



## **BUFFALO CITY MUNICIPALITY**

# **SUSTAINABLE ENERGY AND CLIMATE CHANGE MITIGATION POLICY AND STRATEGY**

*J28015  
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# **DRAFT**

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## EXECUTIVE SUMMARY

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This document is about the way energy is used in BCM and the effect that this has on climate change and the environment, the local economy and livelihoods. By using and generating energy in a more sustainable way, the effects on climate change are limited or reduced. In other terms, the effects on climate change are *mitigated*. It should also be noted that the term *energy* refers not only to electricity, but also to energy generated from liquid and other fossil fuels, wood-fuel and renewable energy such as wind and solar energy. Ultimately the document is about using energy in a way that allows our environmental and economic resources to be sustained. This is the context in which the term *sustainable energy* is used.

Buffalo City, along with South Africa as a whole, is challenged by the fact that supplies of fossil fuels (such as coal and oil) are diminishing while energy demand is accelerating. At the same time, the fuels we burn are resulting in the highest-ever measurable concentrations of greenhouse gasses in our atmosphere. These gasses are causing global warming and climate change. Energy issues are particularly relevant to South Africa. We have among the cheapest supplies of energy (particularly electricity) in the world, but we are also one of the biggest polluters; South Africans generate on average 9 tons of Carbon Dioxide per person per year, while the rest of the world generates 4 tons per person per year. Despite apparently plentiful supplies of energy (particularly coal), these are nevertheless finite. South Africa does not have oil reserves, which means that the majority of liquid fuels must be imported. South African institutions should (and in some instances have begun) planning for the strategic implications of the above energy considerations. South Africa has responded to the international and national energy situation in a number of ways. For example South Africa:

- Is a signatory to the Kyoto Protocol – a legally binding international agreement to reduce greenhouse gasses;
- Has drafted an Energy Bill;
- Has drafted a white paper on Renewable Energy and Clean Energy Development;
- Has drafted an energy efficiency strategy; and
- Has adopted a vision for Climate Change Mitigation based on Long Term Emissions Mitigation Scenarios.

South Africa has also drafted a National Response Strategy to the current electricity shortage. The strategy places emphasis on electricity demand management and power conservation.

These responses set not only obligation for authorities, but also for commercial and industrial organizations. They require us to use energy in a more efficient and sustainable manner. South African cities are key players in meeting national policy and legislative objectives. The 15 largest cities in South Africa take up 3% of the country's surface area, and yet they are responsible for 40% of the country's energy consumption. This means that cities play a major role in facilitating the achievement of the National Energy Efficiency targets, namely 12% energy efficiency achieved by 2014. Cities can also play an important role in renewable energy generation.

The BCM Energy Policy and Strategy process was initiated by the BCM Integrated Environmental Management Planning Unit. It was initiated in response to the numerous international and national sustainable energy and climate change imperatives, as well as to the municipality's Integrated Environmental Management Plan and the BCM IDP.

The State of Energy and Energy Policy and Strategy has been undertaken in association with a BCM task team, representing all line functions with a stake in energy issues, including:

- BCM IEMP
- BCM Electricity;
- BCM Finance;
- BCM City Planning;
- BCM Transport Planning;
- BCM Solid Waste;
- BCM Environmental Services and Amenities;  
and with input from
- BCM Housing and BCM Disaster Management.

The Energy Process has been run in close alignment with other City Energy Strategies in South Africa, and has drawn on expertise from across the country.

The outcomes of the process are summarized below:

1. The process sought initially to understand the Energy Status of BCM in terms energy demand, consumption, issues and opportunities (See BCM State of Energy Report, 2008).
2. Based on the detailed understanding of BCM Energy Status, and through a stakeholder participation process, an Energy Vision and set of objectives (aligned with the IDP and National Policy) was formulated; and
3. Within the framework of the Vision and Objectives, a strategy and set of achievable targets for implementation was developed together with various stakeholders.
4. A modeling exercise was undertaken to explore the possible future energy and cost outcomes of the above targets.

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## **The State of Energy in BCM**

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The development of the Energy Policy and Strategy was informed by a State of Energy Report. The State of Energy Report helped to develop an understanding of patterns of energy use and supply in BCM. In particular the assessment helped to develop a picture of how much energy is coming into BCM and in what form, how that energy is being used and by whom and what issues are currently experienced with regard to this energy usage.

