MOVING MOUNTAINS

Cape Town's Action Plan for Energy and Climate Change

CITY OF CAPE TOWN | ISIXEKO SASEKAPA | STAD KAAPSTAD

THIS CITY WORKS FOR YOU

‘Facing an uncertain climate future, Cape Town aims to be a low-carbon city – a city that is resilient, adapting well and always acting for the common good, with social justice as our guiding principle.’
– City of Cape Town Executive Mayor

A member of MEMBER CLIMATE SMART CAPE TOWN

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In partnership with SEA Sustainable Energy Africa NPC

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Contents

Overview

Cape Town faces a number of challenges: a high carbon footprint compared to other similar cities, poor energy security, rapid urbanisation and associated energy poverty, urban sprawl and vulnerability to the impacts of climate change.

As early as 2001 the City of Cape Town adopted an Integrated Metropolitan Environmental Policy. Known as IMEP, the Policy identified the need for an active shift from business-as-usual to a driven and targeted sustainability agenda. Specifically, IMEP noted that only an integrated approach would enable positive change within this complex arena and that the City would need to increase its commitment to resource conservation and efficiencies.

In 2003 the City's State of Energy report provided a profile of energy supply and use, and in 2006 the Energy and Climate Change Strategy set out the vision, objectives, targets and measures for all city energy activities.

As part of its increasing commitment to implementation, the City has made important – and at times difficult – institutional changes to help ensure ownership, accountability, proper resourcing and alignment with institutional and individual performance management. As a result, in 2007, 'Energy for a sustainable city' was established as one of eight strategic focus areas of the City's five-year plan (the Integrated Development Plan, or IDP). This led to the establishment, in 2008, of an Energy Committee that reports directly to the Executive Mayor.

In 2009 the City established an Executive Management Team Subcommittee on Energy and Climate Change, along with three workstreams established the following year. In May 2010 a full Council voted to approve the Energy and Climate Action Plan. This Action Plan makes the City's commitments operational, demonstrates its leadership role, and forms the basis on which to prioritise, budget for, implement, and monitor and evaluate the City's energy and climate change programme.

Cape Town's Energy and Climate Action Plan has 11 objectives, with targets and detailed implementation plans involving 40 programmes and more than 120 projects. The Action Plan is managed and co-ordinated by the City's Energy and Climate Change Unit, across all directorates and departments.

Population:

3.8

million

(1 million households)

Unemployment:

21%

GDP for Cape Town:

R200

billion

Carbon footprint:

7.8

tonnes per person

(including waste, marine and aviation emissions) per annum

Natural Environment:

Natural environment: The Cape Floral Kingdom is a true global hotspot of biodiversity, being the smallest and richest on earth, while having the highest number of threatened plant species in the world of any city. Cape Town lies within the Cape Floristic Region, a UNESCO World Heritage Site.

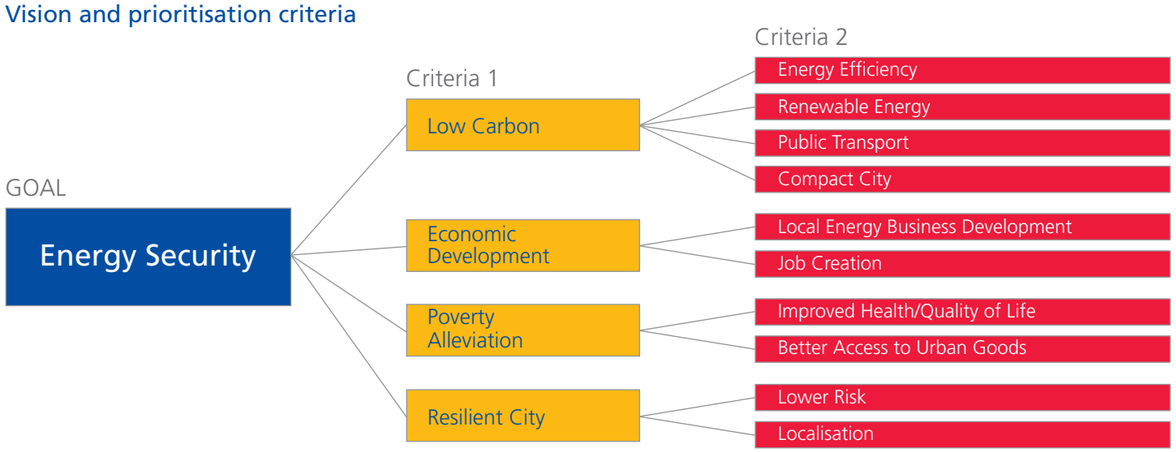
The energy and climate action plan

The Action Plan has not remained at strategic and executive level alone. Its objectives are incorporated in service delivery implementation plans, corporate dashboards and scorecards, and the City's risk register. Formal workstream structures led by executive management cut across functional 'silos' to ensure performance.

The Action Plan is geared toward implementation and actions are prioritised according to a set of criteria (such as low-carbon, economic development, poverty alleviation and resilience). The Action Plan is a living document: it establishes a clear programme of action, while at the same time reflecting ongoing developments. It also contains information to assist allocation of resources, monitoring and evaluation of progress, and identification of priorities and gaps.

Planning and implementing the Action Plan's energy-related programmes and projects are further informed by the Energy Scenarios for Cape Town Study, which provides a foundation for effective decision-making.

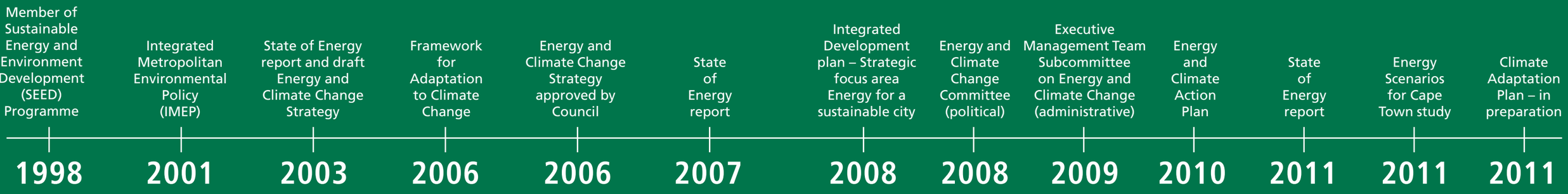
Vision and prioritisation criteria



The objectives

Energy and climate action plan objectives

- **Objective 01** — Citywide: 10% reduction in electricity consumption by 2012, off a 'business-as-usual' baseline
- **Objective 02** — Council (local authority) operations: 10% reduction in energy consumption by 2012
- **Objective 03** — 10% renewable and cleaner energy supply by 2020. Meet growth in electricity demand with cleaner/renewable supply, among other sources
- **Objective 04** — Build a more compact, resource-efficient city
- **Objective 05** — Develop a more sustainable transport system
- **Objective 06** — Adapt to and build resilience to climate change
- **Objective 07** — Improve the resilience of vulnerable communities
- **Objective 08** — Enable local economic development in the energy sector
- **Objective 09** — Access climate finance
- **Objective 10** — Raise awareness and promote behaviour change through communication and education
- **Objective 11** — Recruit staff; undertake research and development; establish data management systems; conduct monitoring and evaluation; update plan annually



Message from the Mayor

Dear Friends

This document, the City of Cape Town's Action Plan for Energy and Climate Change, is our acknowledgement of where we are, and our plan to secure our city's future in a new, necessarily low-carbon world. We have called this publication Moving Mountains, not only because it is a catchy name that calls to mind our world-famous landmark, but also because it calls us to remember who we are. For some, to move a mountain is to attempt the impossible; there are surely those who think that reducing our carbon footprint and acting on climate change is impossible. But we in Cape Town are people who believe in positive change, who have the courage to make the difficult decisions that get us where we want to be. We want to be a city that is resilient and always acting for the common good, with social justice as our guiding principle. And we don't believe that is impossible.

For this reason, in 2010 the City adopted the Energy and Climate Action Plan with its 11 objectives which include resource efficiency, sustainable transport, adaptation, climate finance and improved monitoring and evaluation. Detailed implementation plans involve 40 programme areas and more than 120 projects. The Action Plan addresses issues that at first glance may seem unrelated, from the quality of the City's housing stock, our traffic lights and our weather, to the city's sprawl, our coastal zone, its economic base, and learning activities at local schools. These all add up to Cape Town's unique challenges, and our equally unique opportunities to address these.

Already we have seen significant successes. For example, our Electricity Saving Campaign has seen a marked reduction in consumption in households and businesses; the year-round Youth Environmental Schools (YES) Programme reaches about 50 000 learners a year; the commercial Energy Efficiency Forum attracts more than 150 businesses to each meeting; we have retrofitted four of our buildings this past year, and done dozens of street and traffic lights.

And in late October 2011, Cape Town won its bid to be known as World Design Capital 2014. We won this bid not because Cape Town is naturally beautiful, fashionable or 'cool', but because we are using design to reconstruct and reconnect a city that has been divided for many decades, and make a more liveable, lower carbon city for all.

Last year the Deputy Mayor joined mayors from 138 cities around the world in Mexico City to sign the Global Cities Covenant on Climate (Mexico City Climate Pact) assuming the challenge to fight global warming at the local level. The City showed its commitment by being the first city in Africa to register its carbon inventory; and the City has affirmed this commitment by updating this report.

We believe that a city that pays attention to the source of its power, its energy, food and livelihoods, a connected, integrated city of neighbourhoods and communities, is the kind of city of which we all dream. Only the courageous pursuit of low-carbon living will get us there.

P. de Lille

Executive Mayor of Cape Town,
Alderman Patricia De Lille

Cape Town's energy, past and present

Energy supply

Cape Town's energy supply is dominated by electricity provided from the national grid, liquid fuels (mainly petrol and diesel, refined locally from imported crude oil), and a small amount of coal used by industry. Coal-fired electricity provides 85% of electricity fed into the grid, which means that the average carbon emissions attributed to electricity supplied to Cape Town are high – around 1 tonne of carbon dioxide (or equivalent) per MWh of electricity. These coal-fired power stations are 2 000 km from the city, which results in significant losses en-route. The 1 800 MW Koeberg nuclear power station, just outside Cape Town is also part of the national mix. To supply peak demand and for emergencies, Cape Town uses two open cycle gas turbines (1 327 MW and 171 MW) and a pumped-storage station (400 MW). Cape Town's electricity demand is 2 400 MW, 6% of a total installed national grid capacity of 40 000 MW.

South Africa intends to invest heavily in new electricity generation capacity, with the aim to have 10% of national grid electricity generated by renewable energy sources by 2030 (compared to less than 2% at present).

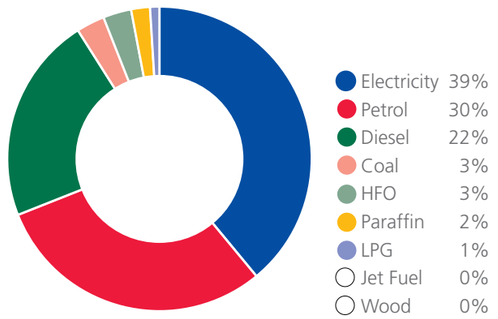
There is considerable potential around Cape Town for wind, concentrated solar and solar photo-voltaic electricity generation. These renewable energy technologies are made more attractive by the increasing costs of new coal plants, the decreasing cost of wind and solar, the likelihood of significant cost reductions in solar photo-voltaic energy, and the need to decrease carbon emissions.

