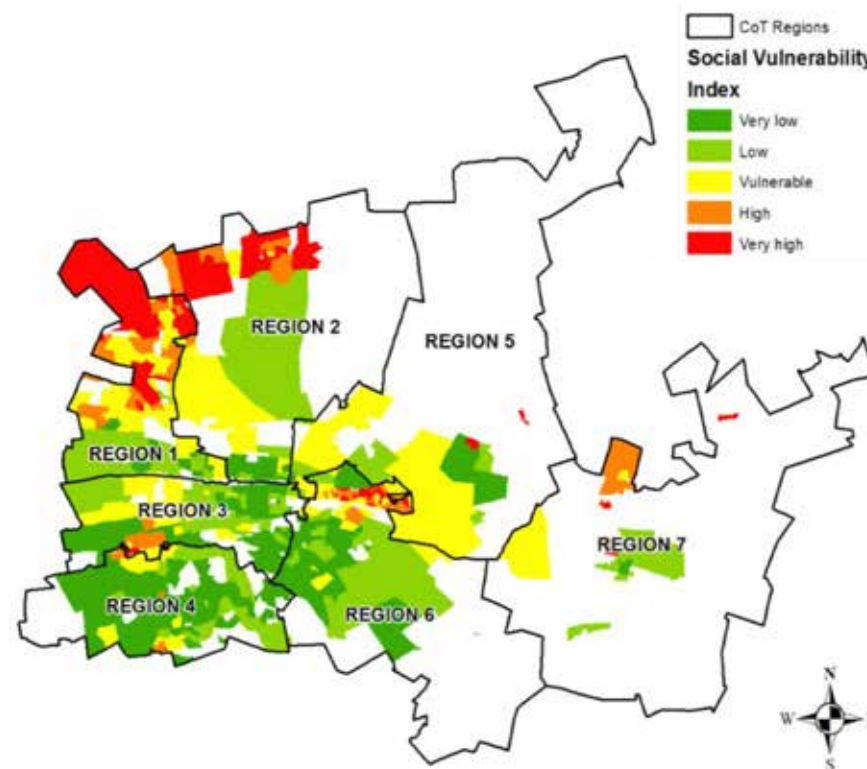


Figure 2: Social vulnerability index scores for the City of Tshwane. Areas with no colour indicate areas with low population densities and/or few households.

3 Baseline studies to support evidence-based planning

and infrastructure are likely to hinder this sector's growth. **Energy use** is likely to increase in summer and decrease in winter, and hence the net climate change impact on this sector is less certain. Increasing temperatures, decreasing rainfall and an increasing number of extreme events will affect the City's **biodiversity**, ability to provide the necessary amount of potable water and infrastructure maintenance and provision. The assessment identified a number of areas of risk (including health and urban planning) and proposed adaptation options to reduce these risks.



3.2 Baseline GHGEI 2014/15 and Emissions Reductions Targets

As a member of both ICLEI and the C40 Cities for Climate Leadership, the City has striven to produce a GHGEI that is compliant with the first global standard for measuring greenhouse gas emissions for cities, known as the Global Protocol for Community Scale Greenhouse Gas Emissions.

The protocol was applied to the development of the 2014/15 GHGEI and verified as compliant by C40.

The City opted to include all emissions recorded for Tshwane which is referred to as the "BASIC+" scope. The BASIC scope excludes (1) Eskom electricity losses and (2) emissions from the aviation sector, whereas the BASIC+ scope includes emissions from Industrial Processes and Product Use (IPPU), and Agriculture, Forestry and Other Land Use (AFOLU), as well as transboundary transportation and indirect emissions.

The per capita emissions in Tshwane are high when compared to the world average (Figure 3) and relatively high when compared to other South African metros¹². This may be due to the high amount of waste emissions (Figure 4), and

as a result of servicing a very large hinterland (Tshwane is the largest municipality in South Africa).

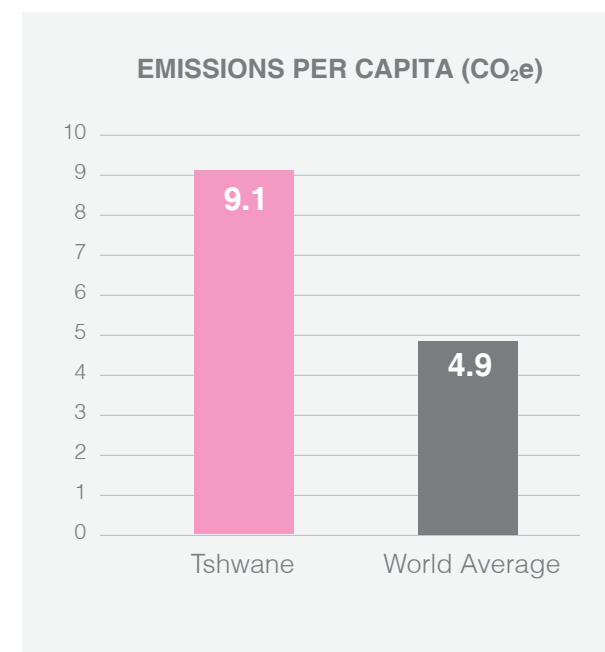


Figure 3: Emissions per capita
(<http://www.c40.org/other/gpc-dashboard>)

12. <http://www.c40.org/other/gpc-dashboard>

3 Baseline studies to support evidence-based planning

The major emission-producing sectors are the stationary energy (45%) and waste sectors (39%) (Figure 4). The stationary energy sector includes emissions (largely carbon dioxide) from energy used for **non-transport purposes** (e.g. electricity used in buildings, LPG used in industries, etc.) as well as fugitive losses (leaks) from natural gas pipelines. The waste sector emissions originate mainly from landfills (largely methane), and to a limited extent from wastewater. All emissions (carbon dioxide, methane and nitrous oxide) are represented as tonnes of carbon dioxide equivalent¹³ (tCO₂e).

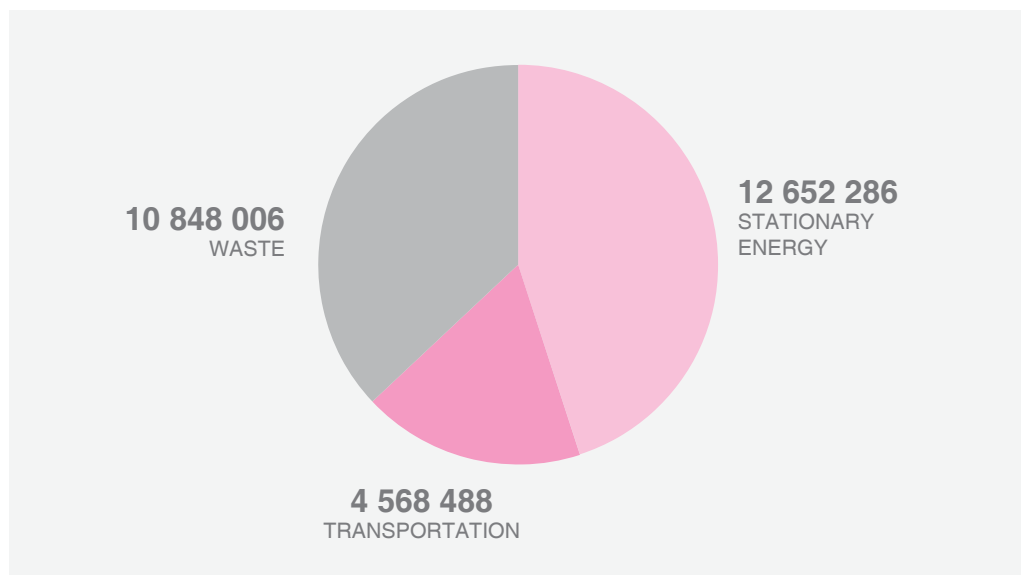


Figure 4: Emissions by sector (tonnes of carbon dioxide equivalent or tCO₂e)(GHGEI, 2014/15)

When considering emissions by sub-sector, emissions from landfilled solid waste dominates (41%), followed by the manufacturing and construction sub-sector (21%), on-road transport (17%), the residential sub-sector (12%) and the commercial and institutional sub-sector (7%) (Figure 5).