Some findings are given below:

- In 2007, we used 1,292,253,456 kilowatt-hours of electricity in BCM. Assuming an average user cost of R0.25 per kilowatt-hour, this amounts to 323 million Rand;
- The consumption of electricity in BCM has increased continuously for the past five years
- In 2007 we used 402,354,920 litres of diesel, petrol and paraffin;
- Our total energy use in 2007 came to 21,990,849 Gigajoules. This is the same as burning 1.3 million tons of dry wood, or 9000 football fields of forest;
- Over half of all the energy used in BCM was for transport purposes;
- A third of energy used in BCM was for industrial and commercial use; and
- 10% of energy used in BCM was for household purposes.

The State of Energy Report highlighted numerous issues and opportunities associated with sustainable energy in BCM. Some overarching issues or themes have emerged from the State of Energy Report. For example:

- BCM is at risk in terms of Energy Security;
- Energy is not necessarily used efficiently or sustainably;
- The way in which we use energy is contributing towards global warming;
- There are many renewable energy, energy efficiency and carbon trading opportunities in BCM, but there is not necessarily an enabling environment to help implement these opportunities;
- Currently, energy use is placing strain on the local economy, whereas sustainable energy options offer local economic development opportunities; and
- Currently, sustainable energy initiatives are planned and operated in an isolated and/or ad-hoc manner within the municipality.

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## **A Sustainable Energy Vision, Goals and Objectives**

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In keeping with sustainable energy principles, together with the IDP and CDS vision and planning objectives of the city, the following energy vision was developed in response to identified energy issues and imperatives.

**A city that supports climate change mitigation, while ensuring a secure and affordable energy supply; which meets its development needs and stimulates local employment through increased energy efficiency and renewable energy measures for all.**

The vision has been translated to **ENERGY GOALS and OBJECTIVES:**

**Goal 1: A city that has sustainable and secure long-term energy supply.**

**Objectives:**

1. Ensured energy security.
2. Reliable energy infrastructure.
3. Reduced reliance on finite fuels, by reducing the intensity of use through energy efficiency.
4. Reduced reliance on finite fuels and outside energy imports by promoting local renewable energy generation.

**Goal 2: A city that uses and manages energy in an efficient way, so that resources are not wasted and so that energy costs are reduced.**

**Objectives:**

5. Sustainable energy reporting and principles included in city planning in order to inform future planning and development decisions.
6. Energy efficiency in local government.
7. Energy efficiency in industry and commerce.
8. Energy efficiency in the transport sector.
9. Energy efficiency in households.

**Goal 3: A city where all residents have fair access to energy that is affordable, safe and appropriate.**

**Objectives:**

10. All households to have access to safe, affordable, appropriate and sustainable energy sources.
11. Increased energy awareness in terms of safety, use and efficiency.
12. Fair access to public transport that is efficient, safe and reliable.

**Goal 4: A city that takes responsibility for its obligations to reduce its impact on climate change, by supporting clean and renewable energy production and use, and working towards a carbon neutral future.**

**Objectives:**

13. Adherence to national policy (e.g. DEAT's Long-term Mitigation Strategy) and international agreements regarding carbon emissions mitigation.
14. A well developed institutional framework within BCM, with capacity to support and/or facilitate public and private renewable energy, energy efficiency and carbon trading projects.
15. Incentives and penalties to improve renewable energy supply, energy efficiency and reduce climate change impacts.

**Goal 5: A city where sustainable energy costs and activities are a stimulating factor in local economic development.**

**Objectives:**

16. A developed industry exploiting manufacturing, income generating and job creation opportunities associated with energy efficiency and renewable energy.
17. Carbon Trading financially supports renewable energy, energy efficiency and climate change projects.
18. The mix of energy supply options is optimised to be least cost.

**Goal 6: A city where sustainable energy measures are supported by well developed institutional capacity.**

**Objectives:**

1. Sustainable energy measures receive adequate institutional support from BCM Local Authority.
2. An established BCM Integrated Sustainable Energy and Climate Change Post to facilitate the development of an institutional framework.
3. An established Integrated Sustainable Energy planning and facilitation stakeholder forum to guide and promote long-term sustainable energy in BCM.

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**Energy Strategy**

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In August 2008 a series of strategy workshops was held, involving the following sectors in BCM:

- Energy Supply;
- Transport;
- Household;
- Local Authority; and
- Commerce and Industry

The strategy translates each energy goal and objective into a set of measures or actions for each sector (see chapters 9 to 13). These measures represent concrete steps that authorities and other stakeholders can take to bring about the sustainable energy goals and vision for BCM.

Associated with each sector strategy, a set of targets for an improved energy future has been defined. These targets are, where appropriate, aligned with national Sustainable Energy targets.