South Africa intends to invest heavily in new electricity generation capacity, with 10% of national grid electricity being generated by renewable energy sources by 2030 (compared to less than 2% at present).

Energy consumption

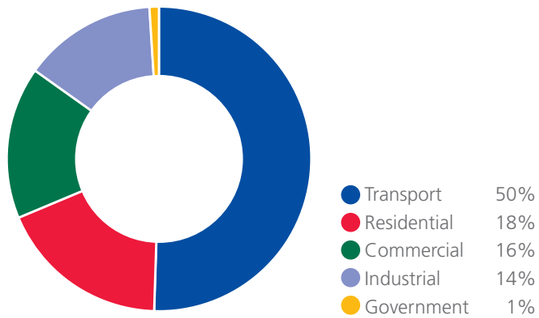
Transport accounts for approximately half of energy consumption in Cape Town, while the residential, commercial and industrial sectors roughly share the other half of demand. Almost all transport energy is supplied by petrol (gasoline) (60%), diesel (39%) and aviation liquid fuels. Residential and commercial energy is supplied by electricity (at least 90%), and the industrial sector uses a diverse supply of energy sources. Although 95% of households are connected to grid electricity, paraffin is still used by poor households (including electrified households), and is associated with fires, poisoning and poor indoor air quality.

Cape Town energy consumption by fuel source, 2007



Source: Cape Town 2011, State of Energy and Energy Futures Report

Cape Town energy consumption by sector, 2007



Source: Cape Town 2011, State of Energy and Energy Futures Report

Carbon emissions

Electricity consumption accounts for 64% of carbon emissions, most of which are attributable to the residential and commercial sectors (which account for 83% of electricity consumption).

Cape Town's energy supply, consumption and carbon emissions profile differs significantly from the rest of South Africa's. Industry and mining account for 55% of energy consumption nationally, while, in Cape Town, industry accounts for only 14%. Nationally, residential and commercial demand account for only 13%, while, in Cape Town, these sectors account for 34%. This very different profile, combined with the tight supply situation, a large services sector and tourism industry, its pursuit of the reputation as a green city and its distance from coal mines and power generation, presents Cape Town with a different set of strategic challenges, such as the need to shrink the city's carbon footprint and to localise energy supplies.

Energy, carbon 2007 figures (conversion factors as per IPCC)

Energy source	Giga-joules (GJ)	CO_2 tonnes
Electricity	48 576 102	14 844 856
Paraffin	2 830 399	202 939
LPG*	1 750 168	110 260
Coal	3 055 991	288 485
Petrol	39 392 694	2 725 974
Diesel	27 874 053	2 059 892
HFO**	4 116 143	317 766
Wood	49 574	–
Sub-total	**127 645 128**	**20 550 175**
Population 2007		3 497 100
Carbon footprint/capita 5,88 tonnes CO_2e		
Solid waste (landfill)		2 665 110
Aviation fuels	16 082 323	1 153 103
Maritime fuels	38 237 320	2 990 158
Total CO_2e	181 964 771	27 358 547
Carbon footprint/capita 7,82 tonnes CO_2e		

* Liquified petroleum gas
** Heavy fuel oil

Source: Cape Town 2011, State of Energy and Energy Futures Report

Electricity prices

Due to cheap coal, South African electricity prices have historically been among the lowest in the world, with little attention being paid to energy efficiency and conservation. However, a supply crisis engendered by poor planning has led to high tariff increases since 2006. These tariffs are required to fund a massive new electricity generation programme which will increase generation capacity from around 40 000 MW to 80 000 MW.

Such increases are set to continue, with electricity prices projected to rise by more than 400% from 2006 to 2016. While this does have a negative impact on households and economic activities, it also offers an opportunity to explore local production of energy from renewable resources, and invest in energy efficiency rather than expand supply. These options are likely to lead to significant co-benefits, such as cheaper energy services, reduced environmental damage, local economic development and a more liveable and economically competitive city.

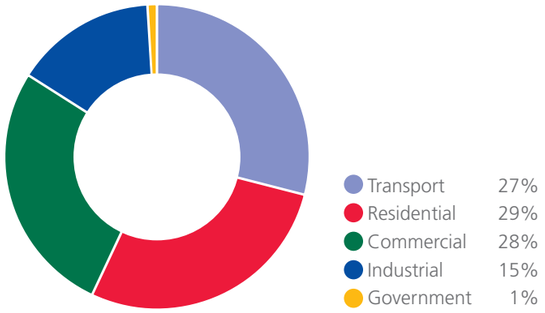
Although the current supply shortage was alleviated by the 2009 recession, the shortage remains, and further blackouts and load-shedding are unlikely to be avoided.

Liquid fuel prices

Liquid fuel prices have increased dramatically over the past five years. This has significant implications for Cape Town's road-based transport system, where average commuting distances are greater than 25 km. We can no longer ignore the likelihood of greenhouse gas emissions constraints playing a role in the medium- and long-term future of South Africa's economy.

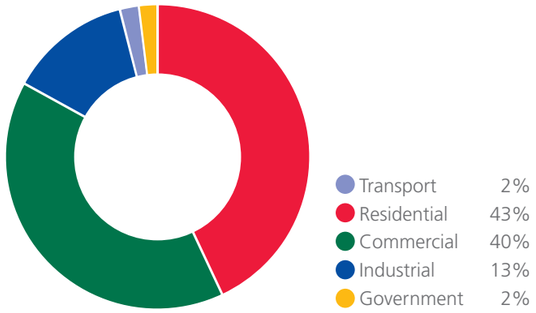
The country is both emissions-intensive and energy-intensive, and mitigation presents South Africa with a fundamental economic challenge that will require a well-planned, long-term and co-ordinated response.

Cape Town carbon emissions by sector, 2007



Source: Cape Town 2011, State of Energy and Energy Futures Report

Cape Town electricity consumption by sector, 2007



Source: Cape Town 2011, State of Energy and Energy Futures Report

An optimum energy future for Cape Town

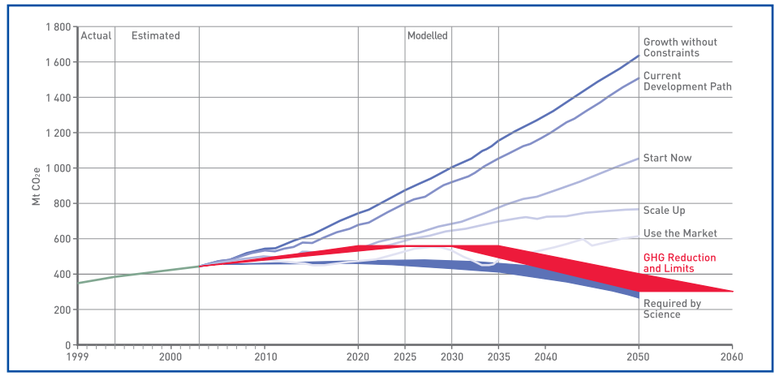
Cape Town's Climate Change Think Tank, a group of academics, specialists and City officials that has been meeting since June 2009 to discuss information and research needs, noted that, without good quantitative information on current and future energy consumption and supply parameters as well as on carbon emissions, the City and partners would not be able to assess climate risk accurately nor plan and prioritise the Energy and Climate Action Plan.

The Think Tank therefore undertook a study entitled 'Energy Scenarios for Cape Town: Exploring the implications of different energy futures for the City of Cape Town up to 2050'. The quality and level of detail of energy data in this study are a great improvement on the 2003 and 2007 State of Energy reports. Original data were collected specifically to inform the study and to assess future options for Cape Town in the context of the rapidly changing local energy scene and environmental context. A Cape Town 2011 State of Energy and Energy Futures report has also subsequently been compiled.

The Energy Scenarios for Cape Town study looks at various scenarios up to 2050 to determine the effect of energy-related interventions and external drivers, such as increasing energy prices and carbon taxes. It also looks at the relative costs and carbon emissions profiles of the different interventions as well as associated job-creation potential.

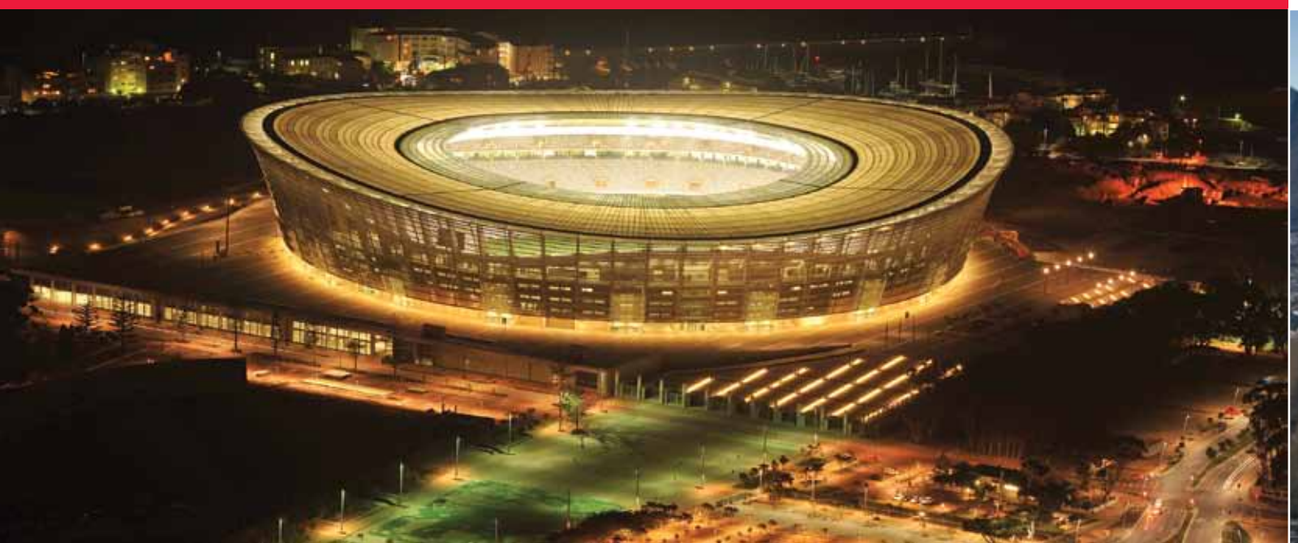
The business-as-usual scenario indicates a doubling of energy consumption and carbon emissions by 2034. Such a future is clearly untenable.