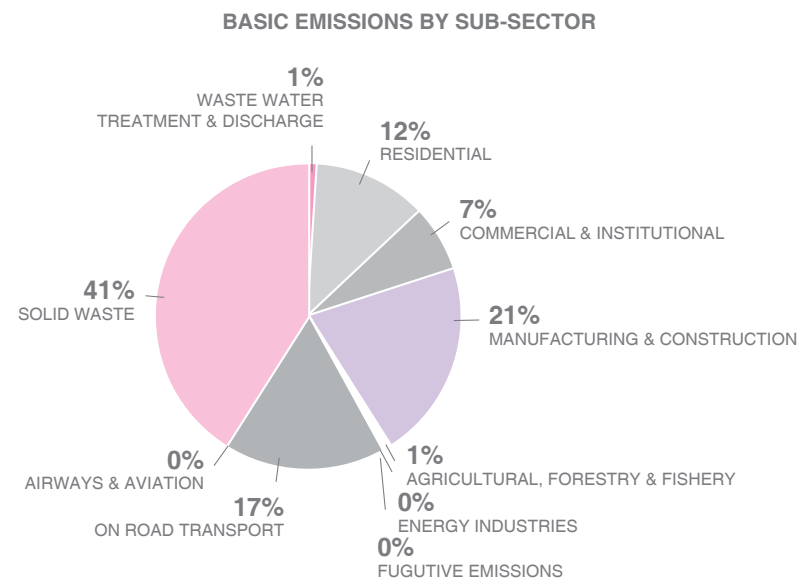


Figure 5: Emissions by sub-sector (including waste)¹⁴

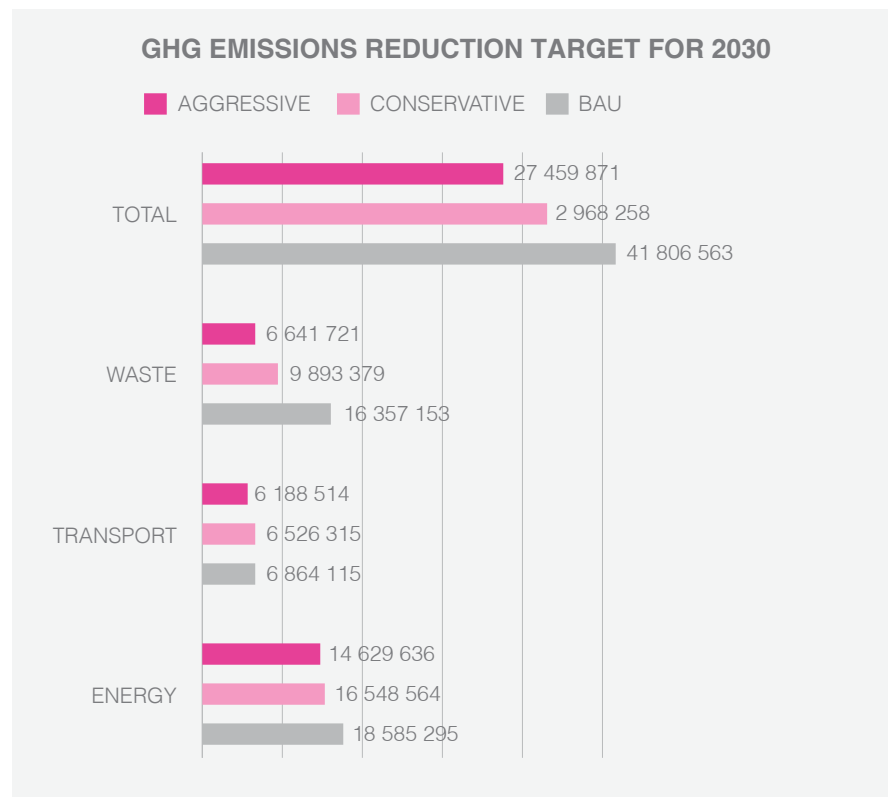
13. Carbon Dioxide Equivalent is a unit value that describes, for a given mixture and amount of greenhouse gas, the amount of CO₂ that would have the equivalent global warming potential when measured over a specified timescale

14. The BASIC+ picture looks exactly the same, due to the small amount of additional emissions captured under BASIC+.

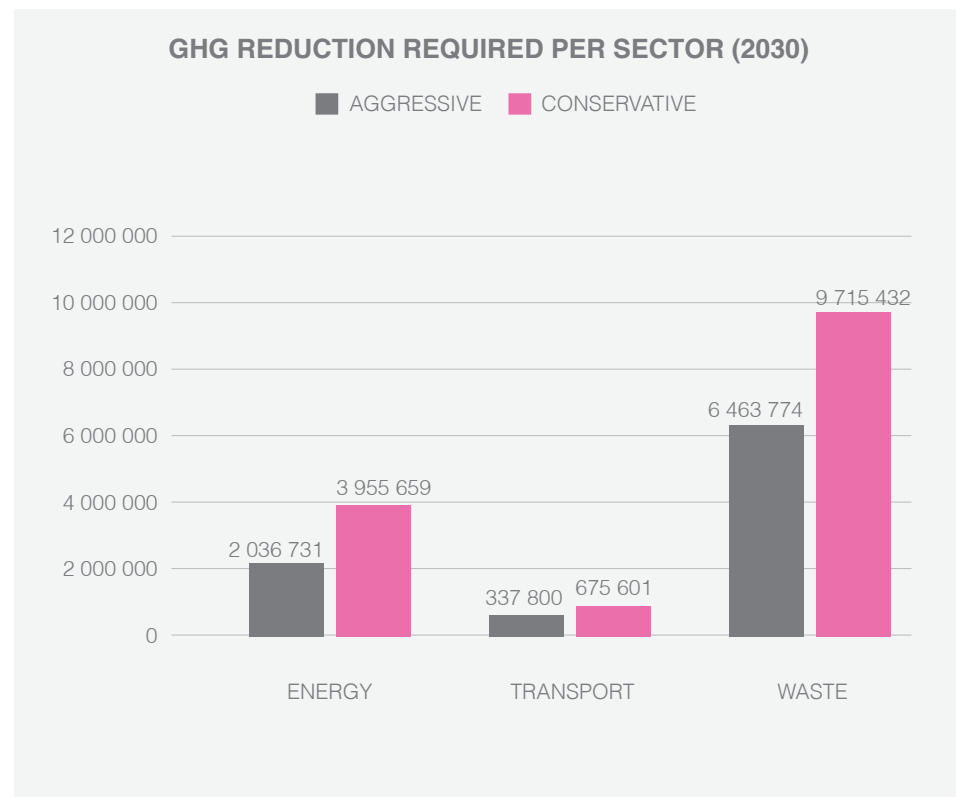
3 Baseline studies to support evidence-based planning

Greenhouse Gas Emissions Forecasting and Target Setting

The figure below shows that without any mitigation efforts driven by the City, its emissions profile will move from its current position to 41 million tonnes of carbon dioxide equivalent¹⁵ by 2030. This represents a 33% increment.

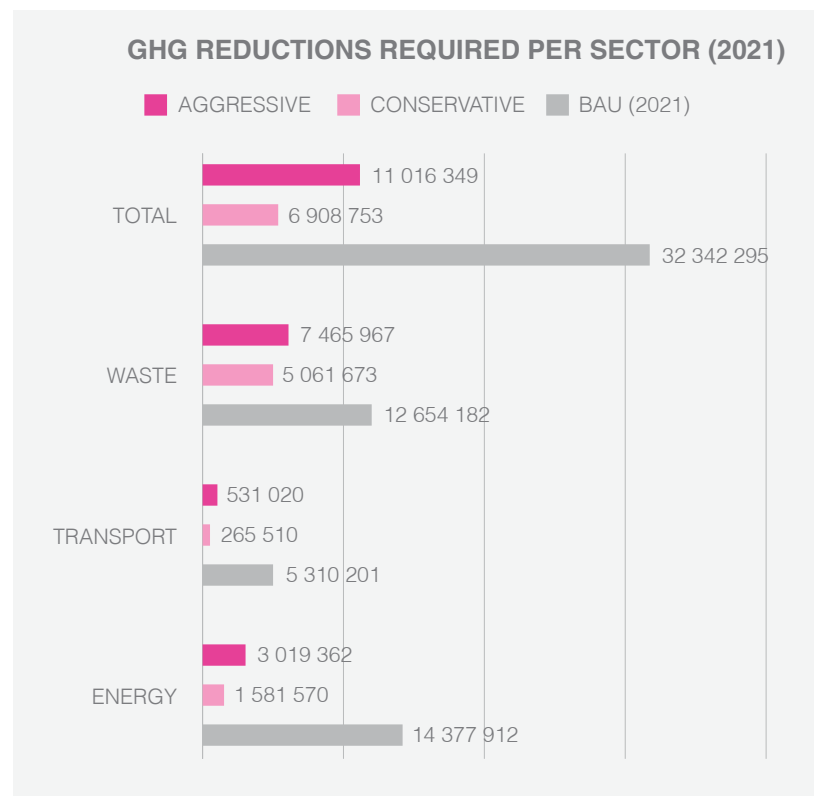


The following figure presents two sets of emissions reductions required depending on whether Tshwane adopts an aggressive or conservative approach in managing its greenhouse gas emissions.



3 Baseline studies to support evidence-based planning

Scaling back to 2021, the following diagram presents the reductions required per sector, again offering an aggressive and a conservative approach, the choice of which will be affected by capacity requirements and challenges:



The City of Tshwane commits to reduce its emissions between 22% and 34% by 2021, with an emphasis placed on the ambitious programme so that our future emissions remain below current emission levels.

Emission reductions will be achieved through the **Mitigation Programme** component of the City Sustainability Programme, by diversifying the energy mix through the uptake of renewable energy, energy efficiency improvements, significant improvements in the public transport system and uptake of cleaner fuels, and the utilisation of methane gas from landfill (either flaring or harvesting for fuel purposes). A number of projects are already underway, and some are in planning phases. These, along with additional measures required, are explored further in the following section.

A detailed implementation plan, developed in consultation with internal and external stakeholders and interested and affected parties, will ensure that the appropriate trajectory is identified for Tshwane with targets and measures that are realistic and achievable.



4 Climate response priority programmes and projects

Based on a strategic review and stakeholder engagement, ten game-changing interventions have been identified, the implementation of which will further the City of Tshwane's sustainability vision. These interventions are listed below, with comments made on the key barriers and enablers to their implementation (informed by stakeholder engagement), and an indication of which current City of Tshwane documents support the interventions and what actions and targets are aimed for or proposed for their achievement provided in the table that follows.

10 The ten game-changing climate change response interventions for the City of Tshwane:

- | | |
|-------------------------|---|
| Intervention 1: | Enhance and protect the City's natural ability to buffer climate change impacts |
| Intervention 2: | Develop an integrated approach to water management in the City |
| Intervention 3: | Build Climate Resilient Communities |
| Intervention 4: | Promote mixed-use densification and transit oriented development |
| Intervention 5: | Promote low-carbon mobility |
| Intervention 6: | Retrofit existing buildings and build green buildings |
| Intervention 7: | Promote energy efficiency |
| Intervention 8: | Promote cleaner and renewable energy |
| Intervention 9: | Divert waste from landfills and find innovative uses for waste |
| Intervention 10: | Pursue sustainability support mechanisms |

1

Enhance and protect the City's natural ability to buffer climate change impacts

Where are we?