**Targets for Energy Supply:**

1. 10% of total supply of energy to be renewable energy by 2018<sup>1</sup>
2. Overall energy saving of 12% per unit of production by 2015 from 2007 levels (in accordance with national target).
3. Quantity of CO<sub>2</sub> equivalent emissions does not increase from 2007 levels by 2012, and reduces 10% from 2007 levels by 2020.

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<sup>1</sup> 1% per year.

4. Maintain electricity connection rate of 100% of formal households
5. 100% of informal households on developable land (not in road/power/other reserves or on private land) including TRA's (Temporary Relocation Areas) to be connected to electricity.

### **Targets for the Transport Sector**

1. 10% modal shift from private vehicles to public transport (rail and/or bus) by 2011.
2. Efficiency criteria in municipal fleet procurement process by end 2009.
3. Fuel efficiency and emissions reductions criteria in public transport service provider contracts by end 2009.

### **Targets for Households**

1. 10% of all households to have solar water heaters by 2012, and 50% by 2015
2. All BCM-owned housing to have free CFLs by end 2009
3. 100% of all households to have CFLs by 2010
4. All new subsidised houses to have ceilings from 2010
5. All existing subsidised houses to have ceiling retrofits by 2015
6. Solar water heater by-law in force for new housing over a certain value (mid-hi-income target group) by end 2009
7. Planning permission for new housing over a certain value (mid- hi-income target group) to require consideration of energy efficiency in design and appliances
8. All informal unelectrified housing to have access to energy services through a delivery system linked to the Free Basic Alternative Energy grant.

### **Targets for Local Authority**

1. Sustainable Energy and Climate Change Post to be established by end 2009.
2. Sustainable Energy planning and facilitation stakeholder forum to be in place by end 2009.
3. All BCM buildings to have energy audits by end 2009
4. All BCM buildings to have efficient lighting retrofits by end 2009
5. All new BCM buildings to include energy efficiency in design and appliance aspects (in accordance with draft SANS codes and Green Star Rating system)
6. All traffic signals to be LEDs by 2010
7. All streetlights to be efficient (LED or Hi Pressure Sodium at least) by 2012
8. BCM procurement policy to include efficiency considerations by end 2009
9. Overall energy saving of 15% by 2015 from 2007 levels in BCM operations (buildings, streetlights, water pumping, sewage treatment) – in keeping with national targets.

### **Targets for Commerce and Industry**

1. All industrial and commercial large users to have undertaken energy audits by end 2010.
2. All commercial facilities to have efficient lighting (e.g. CFLs) by end 2009.
3. All new buildings with demand over 100kVA to demonstrate energy efficiency measure application in building and processes by 2009.
4. All new buildings to demonstrate energy efficiency considerations by 2010, via adoption of SANS codes and/or GreenStar building rating system.

5. Overall energy reduction of 15% per unit of reduction in commercial and industrial sectors by 2015 (in keeping with national target).

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## Modeling the Energy Future of BCM

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A modeling exercise was undertaken to explore the energy future of BCM – both without a significant change of direction in energy use practices, and also with a range of interventions to move BCM to a more sustainable energy profile. The interventions used are the key measures and targets listed in the Energy Strategy. The energy future projections for BCM were modeled using the Long-Range Energy Alternatives Planning (LEAP) model.

### Outcomes

The modelling report is included in appendix 1. The energy saving interventions proposed in the **targets** sections of this strategy can result in a cumulative saving of approximately 2,500,000 Gigajoules of energy (or 8.5%) per year by 2025. This translates to a reduction in Greenhouse Gas emissions of 339,000,000 kg of CO<sub>2</sub> and **financial savings of up to R 235,291,008.00**. Interestingly, despite the above savings, the combined outcomes of the sector targets for BCM fall short of national energy savings and greenhouse gas reduction targets. This implies that BCM will, in the near future, have to invest every effort into meeting and exceeding the measures targets proposed in this strategy.

An assessment of the impacts and effectiveness of some of the proposed sector interventions is summarized in the table below.

Scenario	Energy impact	Ease of implementation	Comment on importance in Energy Strategy
Industrial efficiency	Very high	Much low-hanging fruit – cheap and easy. Interventions will become more expensive over time.	Effective, hi-impact area of focus
Transport modal shift	High	Significant capital cost implications, but included in 2010 World Cup budgets	Hi-impact area. An essential focus
Residential solar water heaters	Medium	Easy. Technically and financially feasible.	Significant impact. Important component of strategy
Residential efficient lighting	Medium	Very easy. Technically and financially feasible.	Significant impact. Important component of strategy
Commercial efficiency	Medium	Much low-hanging fruit – cheap and easy. Interventions will become more expensive in future.	Significant impact. Important component of strategy
Residential ceilings	Low	Relatively expensive and retrofit is time consuming	Low energy impact, but strong social motivation as improves welfare of low-income households. Important focus.
Government efficiency	Low	Much low-hanging fruit – cheap and easy. Interventions will become more expensive in future years.	Low overall impact, but significant for government budgets. Important component of strategy