South African contribution to carbon emissions reductions required to maintain global temperature increase below 2°



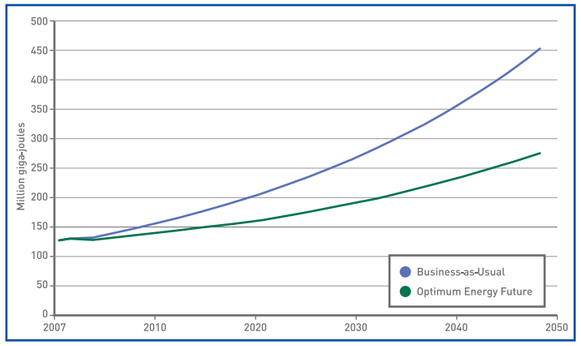
Source: Winkler, H 2010. Taking action on climate change: Long-term mitigation scenarios for South Africa. Cape Town, UCT Press.

Maintaining Cape Town's international reputation and competitiveness is an additional imperative for reducing energy consumption and for pursuing larger quantities of renewable energy in its supply mix. This means not only that the City must intervene proactively in national resource development planning, but that the City must also support and facilitate local projects such as solar water heating, solar photo-voltaics and small wind turbines on house, mall and factory rooftops, for own supply and for feeding back into the grid.



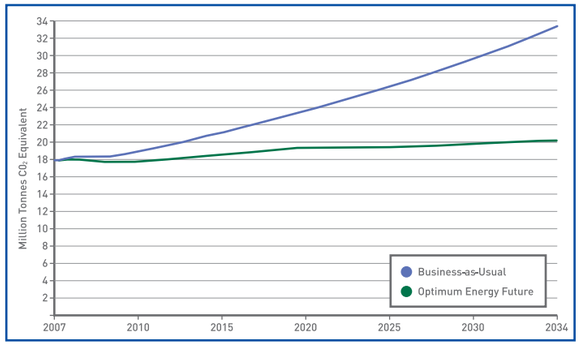
Energy consumption and global warming potential business-as-usual vs optimum energy future

Energy consumption



Source: Energy Scenarios for Cape Town, 2011

Global warming potential



Source: Energy Scenarios for Cape Town, 2011

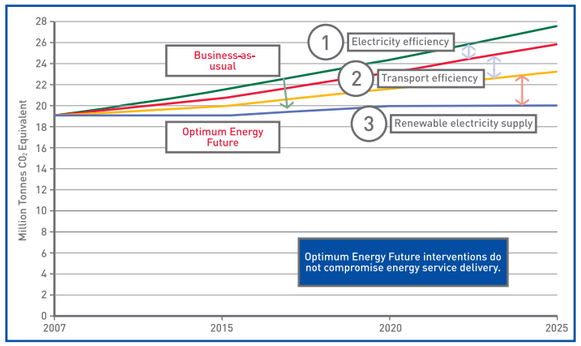
The optimum energy future scenario results in an energy and carbon emissions profile with numerous co-benefits:

- local economic development of renewable energy, energy efficiency and energy services industries;
- lower energy service costs to households, commuters, commerce and industry;
- improved energy security for all sectors;
- local generation and reduced demand through efficiency both decrease the risk of, and vulnerability to, bulk supply disruptions;
- diversity of energy supply provides protection against disruption of a particular supply option; and
- investment in local and onsite energy services decreases vulnerability to energy supply disruption and energy price volatility of bulk supplies sourced outside Cape Town or the Cape Town vicinity.

Energy efficiency and renewable energy often pay for themselves, leading to lower energy costs and more secure supply, as well as local jobs, a cleaner environment and a more competitive economy.

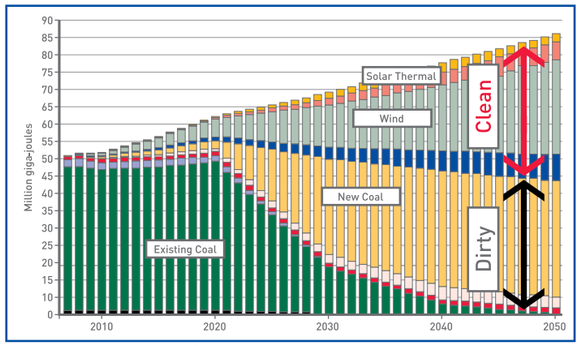
Other structural changes associated with the optimum energy future, such as densification, public transport and integrated neighbourhoods, lead to greater social cohesion, more liveable cities and communities that are more resilient to external environmental and economic shocks (including climate change). Even without alleviating the carbon emissions constraints, the optimum energy future makes financial, economic, environmental and social sense.

Route from a business-as-usual to an optimum energy future



Source: Energy Scenarios for Cape Town, 2011

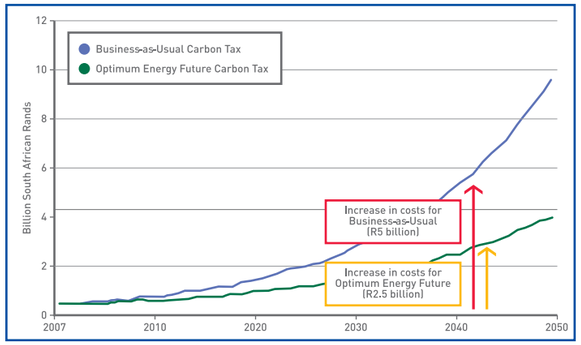
Optimum energy future electricity supply mix



Source: Energy Scenarios for Cape Town, 2011

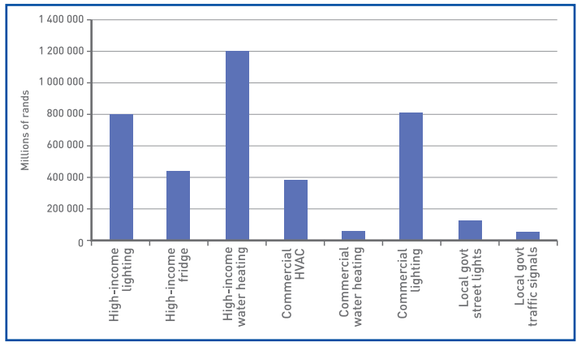
Cape Town has a relatively high carbon footprint, mainly because of its coal-based electricity supply, urban sprawl and predominantly road-based transport system. Hence, urgent action is needed. Delayed action will cost more and will contribute to catastrophic climate change as well as precipitate drastic international measures.

Carbon tax implications of different scenarios



Source: Energy Scenarios for Cape Town, 2011

Cumulative net savings from electricity efficiency interventions up to 2025



Source: Energy Scenarios for Cape Town, 2011

Action plan objectives, programmes and projects

Background to objectives 1, 2 and 3 – increased energy security

Reduction in consumption of high-carbon electricity by increasing energy efficiency and the use of cleaner and renewable energy sources

Objective 01	Citywide: 10% reduction in electricity consumption by 2012, off a 'business-as-usual' baseline
Objective 02	Council (local authority) operations: 10% reduction in energy consumption by 2012
Objective 03	10% renewable and cleaner energy supply by 2020. Meet growth in electricity demand with cleaner/renewable supply, among other sources

Bulk electricity supply from the national grid has become unreliable and Cape Town experienced blackouts (load-shedding) in 2006 and 2008. There is a serious gap between national supply and demand, and this is not expected to change for the next few years. After decades of cheap electricity, price increases approved by the National Energy Regulator of South Africa will result in increases of more than 400% up to 2016.

The first three Action Plan objectives therefore aim to reduce electricity consumption and move toward a more localised and lower carbon electricity and energy supply.

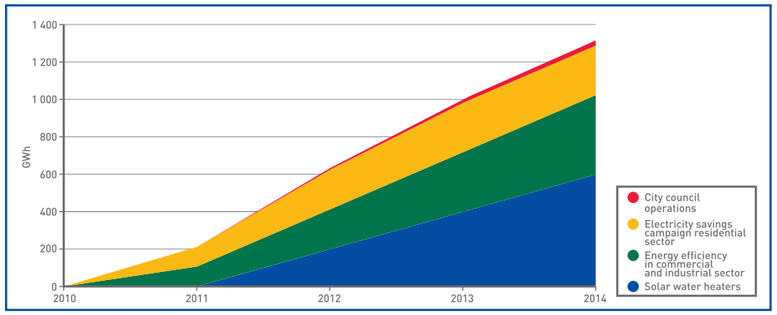
South Africa's recently announced electricity generation investment plan for 2010 – 2030 does not include significant investment in renewable energy: In terms of current planning, only 9% of electricity energy to the national grid will be from renewable resources by 2030. This means that supply from the grid will remain high carbon. However, a variety of renewable energy supply options are already cost-competitive with conventional supply technologies, and over the next decade these options should become more attractive. In addition, South Africa has made commitments to decrease emissions: This not only makes financial and economic sense, but will also become an economic and political necessity as the international carbon emissions regime tightens.

Objective 01

SAVE

Smart Living. Smart Saving.
For all the right reasons.

Citywide: 10% reduction in electricity consumption by 2012, off a 'business-as-usual' baseline



Source: City of Cape Town

Action Plan objective 1 addresses Cape Town's immediate need to cut electricity demand to assist with the national supply/demand shortage and make the city less vulnerable to supply disruptions due to the national supply shortage. It also sets in motion a change in attitude and direction to investments in equipment and electricity use patterns. Investment in both energy efficient equipment and behaviour change is crucial. The City acknowledges the role of energy efficiency in promoting economic development, social welfare and environmental sustainability.

Programmes:

Residential, commercial and industrial efficiency campaigns

The most effective efficiency opportunities are in medium-income to high-income households and commercial buildings. A high-profile and multi-pronged electricity savings campaign, funded in part by the City's Electricity Department, has been in operation since 2009. The City also runs a Commercial Energy Efficiency Forum with the active participation of more than 400 members. An Industrial Energy Efficiency Forum is being established along similar lines.

Solar water heating

Replacing electric water heaters with combined electric solar water heaters offers enormous potential to reduce electricity consumption. There are more than 400 000 electric hot water cylinders in medium-income to high-income households in the city and a programme is being devised to facilitate households changing to solar water heaters. This will reduce electricity consumption by at least 6% at considerably lower financial cost to households.

Resource-efficient development

New and refurbished residential and commercial developments offer opportunities for changing the built environment to a more resource-efficient one, with lower life-cycle costs and with environmental benefits. The City has developed a Green Buildings Handbook, and is preparing to implement the new energy efficient national building regulations.