The City's natural resources remain under threat – development applications that are harmful and destructive to the environment are still being approved, risking the integrity of the few remaining wetlands and pristine natural resources and thus exposing the city to climate risks such as intensified flooding, drought and the urban heat island effect. Environmental recommendations on development applications are being ignored and the systems to ensure that these recommendations are being implemented are weak.

The Mayoral Committee has approved a **Wetlands Management Plan** (May 2016) which identifies 31 priority wetlands throughout the City and the management measures required to keep them in an ecologically functional state. However, its implementation is hamstrung by lack of available budgets. A similar lack of resources plagues the management of alien invasive plant management in the City leading to the outbreak of alien infestations.

The City of Tshwane has developed a **Bioregional Plan** to inform land-use planning, environmental assessment and authorisations, as well as natural resource management. It

4 Climate response priority programmes and projects

consists of a map of priority areas for biodiversity protection, referred to as Critical Biodiversity Areas and Ecological Support Areas, with accompanying land-use planning and decision-making guidelines.

Currently the Open Space Framework (2005) aims to manage, protect and demarcate open spaces. As part of this framework, Metropolitan and Regional Open Space Plans have been developed, which identify and map all networks of importance, both from an ecological and socio-economic perspective. However, the document is dated and will be reviewed and aligned with the parameters of the Bioregional Plan during 2018/19.

Where are we going?

- The City of Tshwane's Open Space Framework not only maps existing open space and its interaction with developed areas, but also takes climate change impacts and social vulnerability (informed by annually revised vulnerability assessments) into account.
- The Open Space Framework is implemented and enforced, with the protection of natural areas prioritised as identified by the Bioregional Plan.
- Budget allocation to both the Wetlands Management Plan and alien plant clearance

is increased, allowing the City to rehabilitate priority wetlands and stay on top of alien infestations, to ensure that important ecosystems remain intact and functional.

- Green spaces are well maintained and safe, with all sectors of society actively enjoying these areas.

How do we get there?

- The updating of the Open Space Framework and the Capital Planning System (CAPS) must be largely informed by the Bioregional Plan
- The review of the Metropolitan Spatial Development Framework and the eight Regional Spatial Development Frameworks must take into consideration the updated Open Space Framework and the Bioregional Plan
- The Bioregional Plan must also be used as an additional tool when making decisions with regards to development applications.
- Undertake an analysis of the monetary value and benefits related to the Bioregional Plan as well as the Open Space System's ecosystem services to bolster the case for the importance of these areas.
- Institute a programme of compliance enforcement in respect of infringements of the Bioregional Plan.

Barriers

- Natural areas do not adhere to regional boundaries, requiring cross-regional collaboration.
- Valuing natural areas for the ecosystem services they provide, and implementing water sensitive infrastructure principles, require a mind-set change and re-training.

Enablers

- Numerous co-benefits: (a) improving the provision of ecosystem goods and services, (b) improving social cohesion, (c) improving existing service delivery.
- The EPWP Programme has a clear focus on green jobs.

Supported by

- Selected wetlands and water bodies fully rehabilitated; improve the conservation status of natural areas; undertake biodiversity assessments to determine the status of sensitive areas (IDP, 2017; Green Economy Framework, 2013).
- Integrate ecological infrastructure into land-use planning and decision-making (Vulnerability Assessment, 2015).
- Pillar 3: A City that Delivers Excellent Services and Protects the Environment (IDP, 2017)

4 Climate response priority programmes and projects

2

Develop an integrated approach to water management in the City

Where are we?

- The City of Tshwane experiences a high-level of potable water loss (25.7% loss, amounting to 87.9 million m³/ annum in 2015¹⁶) due mainly to degraded water infrastructure, i.e. leaks. Illegal water connections as well as metering and data errors make up approximately 20% of water losses.
- The City is hugely reliant on bulk water supplied by Rand Water whilst local sources such as storm water, groundwater, rainwater and grey water remain untapped and unmanaged.
- The Vulnerability Assessment anticipates that water scarcity will be a reality for the City and this bleak water future requires an Integrated Water Resource Plan that is able to practically guide the diversification of the water mix.

Where are we going?

- Municipal potable water infrastructure is well maintained with limited water loss.

- Rainwater harvesting is introduced widely in the City.
- The Green Building By-law is reviewed and provision is made for on-site greywater re-use and storm water harvesting.
- Waste water is cleaned adequately to be re-used either as drinking water or for industrial use.

How do we get there?

- Development of an Integrated Water Resource Management assessment in association with Water Research Commission and CSIR, followed by an implementation plan.
- Implementation of the City's Water Conservation and Water Demand Management Strategy (2015), which includes reducing apparent losses by: (a) conducting meter audits of large water consumers in the City, (b) replacing meters, (c) purifying data; and (d) reducing real losses by managing water pressure effectively, replacing worn water pipes and improving leak detection and reaction time for leak repairs¹⁵.
- This will require the mobilisation of significant resources, as it is estimated that R80 million per year is needed to replace worn-out water pipes in the City of Tshwane¹⁷ (significantly more than has been budgeted to date).

Barriers

- Maintaining existing water infrastructure (leading to a reduction in water loss) is expensive, and exacerbated by further development.

Enablers

- Water loss reduction interventions have been successfully implemented in other South African municipalities, and can be harnessed.

Supported by

- 15% reduction in water-use by 2015; 26 200 additional households with basic water services; community youth trained to maintain water system and repair leaks; awareness of cost of water leaks over time; water demand management strategy; refined water-tariff structure to cross-subsidise free basic water supply (IDP, 2017; Green Economy Framework, 2013).
- Water reuse strategy to be adopted (Water Resource Management Plan).

16. Westman, T. (2015) City of Tshwane Water Conservation and Demand Management Strategy and Activities.

17. Abu-Mahfou, A. (2015). Water loss: Big challenges and potential solution: Water Resource Management Network (WRMN). CSIR Meraka Institute.

4 Climate response priority programmes and projects

- Access to affordable and sustainable electricity and water supply is paramount and a top priority enabling people to live a life of dignity (Budget Speech, 2017).
- 10 150 new water metered connections (Budget Speech, 2017).
- Co-operation of its residents after the City launched an aggressive awareness campaign to inform residents resulted in a saving of 21.7% of water from the Vaal River System (State of Capital Address, 2017).



3

Building Climate Resilient Communities

Where are we?

- The Vulnerability Assessment establishes and confirms the link between social vulnerability and exposure to climate hazards.
- The poor of the City will bear the brunt of climate exposure, having to deal with rising temperatures, water scarcity and extreme weather events exacerbated by living in low-lying areas and dwellings that are ill-equipped to protect them from the hazards. Many of these residents live in informal settlements.
- The better-off are not immune either but have the resources to buffer themselves although they are not inclined to adopt sustainable solutions such as renewable energy technologies, or rainwater and grey water harvesting.
- Communities and residents are exposed to poor indoor air quality that compromises their health and places a burden on already pressured health services. Increased temperature stress or spread of diseases due to climate change will aggravate the situation.

- The City has programmes in place such as the indigent register, the Food Bank and development of agri-parks to support urban agriculture in peri-urban areas, and the formalisation of informal settlements.
- The Disaster Management Plan (2014) does not explicitly take climate hazards and risks into account. A Local Disaster Management Advisory Forum meets on a quarterly basis – it is comprised of several technical task teams but none of these currently explicitly address disaster risk reduction strategies in relation to climate change. The Disaster Management team is actively involved in education and awareness-raising but, again, none directly or explicitly linked to climate change.

Where are we going?

- The City clearly understands the impacts that climate change will have on the health, safety and well-being of city residents and is employing means to mitigate these affects.
- Residents understand the climate risks that they are exposed to and how to address these climate risks.
- The Formalisation of Informal Settlements programme ensures that informal settlements that are dangerously located are moved to safer areas and that the structures are safe for human habitation.

4 Climate response priority programmes and projects

- The wealthier classes invest in climate-proofing infrastructure that are able to augment their water supplies and diversify their energy mix.
- The Food Bank is able to supply all households on the City's indigent register and institutions providing care to vulnerable residents with a ready supply of nourishing food and is able to supply emergency-stricken areas with the same support.
- Food security and nourishment for City residents is a priority and partnerships with civil society embraced to enhance the nutritional status of City residents.
- Disaster management planning and resourcing explicitly addresses climate risks, including increased health burdens.

How do we get there?

- Establishment of the Urban Health Research Working Group, a collaborative initiative between the City Sustainability and Economic Intelligence Units, the Tshwane Department of Health and other external stakeholders.
- Identifying communities that are at risk and developing plans to mitigate these risks, particularly for settlements in low-lying areas and in servitudes.
- The piloting and a roll-out of Cool Surfaces intervention that will greatly enhance the

thermal efficiency of dwellings and mitigate the urban heat island effect.

- The piloting and roll-out of Low Carbon Alternative Energy technologies to address energy poverty without compromising on energy quality.
- Tshwane Green outreach campaign reaching out to communities on climate-proofing actions and precautionary measures.
- An Urban Agriculture & Food Security Policy and Plan is developed for the City informed by the City's climate realities and need for food security.
- Establishment of a technical task team dedicated to addressing climate risks and reporting to the Local Disaster Management Advisory Forum.

Barriers

- At the municipal level, the Health Department has limited capacity for either research or outreach activities.
- Requires community training and awareness raising of the benefits of sustainable agriculture (i.e. would need to take climate change impacts into account).