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## Recommendations

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Implementation of the strategy will have the following benefits for BCM:

- BCM will be at the forefront of local government in terms of ensuring a sustainable city is planned for;
- Long-term financial savings can be met with energy efficiency in terms of municipal operations;
- Investment in energy related concerns can be a stimulus for local economic growth and job creation;
- BCM will be able to meet ESKOM's 10% load reduction mandate, thereby negating the need for load shedding;
- BCM can make a valuable contribution towards climate change mitigation; and
- BCM can comply with national policy and legislation.

**The following is recommended as a priority:**

- An energy and climate change forum be established involving officials in BCM to take the process forward in the interim. This forum should be headed by the BCM IEMP Unit and the BCM Electricity Department;
  - Line functions/ Departments within BCM must take responsibility for those measures assigned to them;
  - The Sustainable Energy and Climate Change Post to be established within the BCM IEMP Unit be advertised and filled as soon as possible; and
  - A Strategy for long-term climate change *adaptation* be prepared by the BCM IEMP Unit and that budget should be reserved accordingly.
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**BUFFALO CITY MUNICIPALITY  
SUSTAINABLE ENERGY AND CLIMATE CHANGE MITIGATION  
POLICY AND STRATEGY  
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## LIST OF ACRONYMS

AAU	Assigned Amount Units
ADM	Amathole District Municipality
BCM	Buffalo City Municipality
BRT	Bus Rapid Transport system
CDM	Clean Development Mechanism
CEF	Central Energy Fund
CER	Certified Emission Reductions
CFL	Compact Fluorescent Light
CO <sub>2</sub> e	Carbon Equivalent
DEAT	Department of Environmental Affairs & Tourism
DME	Department of Minerals and Energy
DSM	Desmond Side Management
EIA	Environmental Impact Assessment
ECA	Environment Conservation Act (Act 73 of 1989)
EE	Energy Efficiency
EEDSM	Energy Efficiency and Demand Side Management
ELIDZ	East London Industrial Development Zone
ESCO	Energy Services Company
ERU	Emission Reduction Units
EU	European Union
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GHG	Green House Gases
GWh	Gigawatt hour
HFO	Heavy Furnace Oil
KWh	Kilowatt hour
KWT	King Williams Town
IDP	Integrated Development Plan
IEMP	Integrated Environmental Management Planning Unit
INEP	Integrated National Electrification Programme
IPP	Independent Power Producer
LED	Light Emitting Diode
LPG	Liquid Petroleum Gas
LPU	Large Power Users
LRP	Lead Replacement Petrol
LTMS	Long Term Mitigation Strategy
MBSA	Mercedes Benz South Africa
MWh	Megawatt hour
NEMA	National Environmental Management Act (Act 107 of 1998)
NER	National Energy Regulator
NERSA	National Energy Regulator South Africa
PJ	Peta Joule
PPU	Prepaid Power Users
PPA	Power Purchase Agreement
REDS	Regional Electricity Distributor
RMU	Removal Units
SAPIA	South African Petroleum industries Association
SDF	Spatial Development Framework
SEA	Sustainable Energy Africa
SPU	Small Power Users
TLC	Transitional Local Council
TRECS	Tradable Renewable Energy Certificate System
TSA	Technical Service Area
UNFCCC	United Nations Framework Convention on Climate Change
ULP	Unleaded Petrol
UPS	Uninterrupted Power Source

# 1 INTRODUCTION

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## **A note on terminology**

This document is about the way energy is used in BCM and the effect that this has on climate change and the environment, the local economy and livelihoods. By using and generating energy in a more sustainable way, the effects on climate change are limited or reduced. In other terms, the effects on climate change are *mitigated*. It should also be noted that the term *energy* refers not only to electricity, but also to energy generated from liquid and other fossil fuels, wood-fuel and renewable energy such as wind and solar energy. Ultimately the document is about using energy in a way that allows our environmental and economic resources to be sustained. This is the context in which the term *sustainable energy* is used.

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## 1.1 Why a Sustainable Energy Policy and Strategy?

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Buffalo City Municipality (BCM), together with South Africa as a whole, faces numerous energy related challenges. Some of these are detailed below:-

**Depletion of energy resources:** BCM relies on finite fossil fuels, whether in terms of coal burned for electricity, or oil-based fuels. Scientists predict that oil supplies will taper off in 30 to 50 years while coal supplies will taper off in approximately 200 years. In addition, supplies are currently becoming more and more expensive to extract as they become depleted.