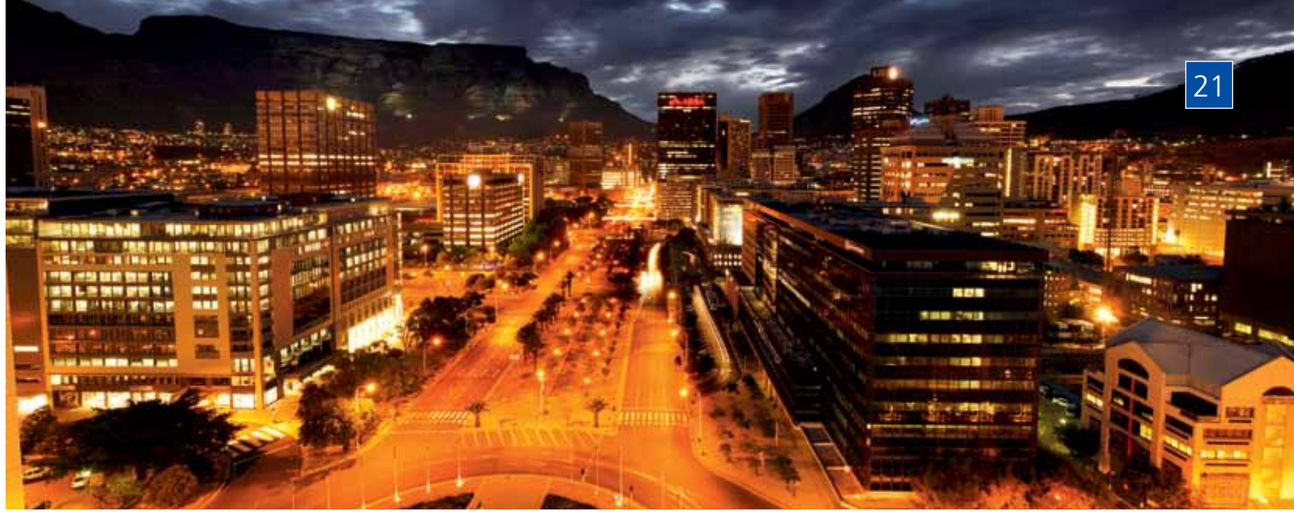
The most attractive immediate opportunities are energy efficiency interventions in medium-income to high-income residential households and commercial buildings.

Objective 02

Council operations – 10% reduction in energy consumption by 2012

The City is a major energy user in its own right, operating a vehicle fleet of some 6 000 vehicles, managing numerous municipal buildings and using energy to provide services such as large-scale water pumping, street lighting and traffic lights. As both the largest single energy consumer and the largest single employer in Cape Town, it has a key role to play in leading by example, transforming local goods and services supply through green procurement, and reaching the citizens through its own staff.

Substantial savings to City coffers can be made through efficiency upgrades, and, in most cases, such investments have financially attractive payback periods.



Municipal regulations can make the financing of energy efficiency projects challenging, but the implementation of a number of successful pilot projects has resulted in significant budget allocation for retrofits from the City's budget.

Programmes:

Building retrofits

The City owns more than 5 000 facilities, including at least 80 significant administrative buildings, 100 clinics and 100 libraries. In initiating this programme, 16 buildings were earmarked for consideration, and a project to audit and retrofit four of these has been completed. Results indicate a seven-year payback period on technology interventions, and approximately 22% savings, about half of which are anticipated from the behaviour-change programme.

Technology retrofits implemented include installation of high-efficiency luminaires, control of air-conditioner operating hours, solar water heater installations, thermostat control, and power factor corrections.

An energy efficiency audit of the Civic Centre, the City's largest building, was completed in June 2010. The implementation of retrofits is expected to finish in 2012.

Solar water heaters have been installed in all 23 nature reserve buildings and 44 clinics. A lighting retrofit project of all City libraries and clinics is also under way. The City's achievements are being used to promote retrofitting and behaviour-change programmes in residential and commercial buildings.

Upgrading existing City rental stock

Phase 1 of the upgrade of existing City rental housing has been completed, with the installation of insulated ceilings, water meters and compact fluorescent lights (CFLs), and the servicing of windows to minimise draughts. The programme includes other interventions such as installing low-flow showerheads and supporting specific behaviour changes.

Greening the City's procurement policy

The City is incorporating green criteria into its procurement process. This includes fuel-efficiency and emissions criteria in vehicle purchase tenders, green-trained professionals in building development tenders, green paper requirements and energy efficiency in maintenance contracts.

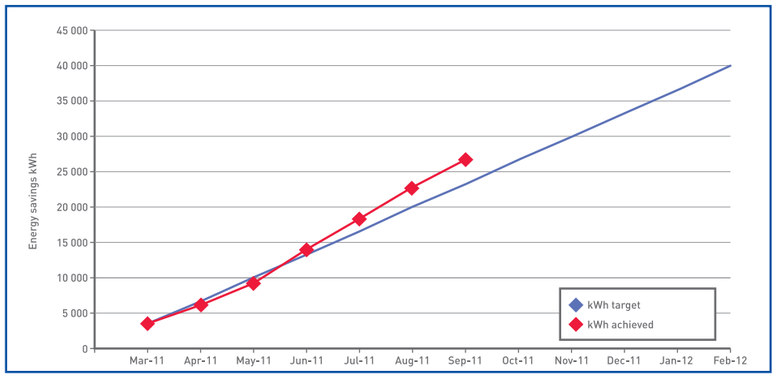
Greening the City's fleet

The City operates more than 6 000 vehicles. A comprehensive fleet-greening strategy was developed in 2010, which includes improving efficiency and decreasing emissions of existing vehicles and ensuring that efficiency and emissions are key criteria in procuring new vehicles. Eco-driver training is under way. Investigating fuel/technology switching, such as liquid petroleum gas (LPG), compressed natural gas, electric and/or hybrids conversion – and implementation if viable – is a component of the programme.

Public lighting and traffic light retrofits

With national government funding assistance for energy efficiency and demand-side management, the City is retrofitting street lights and traffic lights. In the past two years, the City has retrofitted 11 000 street lights and 7 000 traffic lights, with resulting energy savings of 4 321 MWh per annum.

Fezeka municipal buildings – one of four 'performance guaranteed' building retrofits the City implemented in 2010



Source: Shared Energy Management, 2011

Objective 03

10% renewable and cleaner energy supply by 2020; meet the growth in electricity demand with cleaner/renewable supply, among other sources

Action Plan objective 3 addresses Cape Town's contribution to national carbon emissions reduction targets, its aim to be a leading low-carbon city, and the requirement for local business and industry to have access to low-carbon electricity. Nuclear-powered electricity generation is low carbon. However, a large proportion of a nuclear power plant would need to be imported at great cost whereas most of the components for renewable energy technologies, such as solar and wind, can be manufactured and installed in South Africa, providing significant employment and economic development. The costs of renewable energy technologies have been decreasing rapidly and continue to do so. In 2008 more was invested globally in large new renewable electricity generation than in conventional (coal, gas, nuclear and large hydro) plant.

Programmes:

Large-scale renewable energy supply

The City pioneered local government support for wind-powered electricity generation through its contract to purchase electricity produced by the Darling wind farm. This is sold by the City to willing buyers who want access to green power through a Green Energy Certificate scheme.

The South African National Government is setting up a new regulatory regime to facilitate independent power producer access to the national grid. As soon as this is possible, the City will be able to extend city residents' access to green power through the new scheme.

Renewable energy from City operations

The City is considering a number of options to use energy from waste. These include waste/sewerage to methane gas, waste-to-energy, and co-generation. The recovery of landfill, organic waste and wastewater treatment plant methane is of added significance given that methane is a major contributor to the carbon emissions from City-owned facilities.

Embedded and small-scale renewable electricity supply

Rapid technology development is making options such as small-scale wind and solar photo-voltaics, for example on commercial, industrial and residential rooftops, economically viable both for own supply and for feeding back into the City distribution system. The City is working with National Government and regulatory authorities to overcome regulatory and technical issues related to electricity consumers and small electricity producers feeding electricity back into the grid.

GREEN ELECTRICITY CERTIFICATE

PURCHASE STATEMENT

This certifies that
on 5 October 2010

OLD MUTUAL INVESTMENT GROUP - PROPERTY INVESTMENT

purchased THREE HUNDRED (300) kWh
of City of Cape Town Green Electricity Certificates
for the **14th ANNUAL CONGRESS OF SHOPPING CENTRES**

IN SUPPORT OF A SUSTAINABLE FUTURE
Energy resource: Wind (Darling Wind Power (Pty) Ltd)

6 October 2010
DATE

SIGNATURE

Business partner number: 1002017199
Account number: 000210579465
Statement: 13

THIS CITY WORKS FOR YOU

Background to objectives 4 and 5 – a compact, resource-efficient city with a sustainable transport system

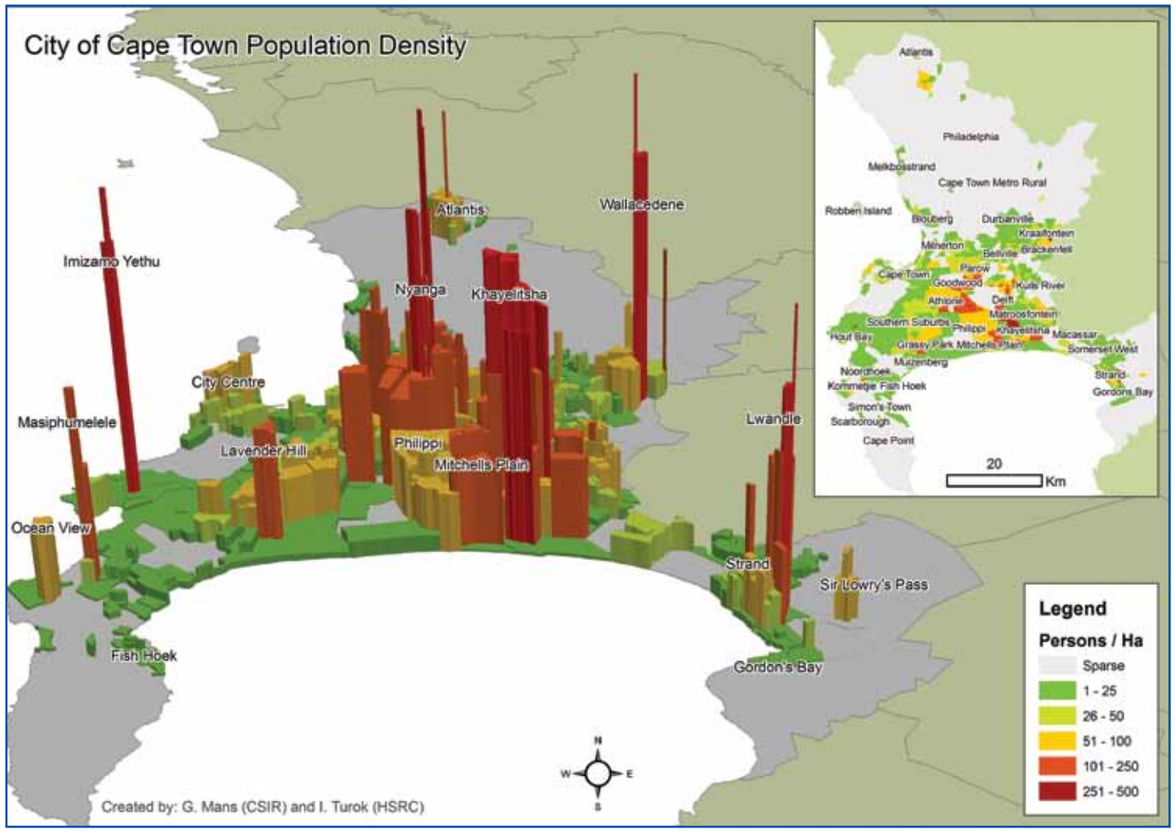
Objective 04 — Build a more compact, resource-efficient city

Objective 05 — Develop a more sustainable transport system

Spatial settlement and economic activity patterns in Cape Town are a legacy of apartheid planning: Population densities are highest in the low-income and informal settlements on the outskirts of the city, far from economic activity and places of employment. The overall city density is very low. Of the 1 million households in Cape Town, 118 000 are informal households. The city population is growing rapidly at an average rate of 3% per year, while growth in informal dwellings is much higher.