Enablers

- Climate change can provide the impetus for enacting health related interventions that are essential regardless of climate change.
- Large portions of land in the City of Tshwane are available for agricultural use.

Supported by

- 10% agricultural land zoned for sustainable agriculture by 2015; enhance skills and knowledge in organic production and agro-ecology practices; enhance local food production and establish food gardens (Green Economy Framework, 2013).
- Promote drip irrigation systems; and diversifying crops to less sensitive varieties (Vulnerability Assessment, 2015).
- Upgrade and maintain health facilities to ensure that they can provide emergency services when most needed; awareness raising for climate change induced health impacts; monitor vector-borne diseases in the city (IDP, 2017; Vulnerability Assessment, 2015).
- Priority 10: Improving access to public health care services (IDP, 2017).

4 Climate response priority programmes and projects

4

Promote mixed used densification and transit oriented development

Where are we?

- The City of Tshwane's Municipal Spatial Development Framework considers: (a) compaction and densification, (b) how spatial planning can contribute to the green economy, (c) sustainable human settlements, and (d) the open space network.
- This is to be supported on a backbone of an efficient and affordable transportation system planned through the Comprehensive Integrated Transportation Plan. The bus rapid transport system, A Re Yeng, is under development and will, in future, provide a world-class public transport system that will provide a realistic alternative to single-occupancy vehicles that currently are a source of congestion and unnecessary vehicle emissions.

Where are we going?

- The City of Tshwane's Municipal Spatial Development Framework takes into account how climate change impacts will affect the City, and is implemented and enforced.
- Spatial planning, building design and transportation infrastructure will make transit oriented design an inherent part of the general built environment.

Transit Oriented Development

Transit-oriented development (TOD) is a type of urban development that maximizes the amount of residential, business and leisure space within walking distance of public transport. This requires support for, and prioritisation of, public transport in parallel to sustainable development patterns.

How do we get there?

- There are a number of departments that are involved in mapping the city, which would benefit from collaboration via an established municipal network. These departments are: The Disaster Management Division (risk assessments), the City Sustainability Unit (vulnerability assessments, spatial mapping of greenhouse gas emissions), the Environmental Management Division (open space system and bioregional mapping), Roads and Transport Department (integrated transport systems) and the City Planning and Development Department (Spatial Development Framework).
- High-level touchpoints from each of these departments will meet on a regular basis, especially when revising spatial maps, to ensure that these mapping exercises align and ensuring that maps (and the infrastructure they plan or depict) do not conflict or contradict each other.
- This network will also coordinate a list of capital projects that drive the sustainability agenda, and require funding.
- The network will also seek out opportunities to source funding for these initiatives.

4 Climate response priority programmes and projects

Barriers

- Will require significant investment in human and financial resources, as well as a mind-set change with regards to planning, development, service delivery and transport.
- Relevant functions are spread across departments (housing, planning, transport) and government spheres¹⁸ (local, provincial, national), making co-ordination difficult.

Enablers

- Well supported by numerous City of Tshwane plans and strategies.
- The planning department has significant scope to enact this intervention (e.g. reduce parking requirements, allow sub-division for densification, mixed-use zoning).

Supported by

- Provide high quality public transportation (IDP, 2017).
- Goals, key pillars, strategies and key catalytic projects outlined in the Comprehensive Integrated Transport

Plan (CITP) (2015-2020), specifically the 3rd and 4th priority IPTN routes following on Line 1 and 2; implement CNG strategy of 30% of bus fleet run on CNG; expanding fleet of electric vehicles (Comprehensive Integrated Transport Plan, 2016).

- 15% reduction in number of trips in private vehicles; R 1.2bn for mass transit infrastructure by 2014; enhance urban compaction and densification (IDP, 2017; Green Economy Framework, 2013).
- Reclaim city space for walking and non-motorised transport; Operation Reclaim: Pedestrianising of streets and closure for vehicular traffic; aspirational target of work trips on public transport set = 80%; smartphone app 'WhereIsMyTransport' allows public transport users to locate transport modes, routes and times; Intelligent Transport System; Integrated Rapid Public Transport Network (IRPTN); Non-Motorised Transport Programme: "walking and cycling as fundamental pillars of Tshwane's fully integrated

transport system, with 15-20% of all (daily trips over 2km being taken by cycling and 50% of all trips less than 2km made by walking" (IDP, 2017; Comprehensive Integrated Transport Plan).

- Non-Motorised Transport programme allocated R40M towards development of various station precincts (Budget Speech, 2017).
- Commitment to C40 Clean Bus Declaration
- The regions together with Roads and Transport are to re-visit the current planned maintenance plan with the intention of revitalizing it to get alignment with the current critical issues of service delivery (Budget Speech, 2017).
- Priority 9: Promoting safe, reliable and affordable transportation system (IDP, 2017)
- 13km of tarred road will be provided to communities who have never had tarred road before (Budget Speech, 2017).
- Integrated, city-wide public transport system be made available (State of Capital Address, 2017).

18. E.g. some roads are maintained by national government, some by the province, and some by the local government.
Contracted buses are often the function of province.

4 Climate response priority programmes and projects

5

Promote Cleaner Mobility

Where are we?

- Each year more than four million tonnes of carbon dioxide equivalent are emitted due to our current modes of transport. Vehicles are not tested for emissions and are a source of air pollution.
- In 2014, the City signed the Clean Bus Declaration which requires a fuel switch to cleaner fuels in the City's bus fleet and to date, 40 CNG-propelled buses have been procured for the bus rapid transit system, A Re Yeng.
- In 2015, the City made a preliminary investment by purchasing 10 electric vehicles that were incorporated into the messenger fleet. This was followed with the installation of two solar-powered electric vehicle charging stations, one for internal use and the other for public use at a customer care centre.
- In 2017, the Tshwane Metro Police Department launched a bicycle unit to patrol high density areas and a bicycle share

scheme is being established at the University of Pretoria for student use.

- The recent refurbishment of the Menlyn Park Shopping Centre included electric vehicle charging stations, leading the way for widening access to electric vehicle charging infrastructure.

Where are we going?

- Expansion of electric vehicle infrastructure throughout the City to support the uptake of electric vehicles.
- A commitment by the City to expand its fleet of electric vehicles, particularly the inclusion of electric buses.
- The production of CNG from landfill sites to supply the CNG-propelled buses, drastically reducing the operating costs of the buses.
- Vehicles that exceed tolerable emissions levels are repaired or, in worst case, are deemed unroadworthy.

How do we get there?

- Enter into a Memorandum of Understanding with the South African National Energy Development Institute to develop an electric vehicle strategy for the City.

- Support the outcomes of the C40 feasibility study on cleaner mobility in respect of buses in the City.
- Engage with the private sector, particularly the property development sector, to install electric vehicle infrastructure in publicly accessible facilities and to develop landfill gas recovery projects.
- Provide support to the Electric Vehicle Industry Alliance in its efforts to stimulate the electric vehicle industry.
- Development and implementation of Air Quality management by-laws.



4 Climate response priority programmes and projects

6

Retrofit existing buildings and build green buildings

Where are we?

- The City of Tshwane is the first municipality in South Africa to have developed a Green Building Policy and By-law. There is limited uptake and this is in part attributed to the absence of a fully-fledged Green Building Development Incentive Scheme.
- National building regulations developed by the South African Bureau of Standards (SABS), specifically SANS 10400-XA: Energy Usage in Buildings and SANS 204: Energy Efficiency in buildings, further serve to improve the energy performance of buildings.
- In response, the City Administration is leading the way with a commitment to certified green buildings and several retrofit projects aimed at improving the performance of public buildings. In 2017, it officially opened its municipal headquarters, Tshwane House, a 5-star green-rated building.
- In 2016, it became a member of the World Resources Institute's Building Efficiency Accelerator Programme which will see the

development of an energy efficiency policy for the City as well as the refurbishment of a city-owned building, the HB Phillips Building in the Central Business District.

Where are we going?

- The City of Tshwane Department of Spatial Planning and Economic Development applies the full suite of mechanisms contained within the Green Building Development By-law, which includes incentivising initiatives that go "above and beyond" the National Building Regulations.
- All new City-owned infrastructure applies the provisions of the Green Building By-Law in the design, construction and maintenance.
- Existing infrastructure is retrofitted to ensure maximum efficiencies in performance.
- The property development and construction sectors are on board and fully immersed in the green building principles, understanding the opportunities and benefits, and using this as a competitive edge.

How do we get there?

- The City of Tshwane fosters greater awareness of the benefits of applying the Green Building Development By-law, through proactive communication internally and with property developers and property owners (incentives

and advantages of green designs).

- This will be augmented through an institutional network that maps out the roles and responsibilities of the various municipal departments that play a role in the implementation, revision and further development of the Green Building Development By-law.
- The medium-term cost-savings achieved when buildings are retrofitted will be calculated and communicated widely as a basis to direct further resources to refurbishment of older buildings.

Barriers

- SANS 10400-XA is not always enforced, as a result of planning department staff capacity constraints.

Enablers

- The City of Tshwane is the first South African municipality to develop a Green Building By-law.
- The City is a member of the Green Building Council of South Africa's Green Building Leadership Network.

4 Climate response priority programmes and projects

- SANS 10400-XA regulations require that all new buildings be energy efficient, e.g. not more than 50% of domestic hot water volume should be heated by electricity.

Supported by

- Businesses achieve GBCSA green building status by 2014; regular review of by-laws; development of new by-laws (IDP, 2017; Green Economy Framework, 2013).



7

Promote energy efficiency

Where are we?