**Energy Security:** The above considerations, together with the fact that BCM imports most energy from outside its borders, is of serious long-term strategic concern for the municipality.

**High Cost of Energy:** As resources become depleted, or when infrastructure is not adequately maintained, energy costs increase. South Africa has recently experienced unprecedented energy costs and in the long term (20 to 50 years), these costs will become higher in real terms. This has serious strategic and economic implications for BCM.

**Climate Change:** Globally, and in BCM, more energy is being used than ever before. This is causing the release of the highest quantities of Greenhouse Gasses ever, recorded. Greenhouse gasses lead to global warming, which in turn leads to climate change. Some impacts of climate change that scientists have predicted will affect Southern Africa, including BCM, are:-

- More disasters related to severe weather events
- Longer and drier dry periods, leading to drought
- More runaway fires
- More intense flooding
- Sea-level rise
- Threats to food security and human health
- Loss of biodiversity
- Water supply problems
- Related economic impacts

**Energy and Poverty Related Issues:** Energy directly affects the poor – if they do not have electricity or access to alternatives, they must rely on other forms, which can be more expensive and more dangerous. For example, most shack fires in BCM were caused by paraffin related accidents.

**Energy and Local Economic Development:** The high cost of energy and the fact that BCM imports all its energy, has a constraining effect on the local economy. However, in many ways, energy can become a stimulus for job creation and economic development if a successful energy strategy is developed.

Considering the above and the fact that cities take up 3% of the South Africa’s surface area but use 40% of its energy, it is vital that BCM develops a Sustainable Energy Policy and Strategy. A Policy and Strategy will assist BCM in coping with the energy and climate change issues challenging the municipality and ensure that energy is used in a sustainable way to secure a healthy and productive future.

### 1.1.1 Financial Savings to the City

Large financial savings to BCM can be initiated by adopting the strategy. For example:

BCM spends up to 323 Million Rand on electricity per year. By simply retrofitting light bulbs, many millions of Rands at today’s prices can be saved. Many other simple interventions as described by the strategy can potentially save council money. However it must be emphasised that these savings are long-term savings and will require some initial capital outlay as well as minor institutional re-arranging. The cumulative saving from electricity and transport fuels interventions proposed in this strategy are given in Table 1 below. Cumulatively R 235,291,008.00 (in today’s prices) may have been saved by 2025. For more details on energy, greenhouse gas and financial savings, see appendix 1.

**Table 1: Cumulative financial savings from electricity and transport fuel saving scenarios**

	2008	2009	2010	2012	2015	2020	2025
Electricity '000GJ	85.164	175.037	239.683	379.883	619.775	712.812	820.249
Elec kWh	23,656,667	48,621,389	66,578,611	105,523,056	172,159,722	198,003,333	227,846,944
<b>Elec savings @40c/kWh</b>	<b>R 9,462,667</b>	<b>R 19,448,556</b>	<b>R 26,631,444</b>	<b>R 42,209,222</b>	<b>R 68,863,889</b>	<b>R 79,201,333</b>	<b>R 91,138,778</b>
Petrol '000GJ	81.326	163.629	246.916	344.997	387.326	461.049	538.892
Petrol litres	2,391,941	4,812,618	7,262,235	10,146,971	11,391,941	13,560,265	15,849,765
<b>Petrol savings @ R7.20/litre</b>	<b>R 17,221,976</b>	<b>R 34,650,847</b>	<b>R 52,288,094</b>	<b>R 73,058,188</b>	<b>R 82,021,976</b>	<b>R 97,633,906</b>	<b>R 114,118,306</b>
Diesel '000GJ	20.802	41.853	63.157	88.201	98.897	117.525	137.192
Diesel litres	562,216	1,131,162	1,706,946	2,383,811	2,672,892	3,176,351	3,707,892
<b>Diesel savings @ R8.10/litre</b>	<b>R 4,553,951</b>	<b>R 9,162,414</b>	<b>R 13,826,262</b>	<b>R 19,308,868</b>	<b>R 21,650,424</b>	<b>R 25,728,446</b>	<b>R 30,033,924</b>
<b>TOTAL financial savings</b>	<b>R 31,238,594</b>	<b>R 63,261,816</b>	<b>R 92,745,801</b>	<b>R 134,576,278</b>	<b>R 172,536,290</b>	<b>R 202,563,685</b>	<b>R 235,291,008</b>

### 1.1.2 What is the Sustainable Energy Policy and Strategy About?

Sustainable Energy is not only about supplying electricity. Rather, sustainable energy, in this report, deals with the full spectrum of energy types, from fossil-fuel based energy types (such as petrol, diesel, gas, and electricity derived from coal) to renewable energy types (such as electricity from wind turbines and solar panels, bio-diesel and bio-methane).