The City is addressing spatial patterns with a Densification Strategy (including promoting densification around transport routes and nodes) and establishing an urban edge.

Spatial layout of Cape Town – denser areas are typically poor areas, far from commercial and industrial centres

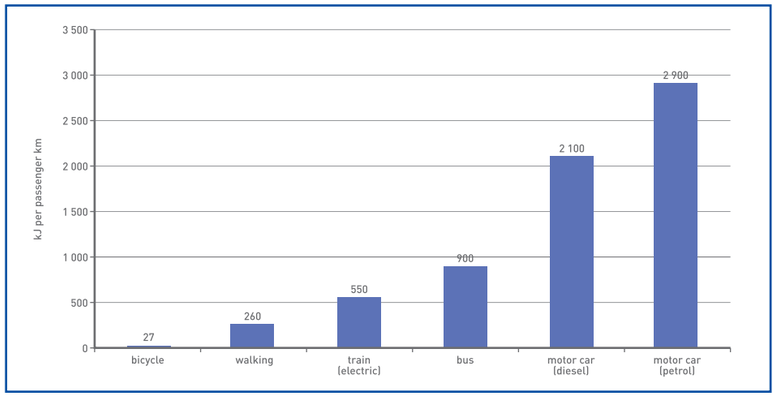


Reference: Turok, Sinclair-Smith and Shand, 2010

While Cape Town has one of the better public transport systems in southern Africa, it is still poor by international standards. The public transport system in Cape Town comprises rail, bus and mini-bus taxis. Just under half of all trips are made by private vehicles, and the average commuting distance is 25 km. Poor people spend up to 20% of their income on public transport. The city is dependent on road-based transport for both passenger and freight mobility: Only four of the 17 rail lines currently meet passenger demand and 77% of all freight is transported by road. The trend towards increasing vehicle ownership and use, particularly of single-occupancy vehicles, is not sustainable: It is energy inefficient, contributes significantly to carbon emissions and requires use of valuable urban space.

Long travel distances and inefficient vehicles mean that transport accounts for half of the city's energy consumption, a third of its carbon emissions and significant air pollution.

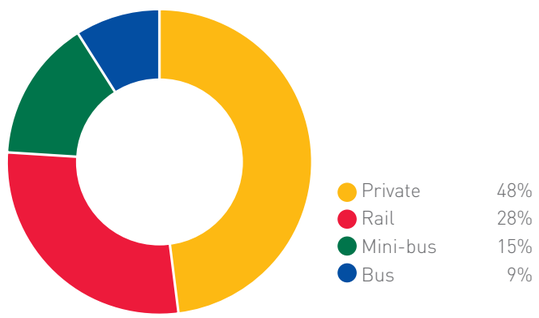
Energy used per mode



Source: Department of Transport: Transport Statistics Bulletin, 2008

Without quality public transport densification is not possible; without densification quality public transport is not sustainable

Transport modal share in terms of passenger km in Cape Town, 2007



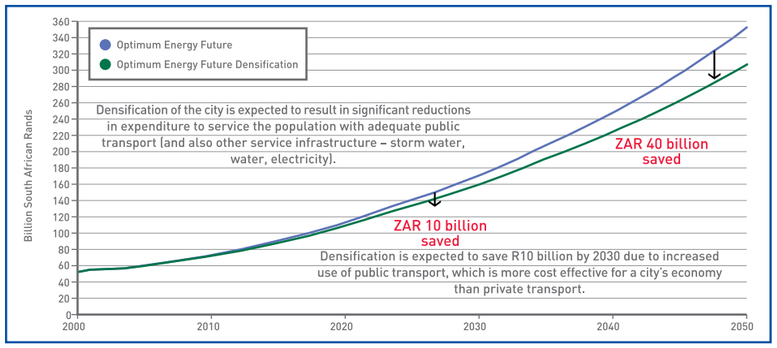
Source: Energy Scenarios for Cape Town, 2011

Objective 04

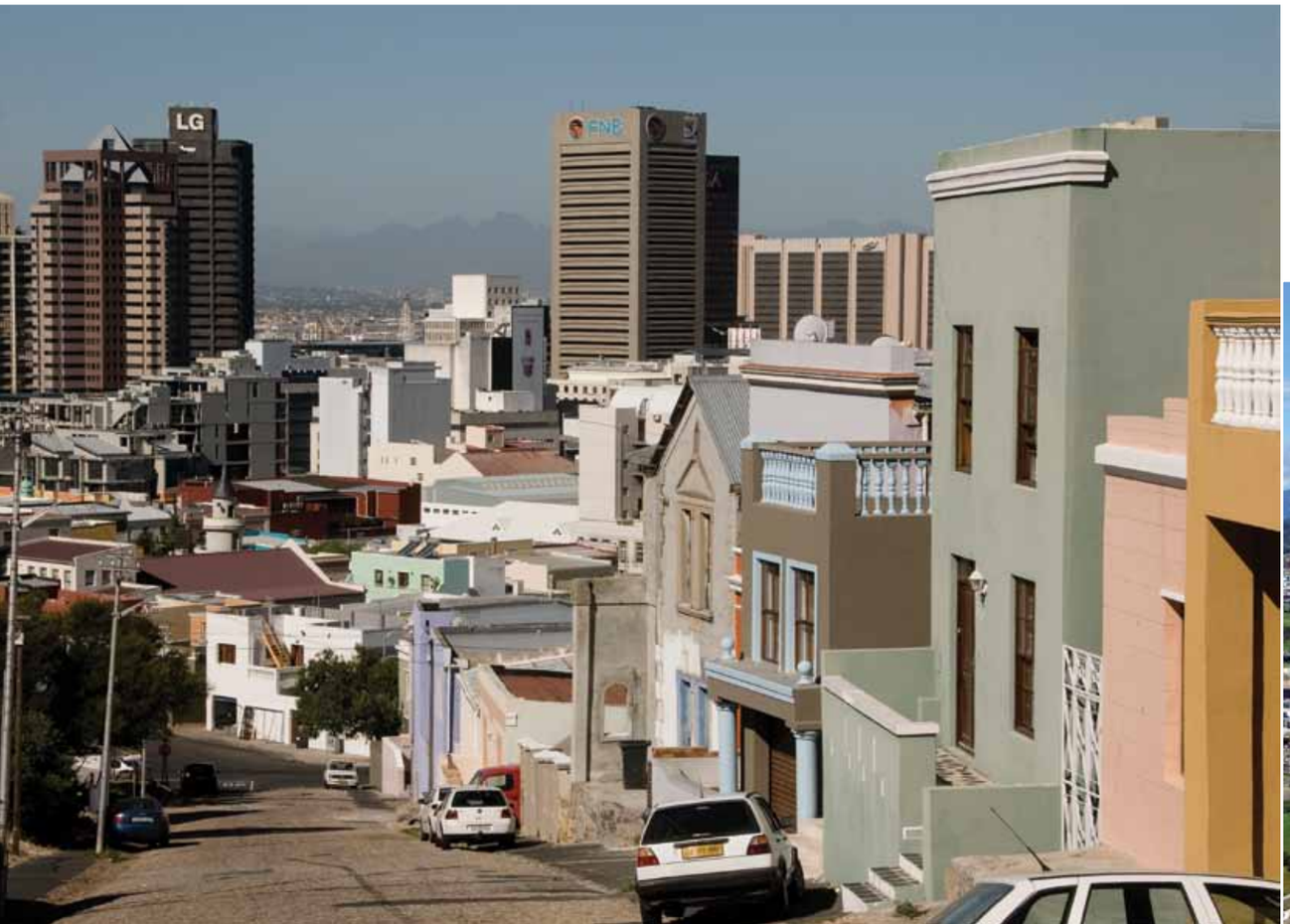
Build a more compact resource-efficient city

Action Plan objective 4 addresses a number of interrelated challenges relating to spatial planning and transport.

The need to densify the City



Source: Energy Scenarios for Cape Town, 2011



Spatial Development Framework

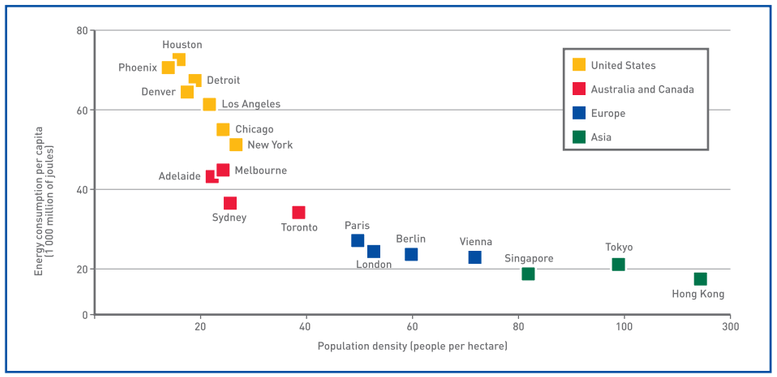
The City of Cape Town's Spatial Development Framework (SDF) (endorsed by Council in 2011) has three key strategies:

- planning for employment and improving access to economic opportunities;
- managing urban growth and creating a balance between urban development and environmental protection; and
- building an inclusive, integrated, vibrant city.

The SDF is supported by integrated spatial development plans and environmental management frameworks for each of Cape Town's eight planning districts. While the SDF has statements supporting densification and development edges, the more detailed Densification Strategy and the Urban Edges Policy are yet to be approved by Council.

Density affects energy consumption

Energy consumption per capita vs density



Source: data from UITP Millenium Cities Database, 1999. Cape Town's position is similar to that of the Australian cities, but in South Africa poor city dwellers generally live far from urban opportunities.

Appropriate densification planning offers multiple benefits. It makes public transport economically viable, enables integrated communities, makes the city more liveable, decreases energy consumption and the need for long-distance commutes, and enables improved lifestyles, recreation and health status.

World Town Planning Day: Planning for a low-carbon city

In 2009 the City hosted a conference for its staff and elected officials in order to build capacity and skills for low-carbon urban design. The conference included information on the role of planning in supporting a low-carbon economy, city case studies (of Johannesburg, China, Brazil), as well as low-carbon legislation and financing.

Objective 05

Develop a more sustainable transport system

Action Plan objective 5 incorporates the City's integrated rapid transit system, non-motorised transport (NMT) and travel demand management programmes.

The new National Land Transport Act allows cities to take on greater responsibility for public transport – everything from planning and co-ordinating the various modes to licensing, regulating and administering funds for capital projects and public transport subsidies. The City aims to develop a single, integrated public transport system with all modes working together efficiently.