- The Energy and Electricity Division's budget is skewed towards the delivery of coal-powered electricity to City of Tshwane residents, partly to overcome service delivery backlogs which hinder the City's economic development.
- Most energy is fossil fuel (e.g. coal-based electricity, LPG, petrol, diesel) based.
- Many poor households are still using dirty/unsafe fuels such as paraffin for cooking/space heating, contributing to making indoor air pollution the number one air quality concern in South Africa.
- 7% of households (about 220 000) are not electrified (according to StatsSA 2016 Community Survey¹⁹).
- The municipality's electricity department gets a large amount of revenue from the sale of electricity, which cross-subsidises other users (e.g. poor households) and other services (e.g. water, waste).

Where are we going?

- Well-conceived and robust energy efficiency targets are developed by the City Sustainability Unit, in collaboration with the Energy and Electricity Division
- These targets are accompanied with a realistic plan of action for their achievement, including a consideration of budget implications.
- Municipal buildings and infrastructure are optimised in terms of energy efficiency.
- The shaping of interventions such as the Cool Surfaces Project that aims to drastically enhance the thermal efficiency of all forms of dwellings, such as by applying smart paints that reflect solar energy and release stored heat energy.

How do we get there?

- The implementation of solar water heater rollout has the potential (with timers) to reduce peak electricity demand, when the city buys electricity at the highest rates from Eskom.
- Introduce 'Smart' technology appropriately, based on a detailed understanding and long-term vision of its role²⁰.

19. Using electricity for lighting as a proxy for electrification.

20. Smart meters allow the monitoring of usage patterns, leading to the prioritisation of buildings earmarked for energy efficient technologies. They are also used to monitor the energy use reductions enabled by awareness campaigns (leading to behavioural change) and the installation of energy efficient technology (also applies to renewable energy technology implementation). However, there are no national standards for these devices, hence the City of Tshwane should ensure that it is not tied to one service provider. Smart meters also require an upgrade of the entire grid, which is costly.

4 Climate response priority programmes and projects

Barriers

- The City gains income from the sale of electricity.
- Energy is a cross-cutting issue (spanning several departments), which means that it is often not seen as the mandate of any department.

Enablers

- Above-inflation electricity price increases are decreasing payback periods of energy efficiency interventions substantially.
- The City can act as a leader by implementing energy efficiency measures within its own operations.
- The City has substantial reach with regards to communication and awareness-raising.
- The City has large purchasing power

Supported by

- 15% reduction in energy consumption by 2015, 10% lower energy intensity in transport sector by 2015, 20 municipal buildings energy efficiency retrofitted by 2016,

15 % energy intensity reduction in mining, industry & residential sectors by 2016, 10% energy intensity reduction in transport & commercial/ public buildings, implement intelligent energy management systems (IDP, 2017; Green Economy Framework, 2013).

- The Energy Efficient City of Tshwane Lighting Project (Sustainable Finance Strategy).
- The Sustainable Energy and Climate Change Strategy (2006).
- Access to affordable and sustainable electricity and water supply was paramount and should be our top priority. These are the basic elements required for our people to live a life of dignity (Budget Speech, 2017).
- The Department of Energy and Electricity is focused on providing a sustainable supply of electricity and are investing in bulk infrastructure and network upgrading (State of Capital Address, 2017).
- Comprehensive installation of energy efficient lighting throughout Tshwane

It is estimated that around 250,000 lights shall be replaced (Sustainable Financing Strategy, 2017).



4 Climate response priority programmes and projects

8

Promote cleaner and renewable energy

Where are we?

- National protocols for independent power production at the municipal level are unclear. The City has approved an Embedded Generation Policy which will lead to development of an Embedded Generation By-law. The By-law will provide an administrative process to facilitate a range of embedded generation applications (technologies, capacities) as well as the grid connection fees.
- There is an opportunity to use alternative energy sources to meet suppressed demand, particularly in low income housing and informal settlements.
- There is an opportunity to supply energy for own use (meaning municipal operations) through renewable energy.
- There is a strong municipal disincentive for the promotion of renewable energy and energy efficiency amongst City residents as the municipality gains income from the sale of electricity.

Where are we going?

- Well-conceived and robust renewable energy targets are developed and accompanied with a realistic plan of action for their achievement, including a consideration of budget implications.
- Waste-to-energy initiatives are implemented throughout the municipality, as good practice interventions; this includes wastewater to energy as well as landfill gas to energy. Thus, waste is seen as a resource as opposed to a drain on municipal resources.
- New and affordable, low carbon technologies are harnessed to meet the basic energy requirements of low income households.
- Use of multiple sources of renewable energy to reduce the City's operational costs through solar, biogas, and hydro-energy.
- Revenue from the generation and sale of electricity decouples grid connection and usage charges.
- A revised energy procurement model encourages distributed generation of renewable energy.

How do we get there?

- Revise the energy revenue model to accommodate modern electricity generation technologies and types of grid connections.

- Waste-to-energy projects need to be packaged in an economically viable way and funding sought for their implementation.
- Promote small-scale embedded generation in a way that preserves financial and technical integrity of the distribution system.
- Facilitate landfill gas and wastewater gas electricity generation, as well as micro-hydro projects.
- Partnerships established with relevant organisations to facilitate the uptake of low carbon energy solutions to address energy poverty.

Barriers

- No guidelines or standards are available for small-scale embedded generation (SSEG), resulting in the national energy regulator putting on hold any approval for SSEG tariffs from municipalities.
- The New Generation Regulations within the Electricity Regulation Act state that a buyer of electricity can only procure energy in accordance with the Integrated Resource Plan (IRP).

4 Climate response priority programmes and projects

- The single-buyer model does not allow municipalities to buy electricity directly from an Independent Power Producer (IPP).

Enablers

- Due to current challenges with the fossil-fuel powered electricity system (e.g. load-shedding), there is appetite for renewable energy.
- South Africa was amongst the top 10 renewable energy investing countries in 2014.
- The Renewable Energy Independent Power Project Procurement Programme (REIPPPP) has demonstrated that renewable energy can be deployed within short lead-in times¹⁰.
- Renewable energy costs have decreased substantially and indications are that large-scale renewable energy projects will soon reach grid parity .

Supported by

- 56 400 solar water heaters by end 2015; 210 MW procured for grid by 2016; 16 000 PV modules by 2020; develop municipal hydro-power initiative; develop the proposed AFRKO Solar Park; generate renewable energy fuels from sewage and waste (IDP, 2017; Green Economy Framework, 2013).
- Renewable power policy promoting real green power development (Budget Speech, 2017).
- Access to affordable and sustainable electricity and water supply is paramount and a top priority (Budget Speech, 2017).
- Development, operation and maintenance of three large-scale 3 MW (200,000 GJ) bio-CNG plants located at the Tshwane Food & Energy Centre (TFEC), a landfill site and a wastewater treatment plant. The three bio-CNG plants shall produce an annual bio-CNG output of around 600,000 Gj, which shall provide green fuel to approximately 1,500 vehicles in the CoT transport fleet (Sustainable Financing Strategy, 2017).
- Implementation of three 2 MW Waste-to-Energy projects at three landfill sites in the CoT (Sustainable Financing Strategy, 2017).
- Independent Power Producer(s) (IPP) to supply cost-effective, sustainable electricity to CoT pump stations and treatment sites that can make the CoT larger sites independent of the national electrical supply grid (natural gas, PV solar, biogas, etc.,) (Sustainable Financing Strategy, 2017).
- Establishment of a 5 MW PV solar power project in the CoT on municipal buildings (roof-tops) and or municipal land (Sustainable Financing Strategy, 2017).

9

Divert waste from landfills and find innovative uses for waste

Where are we?

- The draft Integrated Waste Management Plan needs to be finalised and approved providing a directive on how waste will be diverted from landfill and how compliance of existing landfills will be achieved.
- Several landfill sites in the City have reached the end of their usable life, and must thus be closed. Waste is therefore often transported longer distances to alternative landfill sites, at high cost, with higher carbon emissions and impacts on operational budgets, and ultimately service delivery.
- Existing landfill sites require greater investment of resources for effective management, e.g. boreholes for landfill groundwater require better maintenance and protection from vandalism as well as data management (weighbridge data) to have a better understanding of the quantities and characteristics of waste being produced in the City.
- There is currently no flaring or harvesting of

landfill gas, which is potentially a relatively low-cost intervention for reduction of GHG emissions in the City.

- The development of recycling infrastructure to facilitate the diversion of waste from landfill with the first facility being established on the buffer zone of the Kwaggasrand Landfill Site in Atteridgeville. Atteridgeville Eco-Park, which is the forerunner of four facilities, has the functionality to process all forms of waste and with the residual component being baled and wrapped for future use such as residual waste.
- The impact of the Atteridgeville Eco-Park is limited due to delays in the implementation of the separation at source programme, Boa Gape Recycling, in Regions 3 and 4.
- Buy-back centres throughout the City are providing job opportunities in the recycling industry, but informal recycling still persists at the remaining waste disposal sites, posing a health and safety risk to the individuals working and living around the site.
- Opportunities for beneficiation of sludge at waste water treatment works or utilisation of the gas produced are wasted.
- Limited constructive use of construction waste and the rampant practice of illegal dumping of this waste stream.
- An innovative use of food waste, cattle

manure and abattoir waste is a 4.5MW biogas digester in Bronkhorstspuit. The electricity generated is sold to a third party and a wheeling agreement with the City is in place to utilise the City's infrastructure.

Where are we going?