The Strategy considers not only the generation and distribution of energy. It also takes into account how we use energy, how efficient that use is and how we can reduce or manage the intensity of our energy use. It also considers who uses energy, with an emphasis on ensuring fair and adequate supply of energy to poor households.

Importantly the Strategy takes into account the impact that BCM has on climate change. The more fossil fuel-based energy we use, the more we contribute to global warming and climate change. Currently, South Africa produces twice as much carbon dioxide per person than the world average. BCM, together with South Africa as a whole, has a responsibility to reduce the amount of Carbon Dioxide and other greenhouse gasses released into the atmosphere.

It should be mentioned that this Policy and Strategy does not deal with food or food security.

### 1.1.3 Legal Mandates and Imperatives for Implementing the Sustainable Energy Strategy and Policy

BCM must respond to an overwhelming number of obligations and imperatives associated with sustainable energy and climate change. A selection is listed as follows. A more detailed description of legal and policy mandates and imperatives is given in Section 5.1 as well as in the State of Energy Report.

- Local Agenda 21: This sets obligations for local authorities in terms of sustainable development and reduced impacts on local and global environments;
- UNFCCC: South Africa is a signatory to the United Nations Framework Convention on Climate Change;
- The National Inter-Ministerial Committee on Long Term Mitigation Scenarios for Climate Change (see text box- **Government's Vision for Climate Change Mitigation**);
- The National Energy Bill;
- The White Papers on Energy Efficiency and Renewable Energy; and
- The City Development Strategy, which specifically states that:
  - *"The productivity of the area (namely BCM) is heavily reliant on the sustainable, sufficient and reliable supply of energy which BCM must assist in ensuring".*

and that BCM should develop according to principles of sustainability, including:

- *"The development of a strategy for urban development from a climate change, energy-efficient and environmental perspective and the utilisation of wind and solar power for energy production"; and*
- *"Responsible contribution by BCM to global issues of greenhouse gas emission and resulting effects associated with climate change and global warming".*
- The BCM Integrated Development Plan (2007/2008), Objective No. E6, requires:
  - *The completion of an Energy Efficient and Sustainable Energy Policy, including a State of Energy Report.*

#### **Government's Vision for Climate Change Mitigation**

In July 2008, Cabinet adopted the following Climate Change Vision and Policy Framework based on the Long Term Mitigation Scenarios:

- In designing our policy for the transition to a climate resilient and low-carbon economy and society, we will balance our mitigation and adaptation response.
- Our climate response policy, built on six pillars, will be informed by what is required by science, namely to limit global temperature increase to 2°C above pre-industrial levels.
- The six policy direction themes are:
  - Theme 1: Greenhouse gas emission reductions and limits;
  - Theme 2: Build on, strengthen and/or scale up current initiatives;
  - Theme 3: Implementing the "Business as usual" Call for Action;
  - Theme 4: Preparing for the future;
  - Theme 5: Vulnerability and Adaptation; and
  - Theme 6: Alignment, Coordination and Cooperation.

- We will continue to pro-actively build the knowledge base and our capacity to adapt to the inevitable impacts of climate change, most importantly by enhancing early warning and disaster reduction systems and in the roll-out of basic services, water resource management, infrastructure planning, agriculture, biodiversity and in the health sector.
- GHG emissions must peak, plateau and decline. This means it must stop growing at the latest by 2020-2025, stabilise for up to ten years and then decline in absolute terms.
- Over the long term we will redefine our competitive advantage and structurally transform the economy by shifting from an energy-intensive to a climate-friendly path as part of a pro-growth, pro-development and pro-jobs strategy.
- Implementing policy under six themes will lay the basis for measurable, reportable and verifiable domestic emission reduction and limitation outcomes.
- Overall, this would constitute a fair and meaningful contribution to global efforts. We would demonstrate leadership in the multi-lateral system by committing to a substantial deviation from baseline, enabled by international funding and technology.