Bus and mini-bus taxi (BMT) lane

Programmes:

Integrated rapid transit (IRT) programme

Cape Town's IRT Phase 1A, the MyCiTi service, commenced operations in May 2010. This first phase incorporates a network of main and feeder routes, using a fleet of modern, energy efficient buses travelling on dedicated busways. Smaller feeder buses travel with ordinary traffic through suburbs and industrial areas transporting passengers to and from the main routes.

The MyCiTi service links Cape Town International Airport with passenger rail, commuter bus, taxi and long-distance transport options. Dedicated bicycle lanes form part of the MyCiTi roll-out.

Bus Fleet Planned for Phase 1A of IRT

Service	Vehicle size	Total buses
Feeder buses	8 m	27
	12 m	165
Main buses	12 m	87
	18 m	31
Total		**310**

Non-motorised transport (NMT)

The City of Cape Town's vision is to increase NMT as a preferred means of travel. Its goal is to increase cycling and encourage walking by creating a safe and pleasant network of bicycle and pedestrian routes.

Employee trip-reduction programme

The City is working with the Western Cape Provincial Government and five other large employers on a pilot programme to establish a set of support measures involving flexible working hours, tele-commuting, parking, public transport, vehicle multi-occupancy and NMT. This will help reduce single-occupancy vehicle use and vehicle emissions, and encourage a modal shift toward public transport.

The project is largely funded by the United Nations Development Programme (UNDP).

Objective 06

Adapt to and build resilience to climate change impacts

The Copenhagen Accord agreed to limit emissions so that the temperature rise is no more than 2˚C, although it is likely that with current and future emission levels, we will exceed this. This temperature rise will severely affect our natural and built environment, as well as our communities, economies and social fabric.

Cape Town is a developing city on the coast. It is particularly vulnerable to climatic changes. These changes will likely involve sea-level rise, an increase in storm-surge frequency and intensity, an increase in extreme weather events, changing rainfall patterns, increasing temperature extremes, and shifting wind patterns and extremes.

These changes present a range of risks to Cape Town, including water and food in-security, damage to key infrastructure and transport routes, interruption to service delivery, health risks, heat stress, flooding, and negative impacts on the groundwater table, ecosystem health and biodiversity. These impacts will affect Cape Town's economy, as the city is dependent on its natural assets for its tourism economy and global 'destination' status.

The City of Cape Town is therefore undertaking a number of key actions to adapt to and prepare for, these significant risks and challenges.

Programmes:

Sea-level rise risk assessment and economic modelling

In 2008 the City initiated a five-phase project to model the predicted risks of both average sea-level rise and the associated risk of more frequent and intense coastal storms and resulting storm-surge events. This modelling enabled an economic risk assessment of City infrastructure, which is being used to inform the City's no-regrets risk-averse forward planning. The City continues to update and review its sea-level rise predictions to ensure informed decision-making about development and infrastructure.

Financial preparations for the implications of climate change

The impacts of climate change will have severe economic (capital and operating) costs for the City. The burden of repair, replacement or removal of infrastructure and services, as well as responding to change, rests on the City budget.

The City has therefore embarked on a process to investigate fiscal reform options that will identify appropriate sources of revenue that would finance these significant requirements.

Climate Adaptation Plan of Action

The City's Climate Adaptation Plan of Action (CAPA) is a component of the Energy and Climate Action Plan. It aims to understand the predicted consequences and risks for the city, identify appropriate responses to these, and provide detailed actions in each sector plan, for example stormwater management responses to more intense rainfall, to sea-level rise and storm surges.

Coastal Protection Zone Bylaw

Already under pressure on account of its desirability, Cape Town's coastline, with its highly dynamic coastal zone, is also particularly at risk from climatic changes. The City has therefore proposed a coastal protection zone (CPZ) reinforced with a Coastal Protection Zone Bylaw (the first of its kind in Africa). The CPZ, defined seaward by the high-water mark and landward by the coastal edge line, will limit further infrastructure development and protect the remaining coastal ecosystem function and dynamics. Both the CPZ and the bylaw are currently under review.

Initiating a climate change policy

The City has extensive information on potential climate change impacts. The City is embracing these governance challenges by developing a climate change policy, which will create a legal framework for addressing the City's responsibilities.

Ecosystem mapping

One of Cape Town's most important adaptation strategies is the protection, management and rehabilitation of functioning ecosystems. Not only do functioning ecosystems provide the best adaptation potential, they are also the most cost-effective, with the least associated maladaptation risks. The City will map and identify the functioning ecosystems that must be protected and managed.

Objective 07

Improve the resilience of vulnerable communities

Although 95% of households in Cape Town have access to electricity, poor households often depend on paraffin and/or wood for cooking and heating. Energy poverty remains a significant challenge, as low-income households can spend up to 25% of their income on meeting their energy needs. Paraffin and candles, however, are responsible for devastating fires that spread quickly through informal settlements, leaving hundreds of families homeless. Paraffin is also a dangerous poison and the smoke inside poorly ventilated houses exacerbates respiratory disease.

Many energy interventions result in significant co-benefits. Interventions that improve the thermal efficiency of houses, for example, not only decrease emissions, but also lead to lower monthly fuel bills, a better living environment, improved indoor air quality and, therefore, fewer health problems.

Thermally-efficient low-income housing

Kuyasa CDM

In one of Africa's earliest successful clean development mechanism (CDM) projects, insulated ceilings, energy efficient lighting and solar water heaters were installed in more than 2 300 houses in Kuyasa, Khayelitsha (completed 2010). This is a partnership project between the Department of Environment, City of Cape Town, SAEDF and South South North.

Other projects

Further low-cost housing projects have also seen energy efficiency interventions: Lwandle, once a migrant hostel development, was the first housing project nationally to include solar water heaters; the City has initiated a programme to install ceilings in pre-2005 housing units that were built without ceilings, in order to increase comfort, improve indoor air quality and reduce energy costs to poor households; a pilot ceiling retrofit project has been carried out in Mamre; Witsands in Atlantis has used extensive thermal-efficiency measures; and some of the new housing projects include solar water heaters.

Free basic electricity roll-out

Cape Town has led the country in the provision of a 'lifeline tariff', where households using less than 450 KWh of electricity per month receive the first 50 KWh free.

Solar water heaters

The City is in the process of establishing the mass solar water heater roll-out programme, which will include low-income households.

Background to objectives 8 and 9 – finance and economic development

Objective 08 — Enable local economic development in the energy sector

Objective 09 — Access climate finance

The economic benefits of climate and energy actions

In 2008 worldwide total investment (US$140 million) in new and renewable energy electricity-generation plant (mainly wind and solar photo-voltaic) exceeded investment in conventional plant (coal, gas, nuclear and large hydro). New and renewable energy electricity generation is now a major mainstream industry.

South Africa is about to invest hundreds of billions of rands in new wind and solar photo-voltaic electricity-generation capacity, according to the recently published Integrated Resource Plan 2010 – 2030. The plan contains 8 400 MW of solar photo-voltaic and 8 400 MW of wind-powered electricity generation, enough demand to facilitate and grow local industries that could develop competitive international export capability.

Energy efficiency and renewable energy also offer substantial opportunities for replacing the import and use of energy from outside the metro area. Research and development, design and manufacture, and installation and maintenance of goods and services all provide economic opportunities, as do the mass manufacture and installation of items such as solar water heaters and ceilings.

Objective 08

Enable local economic development in the energy sector

The City plans to see the installation of solar water heaters on every household in the long term, as they offer significant opportunities for local design, manufacture and supply of these and other renewable energy and energy efficiency technologies and associated services.

The Western Cape is an ideal centre for the South African renewable energy industry, including component and system manufacturing. Already the city and the region host leading research and development centres at the University of Cape Town (energy studies, as well as engineering), the Cape Peninsula University of Technology (Energy Technology Unit) and Stellenbosch University (Centre for Renewable and Sustainable Energy Studies). Cape Town is home to a number of solar water heater manufacturers, a solar photo-voltaic panel plant and an internationally competitive alternative energy power electronics design and manufacturing capability. Concerted strategic efforts are now required to establish a competitive local industry based on demand for green energy technologies and related knowledge and skills.

Economic Development Strategy

The City's Economic Development Strategy cites lower carbon city development as a key economic driver, and recognises that in order for Cape Town to be economically competitive it needs to be able to offer investors resource-efficient and lower carbon opportunities.

Establishment of a renewable energy sector development agency

In 2010 the City partnered with the Western Cape Provincial Government to establish Green Cape, a sector development agency aiming to unlock the manufacturing and employment potential of the 'green energy economy' in the Western Cape.

greencape
powering the renewable evolution

Objective 09

Access climate finance

An increasing range of funds are available to cities to invest in climate change-related projects which the City is accessing where possible. The Cleaner Development Mechanism (CDM) and voluntary carbon emission reduction trading opportunities under the Kyoto Protocol have been investigated extensively by the City, but considerable technical capacity, effort and expense are required to access these opportunities. This remains an area of interest, though, and the City is continuing to investigate ways in which carbon trading could work for local government projects. The City has to date accessed extensive climate finance which has been a key catalyst for project development and implementation.

Objective 10

Raise awareness and promote behaviour change through communication and education

Although many of the individual projects mentioned in this document have dedicated communication, awareness and education components, there is a need to provide energy and climate change information to a more general audience, including school learners, City staff, residents and businesses.

SAVE

Smart Living. Smart Saving.
For all the right reasons.

Electricity savings campaign

The electricity savings campaign targets residential consumers, aiming to reduce consumption through a wide range of behaviour-change actions, such as turning down geyser temperatures and switching off plug and light switches. Through electronic resources, posters, publications, exhibitions and events, the campaign shares guidelines, information about energy technologies, and tips on electricity saving, to reach the widest possible audience.

Turn

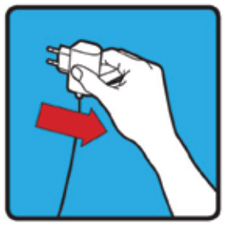
Turn down your geyser temperature to 60˚C. This will save you up to 5% on your electricity bill.

Flip

Rather take a shower. You'll save up to 80% in water and use 5 times less electricity than heating a bath of water.

Fit

Install an energy-saving showerhead. It's designed to use up to 40% less hot water and will save you money on your electricity bill.



Pull

Switch off appliances at the wall and pull out chargers. Leaving them in standby mode could cost you up to 6% more electricity.

Commercial Energy Efficiency Forum

This forum provides a platform for commercial building owners/managers to share best practices, innovative management systems and viable technologies to increase energy efficiency. The forum has seen much success and interest, with substantial attendance at quarterly meetings from more than 200 participating companies.

Industrial Energy Efficiency Forum

Following on the success of the commercial forum, the City is establishing an Industrial Energy Efficiency Forum, using the commercial forum as a blueprint. The City convenes a large consumers group, where information regarding national government's requirements for consumption reduction is shared.

Smart Living Handbook

The 160-page Smart Living Handbook, already in its second edition, guides people in resource-efficient, sustainable daily practices around water, waste, energy and biodiversity.

Smart Living campaign

The Smart Living campaign is a comprehensive, ongoing sustainable-lifestyle campaign, aimed at Council staff, communities, businesses and schools in Cape Town. It focuses on waste, energy, water and biodiversity.