- Formalisation of informal waste-pickers as the recycling infrastructure is put in place at landfill sites.
- Flaring or harvesting of landfill gas for fuelling of the City's CNG-propelled fleet (depending on what is financially feasible). This is essential to reduce GHG emissions stemming from the City's landfills.
- The roll out of recycling infrastructure to divert as much waste from landfill as possible supported by separation at-source in all regions through private sector partnerships.
- The generation of energy from residual waste, thus reducing the need for landfilling to the bare minimum.
- The City capitalises on the contribution to be made by the private sector in the separation of waste at source and expands this to support sustainability and promote employment through sorting and recycling.
- The beneficiation of waste to deal with City challenges – for example, crushed rubble to be used as infill for roads construction as well

4 Climate response priority programmes and projects

as repairing sinkholes, garden greens into compost and sewerage sludge into fertiliser.

- The financial sustainability of the City's waste management function is maintained through increased efficiency in service delivery and increased utilisation of waste as a strategic resource.

How do we get there?

- Recycling facility success at Kwaggasrand is up-scaled, requiring detailed feasibility studies that consider private/ public partnerships and returns on investment (typically around 5-10% for material recovery facilities).
- The implementation and enforcement of the recycling by-laws to support the separation-at-source programme.
- The City contributes towards developing a market for recycled goods through its procurement processes – for example, a portion of recycled aggregates must be used in construction projects.
- The facilitation of technical solutions to deal with residual waste so that the City is not required to consider landfilling in the future.

Barriers

- Significant human and financial resources required.
- A mind-set change required to see waste as a resource.

Enablers

- Many co-benefits to these interventions, e.g. improving health conditions, increasing energy production from renewable sources, and improved return on capital investment.

Supported by

- 5% reduction in waste generated by 2018; 3 600 additional households provided with basic sanitation; 2 flagship municipal buildings with state-of-the-art waste handling infrastructure and standards by 2015; recycled stationery and packaging; maintain green & blue drop certification; generate energy from waste by converting landfill gas into electricity; minimising the waste going to landfills by 25% through recycling or recovering of materials; new waste-to-energy waste water treatment plants (IDP, 2017; Green Economy Framework, 2013).
- Partner with private sector to divert the non-recyclable waste from landfill to waste to energy facilities; waste minimisation and beneficiation (Integrated Waste Management Plan).
- 6500 new households with access to sanitation (Budget Speech, 2017).
- Improved weekly waste removal services (Budget Speech, 2017).
- The Water and Sanitation Education day-to-day activities promote awareness, guide education and communicate the responsible use of water. It focuses on the need to restore and preserve the integrity of our most precious resource (State of Capital Address, 2017).
- Minimum 1700 tons per month of dry recyclables from the Atteridgeville Eco Park.
- Roll-out of multi-purpose Material Recycling Facilities (MRFs), composting plants, construction and demolition waste processing facilities (Sustainable Financing Strategy, 2017)

4 Climate response priority programmes and projects

10

Pursue sustainability support mechanisms

Where are we?

- A Sustainable Procurement Strategy has been developed by the City Sustainability Unit. It is understood that through City spend alone, the City's ecological and carbon footprint can be reduced.
- A Sustainable Financing Mechanisms Strategy has been developed by the City Sustainability Unit and its implementation yields cost-savings for the City as well as manifests the inherent value of waste resources.
- The conceptualisation of demonstration projects that can be financed through resource mobilisation

Where are we going?

- Sustainability principles and or criteria have been factored into every City tender. There is significant market stimulus for green goods and services.
- The medium-term cost savings of particular initiatives that will assist in minimising the City's generated carbon emissions will be

understood and used as a basis for making these investments. This applies in particular to energy efficiency and renewable energy projects.

- Proof of concepts from demonstration projects are rolled out through the integrated development plan

How do we get there?

- Supply chain management policy is amended to include sustainable procurement principles and criteria.
- The development of sustainability specifications that can be incorporated into tenders.
- A supplier development programme is put in place so that SMMEs, particularly black-owned businesses, are equipped to provide products and services that comply with sustainability criteria.
- The City Sustainability Unit, in partnership with line departments, designs and implements demonstration projects
- The medium-term cost savings for low carbon projects are calculated and communicated as a basis to encourage allocation of resources to funds
- Demonstration projects (proof of concept) are designed to show practically how an existing or unmet service delivery challenge can be met from a sustainability lens.

Barriers

- A mind-set change required to use non-financial values as part of a holistic accounting system.

Enablers

- Many co-benefits to these interventions, e.g. improving health conditions, increasing energy production from renewable sources, and improved return on capital investment.

Supported by

- Five of the City service delivery departments are to be certified to ISO 9001 system; Sustainable procurement is to be embedded in the Supply Chain Management (SCM) policy; Incorporation of the new ISO 20400 standard for sustainable procurement into procurement systems (Sustainable Procurement Strategy, 2017)
- Prioritisation of six green economy projects with a combined estimated Capex of around R1.1 billion; Establishment of a centralised unit to proactively develop and package green projects for additional funding (Sustainability Financing Strategy for Green Economy Transition, 2017)

5 Means of implementation

The City of Tshwane has the inevitable responsibility of facilitating the City's transition to a low carbon, resource efficient and climate-resilient state. It also has the responsibility of understanding the risks its residents are confronting and ensuring that there are sufficient measures in place to mitigate these risks. The City as the facilitator is required to drive partnerships with relevant organisations to achieve its goals. It also has the responsibility to ensure that all its policies, plans and resources are focused on the same goals of reducing social vulnerability and shaping a low carbon, resource efficient future driven by the City's leadership.

The City is, critically, richly endowed with an effective institutional environment and workforce, a wealth of knowledge institutions, a responsive private sector and an active civil society, which can be leveraged for a transition to a more 'climate-proof' state.



5.1 Institutional commitment

It is incumbent on each and every department in the City to adopt a **sustainability pledge** for its deliverables which demonstrates that thought and consideration has gone into how a department can improve its performance in terms of a) measures to reduce carbon emissions and b) measures to respond to climate impacts.

The City Sustainability Unit will prepare **Climate Response Advisories** for each department pointing out departments' contributions to the production of carbon emissions as well as climate risks that require adaptive responses. The sustainability pledges will form the 'response' to these advisories as commitment to action needs to be linked to real need.

Sustainability pledges may contain the following elements:

- Identification of a **Green Ambassador** or sustainability champion that can represent the department in climate response and sustainability oriented fora and activities.
- Identification of **capacity development requirements** and commitment for staff to receive required training and get involved in relevant C40 networks as well as national initiatives to enhance skills development

- amongst the metropolitan municipalities.
- Identifying funded projects to which **sustainable procurement principles** may be applied in the development of the specifications.
- Events that has mainly an impact on operational expenditure, a commitment to apply an event greening guideline to all events planned and hosted by the City will be a progressive step.
- Forming and participating in **multi-disciplinary teams across departments** to tackle service delivery challenges in a holistic manner as rising above silos typically yields a more sustainable outcome.
- Identifying external stakeholders (organs of state, non-profit, overseas development agencies, private sector) that can make positive contributions to City's sustainability trajectory.
- Committing to supporting the process of sustainability profiling by supplying required information and data as required.
- Identification of performance measures or sustainability indicators that will also be used in the production of the City's annual **Sustainability Report**.

In the case of certain departments such as Environment and Agricultural Management

5 Means of implementation

Services (waste management practices), Energy and Electricity (uptake of renewable energy), Group Property (retrofitting buildings, green buildings, green leasing), Roads and Transport (buses), Corporate and Shared Services (corporate fleet), firm emission reduction commitments will be required so that the City is able to achieve its overall emission reductions targets (see Section 3).

The development of a GRI-compliant Sustainability Report for the City will be informed by these sustainability pledges and commitments.



5.2 Partnerships, Sustainability Profiling and Resource Mobilisation

Identifying and building partnerships, profiling the City's sustainability trajectory and resource mobilization in combination are a key driver of the City's Climate Response Strategy and are key to **Intervention 10: Pursue Sustainability Support Measures**.

Resource mobilization has a number of manifestations including funding for technical studies, infrastructure and demonstration projects; as well as sponsorships and capacity-building for City officials and stakeholders. Resource mobilization also yields technical partnerships to support particular objectives such as the Building Efficiency Accelerator (see box x) which aims to yield energy efficiency outcomes for buildings owned by the City of Tshwane.

Resource mobilization goes hand-in-hand with **sustainability profiling** whereby the City, primarily through the City Sustainability Unit, engages with strategic and relevant organisations and individuals in order to advance the City's sustainability goals. Successful resource

mobilisation relies on the professional packaging of information on programmes and initiatives underway in the City.

Currently, there are two primary international organisations that the City engages with regularly:

C40 Cities Climate Leadership Group

The City became a member of C40 in 2014 and is part of several of its networks. The concept behind C40 is that member cities share best practice with each other in a bid to enhance the sustainability performance of each member city. The more involved one becomes in C40, the more one is able to gain from the relationship. To date, the City has signed the Clean Bus Declaration (see box x) and has served as the global lead on the Transit Oriented Development (ToD) network. Whilst membership is free, there is an expectation that participation in C40 will be prioritised as the organisation can only thrive on active participation.

Implementation the Climate Response Strategy, which is also a requirement of continued membership of C40, will be enriched through enduring participation in the different networks where best practice examples and solutions are readily available at no cost to the City.

Means of implementation

The City, through its City Sustainability Unit, supplies data to the **Carbon Disclosure Project** (CDP) platform on an annual basis and this uploading of data (project updates) also facilitates further technical resources to the City. In addition to the CDP platform, the City also reports to the **Climate Risk Adaptation Framework and Taxonomy** (CRAFT), a standardised framework to help municipalities assess their progress in adaptation planning, identify areas for improvement and collectively advocate for resources to support their adaptation efforts.