### **Mitigation Strategy**

With reference specifically to our mitigation strategy, Cabinet adopted the following approach:

- The Start Now strategic option as outlined in the LTMS will be further implemented. This is based, amongst others, on accelerated energy efficiency and conservation across all sectors, including industry, commerce, transport and residential, inter alia through more stringent building standards.
- We will invest in the Reach for the Goal strategic option by setting ambitious research and development targets focussing on carbon-friendly technologies, identifying new resources and affecting behavioural change.
- Furthermore, regulatory mechanisms as set out in the Scale Up strategic option will be combined with economic instruments such as taxes and incentives under the Use the Market strategic option, with a view to:
- Setting ambitious and mandatory (as distinct from voluntary) targets for energy efficiency and in other sub-national sectors. In the next few months each sector will be required to do work to enable it to decide on actions and targets in relation to this overall framework.
- Based on the electricity-crisis response, government's energy efficiency policies and strategies will be continuously reviewed and amended to reflect more ambitious national targets aligned with the LTMS.
- Increasing the price on carbon through an escalating CO2 tax, or an alternative market mechanism.
- Diversifying the energy mix away from coal whilst shifting to cleaner coal, by for example introducing more stringent thermal efficiency and emissions standards for coal fired power stations.
- Setting similar targets for electricity generated from both renewable and nuclear energy sources by the end of the next two decades.
- Laying the basis for a net zero-carbon electricity sector in the long term.
- Incentivising renewable energy through feed-in tariffs.
- Exploring and developing carbon capture and storage (CCS) for coal fired power stations and all coal-to-liquid (CTL) plants, and not approving new coal fired power stations without carbon capture readiness.
- Introducing industrial policy that favours sectors using less energy per unit of economic output and building domestic industries in these emerging sectors.

- Setting ambitious and where appropriate mandatory national targets for the reduction of transport emissions, including through stringent and escalating fuel efficiency standards, facilitating passenger modal shifts towards public transport and the aggressive promotion of hybrids and electric vehicles.

**Process going forward: 2009 to 2012**

- ***Cabinet has mandated a clear path for the future.*** Milestones will include a national summit in February next year, the conclusion of international negotiations at the end of 2009 and a final domestic policy to be adopted by the end of 2010 after international negotiations have been completed.
- The process will culminate in the introduction of a legislative, regulatory and fiscal package to give effect to the strategic direction and policy from now up to 2012.
- (Source: Media statement by Marthinus Van Schalkwyk, Minister of Environmental Affairs and Tourism, Cape Town, 28<sup>th</sup> July 2008)

**1.1.4 ESKOM 10% Demand Reduction Mandate**

Through the National Response Strategy to South Africa’s electricity shortage, Municipalities are required to reduce electricity demand by 10%. The response strategy has been translated into a Power Conservation Programme, which includes an Energy Conservation Scheme (initiated in July 2008), which places stringent obligations on electricity users. BCM Electricity is currently taking steps to reduce demand through Demand-Side Management (DSM) interventions. These include, for example, ripple switches on household geysers. BCM DSM takes place in the context of a general change in awareness and attitude towards the way we use energy within BCM.

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**1.2 Structure of the Report**

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Figure 1 has been included to guide readers of this document through the Energy Policy and Strategy.

The BCM Energy Policy and Strategy is to be used as a reference-planning tool to coordinate and streamline sustainable energy planning for the city.

The aims of the Sustainable Energy process have been:

- To understand the Energy Status of BCM in terms of the nature of demand and supply (this involves an energy audit);
- Based on the detailed understanding of BCM Energy Status, to formulate an Energy Policy (aligned with the IDP and National Policy); and
- To formulate a strategy and set of achievable targets so that each line function or department can play a role in the implementation of the policy.

The Policy and Strategy is structured around a Sustainable Energy vision (see Chapter 0), which has been informed by a State of Energy study, which in turn identified six underlying sustainable energy and climate change principles.

Under the vision, a suite of goals with associated objectives are identified. Objectives are then translated into sector specific (Energy Supply, Transport, Household, Local Authority and Commerce and Industry) measures with related targets (see Chapter

7). Measures are individually numbered for cross-referencing purposes, (i.e. LA11–refers to Local Authority Measure No. 11).

Examples of Implementation Plans have been populated for each sector (see Chapter 14). The populated templates are illustrative and are intended to guide relevant departments in developing approaches to achieving targets. Responsible departments should prioritise measures and targets and then develop specific implementation plans as the first step in the execution of the strategy and policy accordance with the template. It should be noted that the Implementation Plans are neither prescriptive or rigid, but rather provide a focus around which departments can come together to achieve an energy target.

BCM departmental responsibilities have been allocated to those relevant measures as BCM has committed itself as the overarching responsible lead agent in the Energy Strategy (see Chapter 15 ).

Many of the energy measures are cross-cutting and do not fit within the responsibility of a single department. A sustainable energy and climate change post is suggested and the terms of reference for the post are given (see Chapter 16).