City staff training

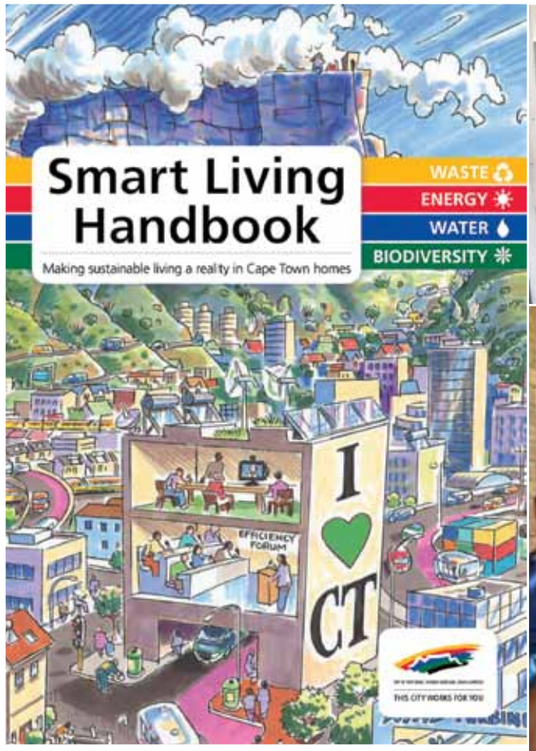
Extensive training programmes range from basic environmental awareness training to Smart Living and Smart Office training.

Youth Environmental School (YES)programme

The City manages a year-round Youth Environmental School (YES) programme, which reaches about 50 000 learners a year. Through YES, young Capetonians from all backgrounds gain knowledge, hands-on skills and respect for their environment, through clean-up days, festivals and energy efficiency conferences.

YES is complemented by EduNet, an environmental educators' network.

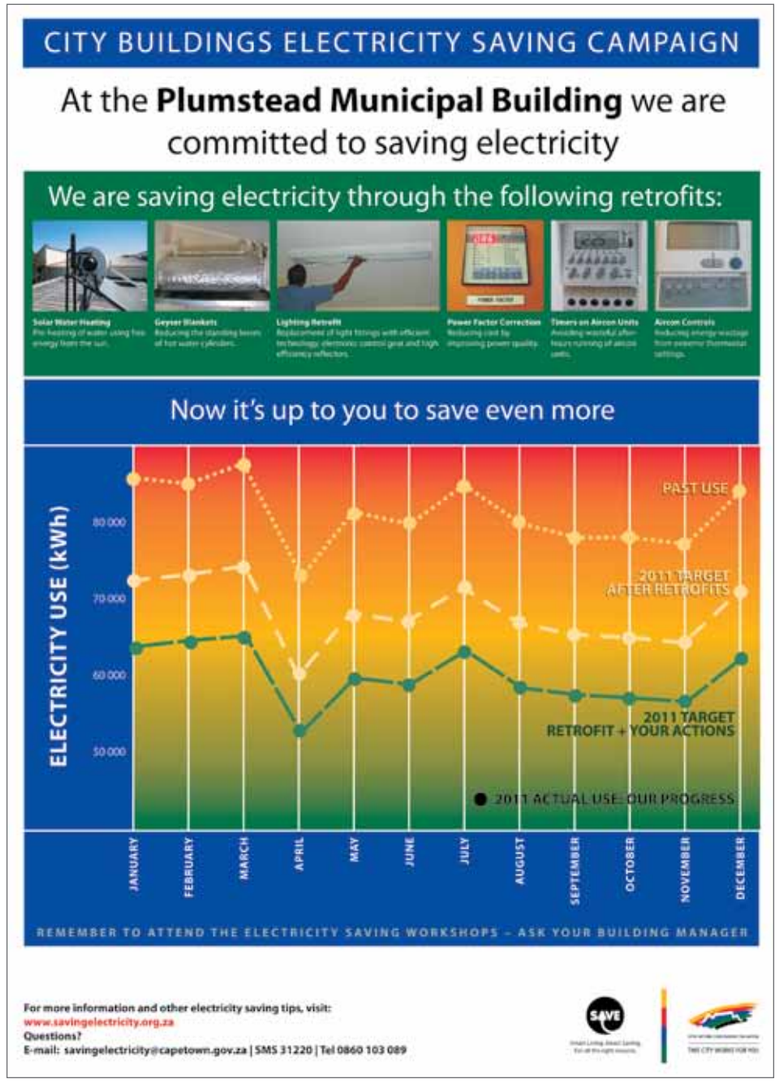
As part of a Green Schools programme, selected schools have received energy, waste, water and biodiversity audits and have been retrofitted, with the aim of promoting the concept of sustainable schools.



Climate Smart Cape Town

In 2011 the City, in partnership with the Cape Town Climate Change Coalition, launched the Climate Smart Cape Town Campaign, which promotes climate change literacy and awareness among residents and decision-makers, and leads the way for the city's participation in COP17. The Cape Town Climate Change Coalition includes businesses, NGOs, academia, and provincial and local government.

CLIMATE SMART
CAPE TOWN



Resources and partners

City of Cape Town climate change think tank

The Climate Change Think Tank comprises academics, specialists and City officials who have been meeting since June 2009 to discuss information and research needs. The Think Tank is funded by the Royal Danish Embassy, British High Commission and more recently MISTRA (Swedish) funding, and works with partners Sustainable Energy Africa and the African Centre for Cities at University of Cape Town to commission research and to share research results with broader groupings and key stakeholders such as Western Cape Provincial Government and the Cape Town Partnership. The research programme includes modelling for the Energy Scenarios for Cape Town 2011 study, modelling of the interaction between the fresh water and marine systems, risk assessment and defining adaptation measures, a review of legal implications and tools for addressing both mitigation and adaptation, and building a financial model to underpin fiscal reform to support adaptation and mitigation mechanisms.

Funders and partners

The Royal Danish Government via DANIDA has lent significant support to the development of the City's energy and climate change work. National Government's Energy Efficiency and Demand-side Management Fund is providing significant funding to projects. The Department of Provincial Government of Western Cape Environment provided critical funding for the Kuyasa project. We are also immensely grateful to the British High Commission and Hivos, as well as a great number of other funders and supporters.

Key technical support partners

The City has long-term close relationships with the non-profit organisation, Sustainable Energy Africa, the national electricity utility, Eskom, the South African Cities Network, ICLEI (Local Governments for Sustainability), and academic institutions such as the University of Cape Town (in particular the Energy Research Centre, African Centre for Cities and Climate Systems Analysis Group), Universities of Stellenbosch and the Western Cape, and Cape Peninsula University of Technology and the Council for Scientific and Industrial Research (CSIR). The City also works closely with the Western Cape Provincial Government and has a Joint Energy Action Plan and regular meetings on all matters environmental; the City and Province are partners in the Green Cape initiative (see Objective 8).

Resources

- Energy and Climate Change Strategy, 2006
- Energy and Climate Action Plan
- What is the City of Cape Town doing about Energy and Climate Change?

www.capetown.gov.za/environmentalpolicies <http://www.capetown.gov.za/environmentalpolicies>

- State of Energy and Energy Futures Report, 2011
- Moving Mountains – Cape Town's Action Plan for Energy and Climate Change, 2011
- Energy Scenarios for Cape Town, 2011
- Framework for Adaptation to Climate Change, 2006
- Sea-level Rise Risk Assessment

www.capetown.gov.za/environmentalreports <http://www.capetown.gov.za/environmentalreports>

- Smart Living Handbook

www.capetown.gov.za/smartlivinghandbook <http://www.capetown.gov.za/smartlivinghandbook>

- Green Building Guidelines

www.capetown.gov.za/greenbuilding <http://www.capetown.gov.za/greenbuilding>

- Green Goal Report (World Cup 2010)

www.capetown.gov.za/greengoallegacy <http://www.capetown.gov.za/greengoallegacy>

List of city of Cape Town energy and climate change programmes and projects

Objective 1 – citywide: 10% reduction in electricity consumption by 2012, off a business-as-usual baseline

Programme area	Project	
Energy efficiency plan	Detailed plan development based on Energy Scenarios for Cape Town study	→
Electricity consumption reduction – residential and commercial	Electricity Savings Campaign: Energy Efficiency Forum	→
Solar water heating	Mass roll-out of solar water heaters, mid- to high-income (low-income under Objective 7)	▲
Metering as an energy efficiency measure	Internet-based metering – large customers	→
	Ripple control pilot	✓
	Smart metering for all consumers	▲
Energy efficiency in new/ renovated developments	Preparation of Resource Efficient Development Policy	▲
	Implementation of National Building Regulations Part XA – amendment which establishes energy efficiency requirements in all new build and renovations	▲
	Green Building Handbook	✓
Reduction in electricity theft	Integration with electricity savings campaign	→

Objective 2 – council operations: 10% reduction in energy consumption by 2012

Programme area	Project	
Buildings retrofits	Monitor six completed municipal buildings, continue behaviour-change work/best practice demonstration	✓ →
	Ongoing retrofits of buildings until all are complete – use guaranteed savings method	▲
	Energy management system: Cape Town Stadium, ongoing monitoring/ best practice demo	✓
	Civic Centre retrofit – project implementation (audit complete)	▲
	City buildings – lighting retrofit and automatic meter reader installation	▲
	City clinics – solar water heaters retrofit – monitor/best practice demo	✓
	City fire stations – solar water heaters and energy efficient showerheads	▲

Objective 2 – council operations: 10% reduction in energy consumption by 2012 (continued)

Programme area	Project	
Upgrade existing City rental stock (CRU programme) Phase 1, 2 and 3	Energy efficient lighting	▲
	Solar water heaters where appropriate	▲
	Water-efficient devices	▲
	Thermal efficiency (ceilings)	▲
	Food security – food gardens	▲
Greening the City's procurement policy	Development of the greening procedural document for the supply chain management policy	→
Public lighting and traffic lighting retrofits	Large-scale retrofits street and traffic lighting (Phase 1 and 2 complete)	✓→
Energy efficient pumps	Energy efficient water and sewerage pumps – assessment	▲
Water efficiency	Water efficiency integrated with electricity saving campaign – reduces need for pumping	→
	Gravity-fed water supply – Green Point precinct	✓
Greening the City's fleet	Green fleet programme development and implementation	✓→
	Fuel-efficiency campaign	✓
	Eco-driver training pilot project	✓
Green IS&T	Greening the City's information technology system	▲

Objective 3 – 10% renewable and cleaner energy supply by 2020; meet the growth in electricity demand with cleaner/renewable supply, among other sources