ICLEI— Local Governments for Sustainability

The key differences between ICLEI and C40 is that the membership to ICLEI is open to all municipalities whom are required to pay a nominal annual membership fee. The City's membership to ICLEI has assisted the municipality in the development of a Wetlands Management Plan through its Local Action for Biodiversity Programme and its partnership with the WWF-SA has seen the City of Tshwane announced as the Earth Hour Capital 2015 and 2016 in respect of the implementation of the city sustainability programme from 2013.

ICLEI is also on hand to provide technical support and a range of resource materials that assist

municipalities such as Tshwane to enhance its sustainability planning and implementation. ICLEI-Africa played a supportive role in the drafting of this Climate Response Strategy.

The City also reports annually to the Carbons Registry and this too avails the opportunity to benefit from initiatives such as the Transformative Action Program (tap-potential.org).

Over and above C40 and ICLEI, there are an array of organisations that the City of Tshwane is affiliated to and which have willingly partnered with the City on joint initiatives. The willingness comes from the high level of political commitment shown by the City towards sustainability and the role of the Executive Mayor as a climate and sustainability leader. Much of the available resources are contingent on this political commitment. As part of the implementation of the Climate Response Strategy, the City will continue to pursue these partnerships.

Currently, the City is a member of the Green Building Council's Green Leadership Network, the Building Efficiency Accelerator and Global Lead City Network on Sustainable Procurement. Each of these programmes support the City in achieving

a sustainability objective and such memberships are regarded as key to implementing the Climate Response Strategy. The City will sustain such memberships and consider further memberships where these are aligned to the aims of the Climate Response Strategy.

The City is also actively involved in national and provincial networks and fora where it shares its best practice with other metropolitan municipalities. These activities will be sustained and also used to explore opportunities and solutions with other metros such as joint funding for the adaptation projects through the Green Climate Funding.



5 Means of implementation

5.3 Building knowledge

The basis for the Climate Response Strategy are the findings of the annual Greenhouse Gas Emissions Inventory and the Vulnerability Assessment and Climate Risk Study. The former has become institutionalised in the City with quarterly collection of data and inputting into a GPC-compliant tool. It took several years for the municipality to develop the internal know-how to undertake this function and represents exceptional progress in managing the City's Mitigation programme. The City plans to undertake a similar exercise for the vulnerability assessment so that it has a system in place to keep the assessment relevant, understanding which parts of the vulnerability assessment can be done in-house and which parts require specialist studies and/ or expertise and at what frequency.

A strong and effective **research agenda** is required to support the implementation of the Climate Response Strategy. The research requirements include documentation and tracking to produce case-studies and blue prints; evaluation studies to determine the impact of initiatives; and benchmarking and feasibility studies to assist in assessing available technologies.

Under the auspices of the **Research and Innovation Unit**, a number of Memoranda of Understanding either exist or are being pursued with the rich assortment of research and academic institutions that reside in the City of Tshwane. These MoUs will lay the foundation for a research platform for a) commissioning of specific studies and b) to encourage researchers to apply their skills or research interests to the needs identified by the City of Tshwane.

The Research and Innovation Unit is also empowered to establish **municipal research networks** such as the Tshwane Water Research Network currently headed by the CSIR. Such networks play a formidable role in combining and advancing knowledge in dedicated areas.



5.4 Communication and behaviour change

Communication is central to the enactment of the Plan, as it relies on understanding, buy-in and support from partners and stakeholders. Effective outcomes require majority buy-in and scale for an impact to be felt, hence communication strategies should have a wide reach and high impact. Communication will be better coordinated, portraying a clear message from the City, it should be regular and consistent, action-oriented and positive.

The societal behaviour changes that are required to meet the challenge of addressing climate change are profound. Emotive and inspirational communication which captivates the audience is important, as it will lead to individuals taking responsibility for behavioural shifts. It is also useful for the City of Tshwane to profile the numerous sustainability initiatives that it has underway to residents, to indicate the City's leadership in this regard, garnering pride and inspiration within the private sector and civil society.

5 Means of implementation

Internal communication and outreach

The City of Tshwane is a significant employer and its current communication systems can be better harnessed to raise awareness and deepen understanding of climate change and positive actions to mitigate the effects of climate change. Whilst there is not an explicit climate change communications and outreach campaign, there are communications activities managed by several departments and divisions that require enhanced co-ordination.

Currently the Agriculture and Environmental Management Department is tasked with environmental education as a key enabler of the Tshwane Integrated Environmental Policy. The Disaster Management Division is involved in a number of awareness campaigns (e.g. Safety and Security Month, Flood Awareness Campaign). The City Sustainability Unit is responsible for implementing the Tshwane Green Outreach Campaign.

Communications with staff members is two-fold – 1) to build awareness of how climate change affects individuals' area of responsibility and what they can do differently to ensure that their work does not compound the effects of climate change and 2) to understand what changes they

can effect in their personal lives to minimise their ecological footprint, such as practising recycling and using public transport to commute to work. Ideally, exposure to climate change information should be part and parcel of officials' induction into the City, combined with exposure to the City's sustainability programme and applicability to their pending portfolio.

External communication and outreach

External communication is segmented according to target audience and the intended outcomes. **Tshwane Green** reaches out to a spread of stakeholders deploying a variety of communication methods to build awareness and promote particular behaviour changes. It is best known for its annual **Tshwane Green Ride**, which is a fun family ride to encourage all residents of Tshwane that cycling is a viable alternative to motorised transport, particularly for shorter distances.

The external communications and outreach plan for the Climate Response Strategy, which will be developed in concert with the **Group Communications, Marketing and Events** will include workshops, seminars and conferences, presentations, publications, and awareness raising materials and technologies.



6 Monitoring and evaluation

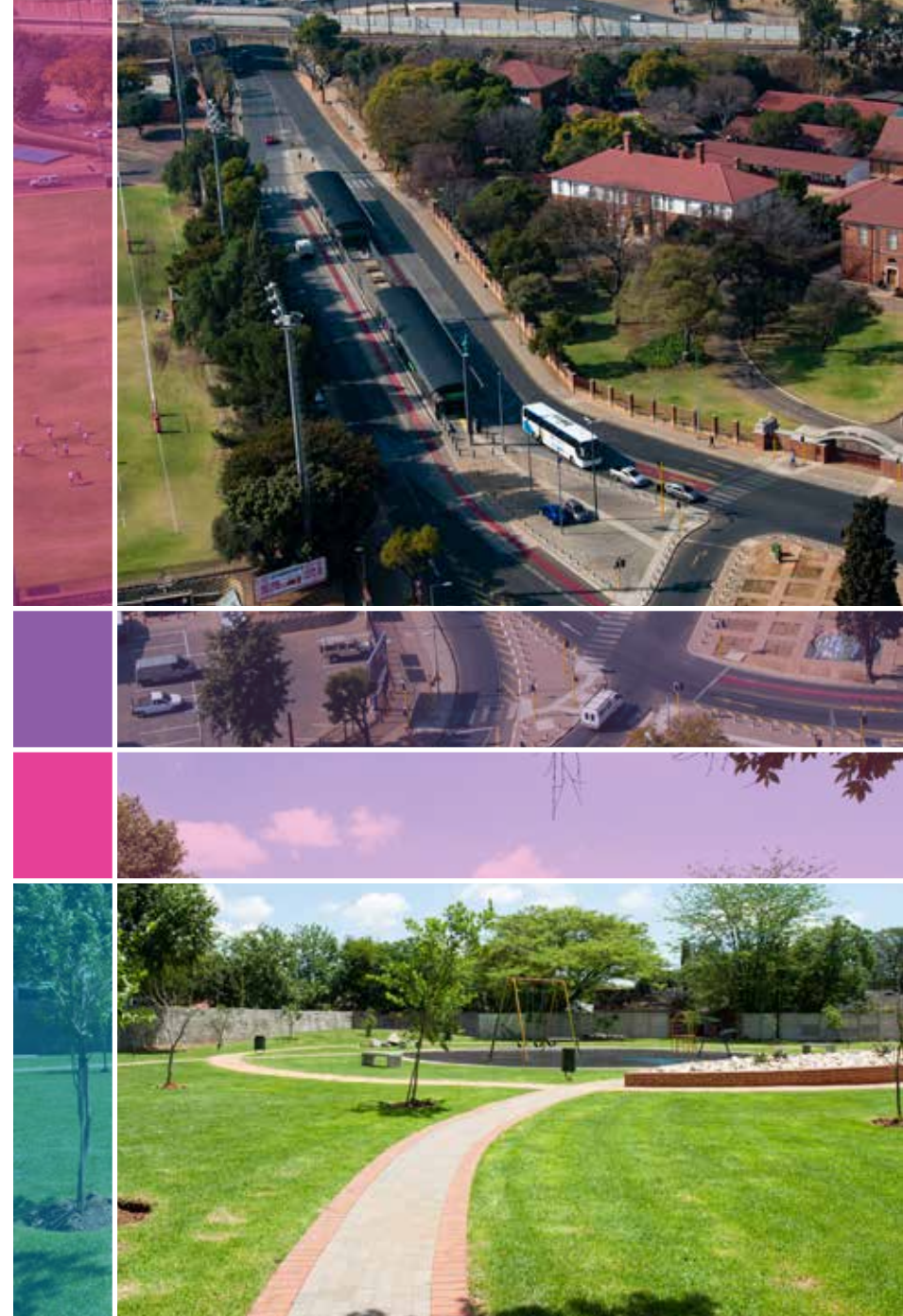
The monitoring and evaluation of the implementation of the Climate Response Strategy is required to ensure that the City of Tshwane's efforts to reduce carbon emissions are taking effect.

The City has pledged by 2030 to reduce its emissions between 8,838,305 tCO₂e and 14,346,691 tCO₂e. These reductions will be derived from energy efficiency gains, a switch to renewable energy, cleaner mobility and the harvesting or flaring of methane gas at landfill sites.