Programme area	Project	
Renewable energy and energy supply diversification plan	Detailed plan development based on Energy Scenarios for Cape Town study	▲
Renewable energy large-scale supply	Darling wind power purchase agreement and sale of Green Electricity Certificates	✓→
	Power purchase agreements with independent power producers	▲
	REBID for cities – assess potential	▲
	Combined cycle generation from natural gas sources (e.g. Kudu/Ibubhezi)	▲
Electricity generation from municipal operations	Landfill gas project	▲
	Micro-hydro on potable water flows: feasibility	✓
	Anaerobic digestion – wastewater and wet solid waste	▲
	Micro hydro pilot – Green Point Park	✓
Renewable energy small-scale supply	Embedded generation/net-metering – development of technical specs for grid connection, meters, and tariffs	→
	Small wind turbines – residential/commercial/industrial applications –development of technical specs for grid connection, and building permission guidelines/regulations	▲

Objective 4 – build a more compact, resource-efficient city

Programme area	Project	
Spatial Development Framework	Densification strategy and implementation mechanisms	→
	Development Edges Policy – urban and coastal edges	→
	District spatial development plans and environmental management frameworks	▲
Planning for a low-carbon city	Conference – partnership with Sustainable Energy Africa & InWent – 2009	✓

Objective 5 – develop a more sustainable transport system

Programme area	Project	
Integrated rapid transit system (IRT)	Roll-out of IRT programme – Phase 1 complete	✓→
	CDM application for IRT Phase 2	▲
Non-motorised transport (NMT)	Citywide NMT: Klipfontein corridor, inner city and IRT Phase 1	✓
Travel demand management	Park-and-ride programme	→
	Large employer programme	→

Objective 6 – adapt to and build resilience to climate change impacts

Programme area	Project	
Climate Adaptation Plan of Action (CAPA)	Detailed CAPA development	→
	Coastal protection zone policy	→
	Food security and urban agriculture policy	→
	Water security	→

Objective 7 – improve the resilience of vulnerable communities

Programme area	Project	
Low-income housing: energy efficiency	Energy efficient housing – various projects	✓→
	Kuyasa thermally-efficient housing implementation – project complete; CDM management ongoing	✓ →
Low-income housing: greening	Greening Tafelsig TA2 housing units, Kew Town, Wesbank, Witsands	✓
Low-income housing: ceilings	Retrofitting low-income houses with ceilings (Mamre pilot complete)	✓→
Low-income housing: solar water heaters (SWHs)	Retrofitting low-income houses with SWHs – partnership programme	→

Objective 8 – enable local economic development in the energy sector

Programme area	Project	
Renewable energy business	SWH business in Cape Town: study complete	✓
	Establishment of renewable energy SPV: Province/City – Green Cape	✓
	Establish green zone in Atlantis to attract energy manufacturing business	✓
	Support programmes which create local demand: e.g. SWH mass roll-out	→

Objective 9 – access climate finance

Programme area	Project	
Carbon trading scoping and development	Carbon projects scoping assessment	✓
	Carbon Finance Capacity Building partnership	▲
	Kuyasa CDM project – carbon sales	→
Funding proposals to climate funds	Funding applications as appropriate, as the City and in partnership with private sector and NGOs	→

Objective 10 – raise awareness and promote behaviour change through communication and education programmes

Programme area	Project	
Electricity saving campaign	Electricity savings campaign roll-out – ongoing	→
Energy Efficiency Forums	Energy Efficiency Forum for commercial buildings and industrial sector	→
Schools/Youth/Citizens	Green schools' audit	→
	Climate change adaptation and mitigation	→
	Energy efficiency and resource conservation	→
Smart Living campaign	Smart Living corporate campaign – pilot	✓
	Smart Living Handbook – revision and programmatic distribution	✓
City staff training	Staff training programmes and material on Smart Living	→
Enviroworks (biannual)	Climate change edition, 2009; COP17 special edition, 2011	✓
Green Building Handbook	Green Building Handbook	✓
Resource-efficiency campaign	Green identifier for all resource management programmes	→
	Climate Smart Cape Town campaign – stakeholder partnership campaign	→

Overall – research and development; data management; monitoring and evaluation

Programme area	Project	
Energy and climate change: research and development	Climate Change Think Tank – mitigation and adaptation research	→
	Cape Town Energy Scenarios study, 2011	✓
	Sea-level rise and stormwater management study	✓
	Energy and climate change legislative and regulatory study	✓
	Low-carbon zone project WWF	✓
Energy data management, monitoring and evaluation	Energy data management system pilot programme – partnership	→
	Cape Town State of Energy Report, 2011	✓
	Urban atmospheric carbon measurement – CSIR project on Cape Town	→
Air Quality Management Plan	Air quality management reporting	→
	Vehicle emissions monitoring programme	→
Statutory/policy linkages and alignment	IDP energy and climate change focus areas	→
	Integrated Metropolitan Environmental Policy (IMEP) Agenda – development of business plans	✓

Abbreviations

BRT	bus rapid transit
CAPA	Climate Adaptation Plan of Action
CCT	City of Cape Town
CDM	clean development mechanism
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
DANIDA	Danish International Development Agency
DoE	Department of Energy
ECAP	Energy and Climate Action Plan
EEDSM	energy efficiency and demand-side management
GDP	gross domestic product
GHG	greenhouse gases
GJ	giga-joules
HFO	heavy fuel oil
HVAC	heating, ventilation and air conditioning
IDP	Integrated Development Plan
IMEP	Integrated Metropolitan Environmental Policy
IPCC	Intergovernmental Panel on Climate Change
IRT	integrated rapid transit
IS&T	information systems and technology
LED	light-emitting diode
LPG	liquified petroleum gas
LTMS	long-term mitigation scenarios
Mt	mega-tonnes
MW	mega-watt
MWh	mega-watt hours
MYPD	multi-year price determination
NERSA	National Energy Regulator of South Africa
NMT	non-motorised transport

References

City of Cape Town. 2011.
Cape Town's Economy: A brief overview (August 2011) fact sheet.

City of Cape Town. 2011.
Cape Town 2011. State of Energy and Energy Futures Report.

Department of Transport. 2008.
Transport Statistics Bulletin.

Sustainable Energy Africa, University of Cape Town. 2011.
Energy Scenarios for Cape Town: Exploring the implications of different energy futures for the City up to 2050. City of Cape Town.

Turok, Sinclair-Smith and Shand. 2010.
Environment and Planning A 2010, volume 42, page 2295.
Online: available: www.envplan.com/abstract.cgi?id=a42424

Winkler, H 2010.
Taking action on climate change: Long-term mitigation scenarios for South Africa. Cape Town, UCT Press.

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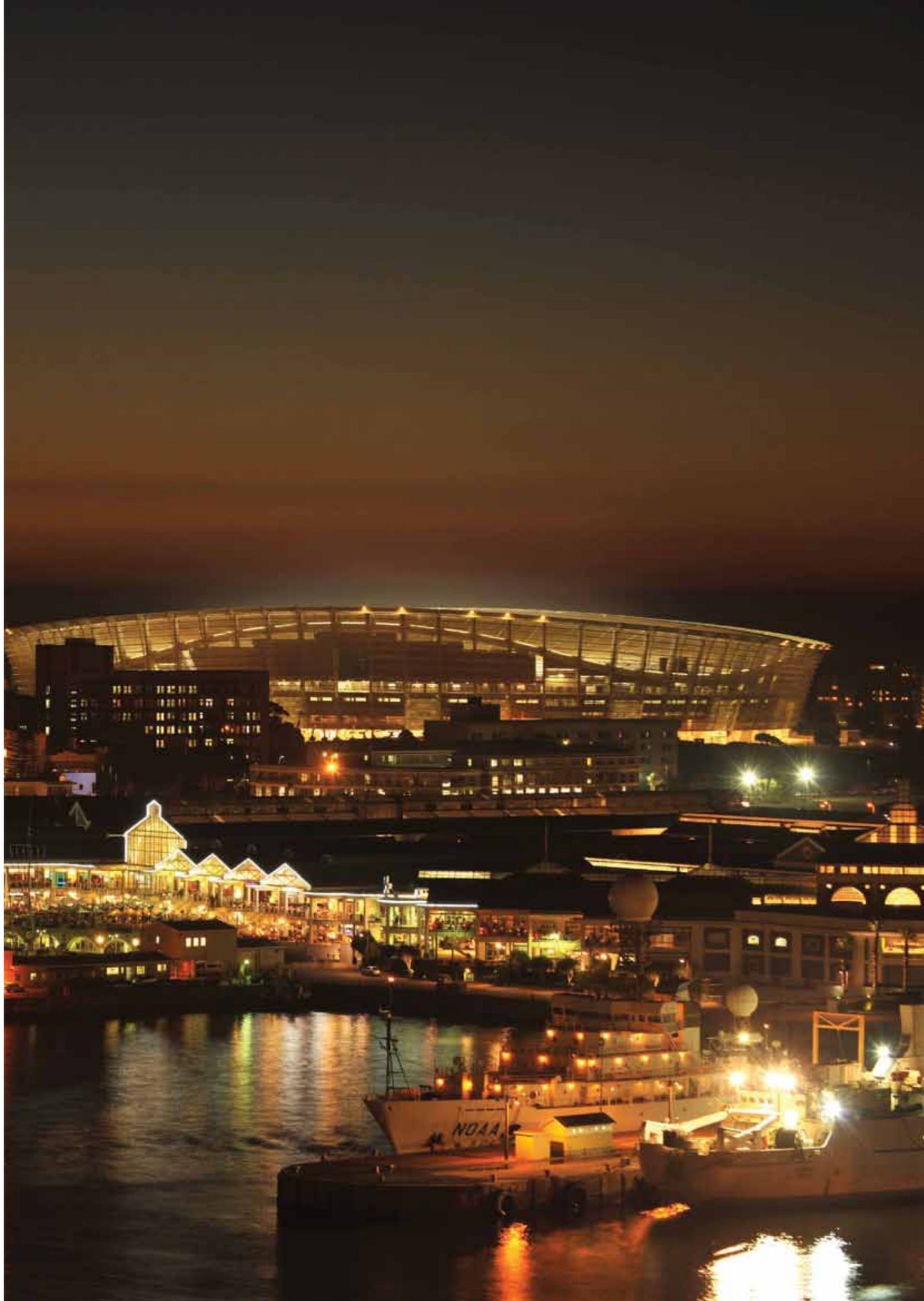

City of Cape Town position on climate change

"Cape Town acknowledges climate change as one of the greatest challenges of our generation but seeks to use it as an opportunity to build a better future for all".

1. Climate change is a global problem – we are all in this together. Cape Town's response to climate change must be a collective partnership between government, business and civil society.
2. Climate change is an economic, social issue and development issue. Mitigation and adaptation responses must be at the core of government planning and offer opportunities for changing to a more equitable, sustainable development path.
3. We have to move away from 'business-as-usual' and plan differently. This requires progressive thinking and strong leadership.
4. Energy drives our city, our lives and our economy. Renewable energy sources and increased energy efficiency to meet carbon emission reduction targets are urgent priorities so as to avoid catastrophic climate change; and to promote economic competitiveness and job creation.
5. Implementing adaptation plans now will reduce the City's risk to a changed climate.
6. Climate change presents opportunities to build a green economy, create jobs, develop a more compact city; leading to a more resource-efficient, integrated, equitable and liveable city that protects and enhances our natural legacy.

Sustainable Energy Africa NPC

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THIS CITY WORKS FOR YOU

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