The City Sustainability Unit will assume the responsibility of calculating the emissions reductions potential of various projects and to advise how the emissions reductions can be intensified, maintaining that oversight role. Central to this effort will be the collection and analysis of emissions data for purposes of continuously updating the GHG inventory. An inventory management plan has been compiled, with aspects such as responsible persons, timelines, data collection protocols and record-keeping detailed²². The ultimate purpose of the reporting should be an annual review of progress towards the set emissions reduction targets, with adjustments to the programme of action where necessary.

The City Sustainability Unit will continue to compile an annual Greenhouse Gas Emissions Inventory which will determine progress of the implementation of the Mitigation Programme. It will also continue its role in reporting climate response measures in international reporting platforms (Carbon Disclosure Project, Climate Risk Adaptation Framework and Taxonomy and Carbon Registry).

The City has committed to publishing a GRI Sustainability Report and that its annual report, in time, will be an integrated report, meaning that the sustainability reporting will be combined with the annual report. The implementation of sustainability reporting will rely on the development of sustainability pledges by the City departments inclusive of measures of performance or **sustainability indicators**.



22. City of Tshwane Greenhouse Gas Inventory Management Plan, 2014/15

7 Conclusion and the way forward

The City of Tshwane has made excellent strides in rapidly developing an institutional environment for the planning and implementation of a Climate Response Strategy and supporting strategies. The establishment of a dedicated unit, the City Sustainability Unit, to drive the Strategic Framework to a Green Economy Transition and now the Climate Response Strategy, was the starting point. Through this unit, a basis for evidenced-based planning was laid leading to the institutionalisation of an annual Greenhouse Gas Emissions Inventory, the Vulnerability Assessment and Climate Risk Study and other supporting studies such as the State of Energy study.

The City has also experienced a rapid ascent in the global sustainability space with the City already established as an active player and making meaningful commitments and investments that is exemplary of a city on the African continent. The City, as the administrative capital of one of Africa's powerhouses, has advocated for best practice on the continent especially following the establishment of the African Capital Cities Sustainability Forum (www.africancapitalcities.org).

Having engendered cursory climate response and sustainability thinking in the City, the time has now come for each City department to play its part in responding to climate change and

developing sustainability pledges that are mindful of their contributions to carbon emissions as well as required adaptive responses to mitigate the climate-related risks the City's residents are exposed to. This is part and parcel of mainstreaming and will ensure that every department plays its role which, in turn, will be captured in a GRI-compliant annual Sustainability Report, later to be integrated into the City's annual report to produce an Integrated Report. The commitment and support shown by the City's top political and administrative leadership is exemplary and will steer the City towards a more resilient City, one in which its residents can truly prosper.

With the publication of this strategy, next steps will involve the active consultation of internal and external stakeholders as well as interested and affected parties in the development of a **Climate Action Strategy**. This plan will serve as the implementation plan for this strategy and will be the driver for achieving the City's commitment to **C40's Deadline2020**.

"Our children are the rock on which our future will be built, our greatest asset as a nation. They will be the leaders of our country, the creators of our national wealth who care for and protect our people"

Nelson Mandela 3 June 1995



8 Annexures

City of Tshwane Vulnerability Assessment to Climate Change

Compiled by: City of Tshwane and South African Cities Network

Climate projections for the City of Tshwane region under an A2 emission scenario suggest less rain over and more hot days can be expected. Also, the occurrence of extreme weather related events such as droughts, floods, hailstorms and heat waves are expected to increase in frequency and intensity affecting especially the vulnerable population groups, as well as essential infrastructure and economic development. According to a social, health and environmental vulnerability ranking, Region 1 is ranked highly vulnerable due to the informal settlements and high population density and its location within the flood lines. Regions 2, 3, 4, 5 and 6 have medium to high vulnerability and Region 7 has a low to medium vulnerability. Vulnerable sectors identified in the city includes human health, human settlements that are at risk of flooding, agro-ecosystems that provide food security, water security, both supply and quality, high energy demand for domestic and industrial use and ecosystems goods and services.

Adaptation responses require that both human

and natural systems adjust to actual or expected changes in climate and associated effects and build resilience. This is only possible through partnerships between sectors such as the human settlements, roads and storm water infrastructure planning, social development, disaster management and emergency services.

The City of Tshwane has some initiatives in place that influence their ability to cope with climate change related hazards. These include a functional disaster management department and establishment of sustainability office that drive the transition to a climate resilient city. There are also community based organisations and non-governmental organisations that were established to strengthen adaptation at grassroots level. There are also some barriers within the city that inhibit their transition to a resilient city and these include uncertainty on extent of climate change, limited financial allocation for maintenance of adaptation projects and attitude of officials who are unreceptive to new ways of doing things.

Sustainability Financing Strategy for Green Economy Transition

Compiled by: City of Tshwane, City Sustainability Unit

The Sustainability Financing Strategy (SFS) identifies financing approaches and instruments to support green policies and projects to support the implementation of the green economy objectives of the city. Sustainable financing mechanisms are funds and instruments that are initiated, designed and or operated by the City of Tshwane to have a leveraging or catalysing effect by providing part of the total requisite funding as grant, equity, resources or assets in order to attract additional funding to invest in projects and initiatives with explicit green economy developmental impact objectives. The SFS is furthermore focussed on projects and proven technologies, City of Tshwane resources and assets, additional funding, job creation, revenue generation, integrated and complex cross-cutting projects, and proactive green project packaging.

The green economy projects selected for the City of Tshwane SFS (first round) are:

- The Materials Recovery Facility (MRF) roll-out project
- The Integrated Green City of Tshwane Fleet project
- The Waste-to-Energy (WTE) project
- The Sustainable Water & Wastewater Electricity Supply project
- The Energy Efficient City of Tshwane Lighting project

8 Annexures

- The Renewable Energy Solar PV Power project.

In terms of the city economics, the projects are to generate an estimated income for the City of Tshwane, create jobs with potential external partner-ship and funding resource. The six projects combined entails a total estimated Capex of around R1.1 billion for the City of Tshwane. This funding can mainly be sourced from both public and privates funding sources and projects can be implemented in partnership with the private sector parties (the City of Tshwane total Capex budget is R4.5 billion). These are sustainable projects with typical Returns on Investment of 5% to 20% and a sustainable, combined permanent job creation impact of more than 1 000. Substantial City of Tshwane additional income is expected during project operations.

The City of Tshwane City Sustainability Unit in the Office of the Executive Mayor is the Central SFS Coordination Unit for the selected green economy projects requiring additional external funding. The key task of the City of Tshwane Sustainability Unit shall be to proactively and efficiently develop and package green projects for additional external funding.

Sustainable Public Procurement Strategy

Compiled by: City of Tshwane

The City of Tshwane has embarked on a journey towards a low-carbon, climate resilient and resource efficient economy by using the power of sustainable public procurement. Sustainable public procurement implies the procurement of products and services that benefits for the organisation, the environment, society and the economy. Strong emphasis and priority is given to the preservation of the environment for present and future generations, and in achieving its developmental goals.

The City employed best practice without necessarily having an overarching strategy on sustainable public procurement, with elements thereof incorporated into a number of internal policy frameworks, strategic planning, institutional support and collaborations, as well as key initiatives. This Sustainable Public Procurement Strategy (SPPS) aims to further enhance the City's drive and to assist in mainstreaming sustainability into city-wide operations. Its development was based on the assessment of what is possible under the current political landscape; the rules of engagement of public procurement process; market readiness based on the City's most

procured products, and the opportunities in the value chain to stimulate product innovation, new enterprise development and green jobs.

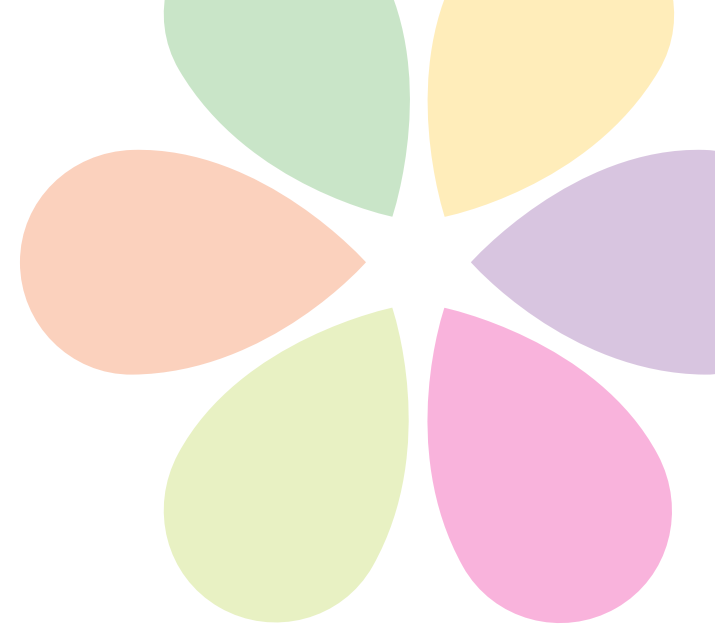
The integration of sustainable public procurement environmental requirements in procurement processes will be a gradual and structured approach in accordance with procurement legislative framework, giving consideration to the availability of supply of sustainable products. It will also be based on building sustainable procurement into e-procurement platform to enable the ability to measure, monitor and report on its performance.

Sustainable procurement is to be embedded in the Supply Chain Management (SCM) policy and requires support from decision makers, industry and society to achieve its goals. Policy instruments such as Environmental Management Systems (EMS), eco-labels and Life Cycle Costing (LCC) requirements are enablers to successfully integrate sustainable considerations throughout the procurement process but also for minimizing environmental footprint while meeting the obligations of environmental legislation and regulations.



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