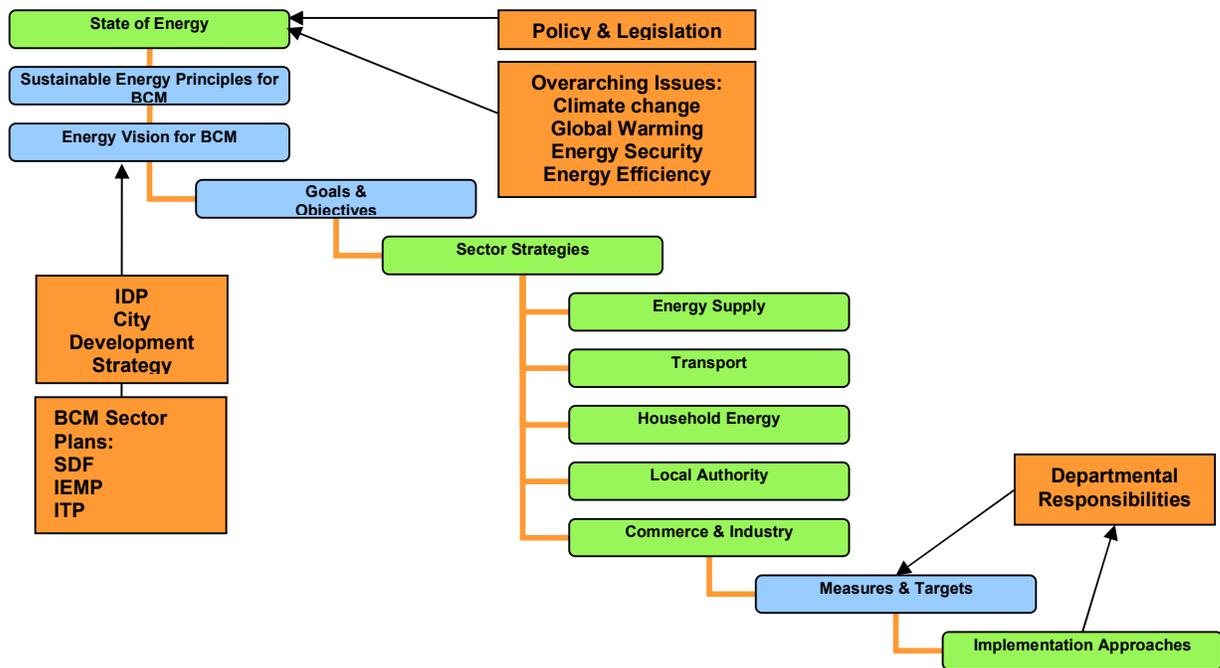


Figure 1 : Schematic Diagram Illustrating the Structure of the Energy Policy and Strategy

### 1.3 Elements of Climate Change Addressed in This Point

A climate change strategy typically has three elements:

- Climate change mitigation (reducing the release of greenhouse gases to the atmosphere);

- Local air quality management and planning; and
- Adapting to the effects of Climate Change (e.g. adapting to predicted increases in climate change related disasters, and adapting to changes in our environmental systems).

This report deals primarily with climate change mitigation, and to a lesser extent, local air quality. BCM is currently developing and implementing an air quality management plan, which is independent to this process.

This report does not deal with long-term climate change adaptation. One of the recommendations coming out of this report would be that such a strategy should be developed in the near future.

## 2 DEVELOPING THE BCM SUSTAINABLE ENERGY POLICY AND STRATEGY

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The development of the State of Energy Report and Energy Policy and Strategy has been undertaken as an integrated and participative process. The process has been lead by the BCM IEMP unit and the BCM Electricity Department.

At the project outset, a sustainable energy task team was formed representing all line functions with a stake in energy issues (See Figure 2). The task team met regularly (6 times) and has steered the project. Presentations on the status of the project as well as key issues were regularly discussed. This ensured knowledge sharing and capacity building. The task team was represented by the following BCM Departments:

- BCM IEMP;
- BCM Electricity;
- BCM Finance;
- BCM City Planning;
- BCM Transport Planning;
- BCM Solid Waste;
- BCM Environmental Health;
- BCM Environmental Services and Amenities; and with input from
- BCM Housing and BCM Disaster Management.



**Figure 2 : Sustainable Energy Task Team in Action.**

Sector Specific Workshops were held with members of the task team as well as key sector representatives at the East London Golf Club. Here the Energy Vision, Goals, Objectives and potential measures were identified.

**Figure 3 : State of Energy Workshop - East London Golf Club.**



**Figure 4 : State of Energy Workshop - East London Golf Club.**



**Figure 5 : State of Energy Workshop - East London Golf Club – Mark Borchers SEA**

Once a draft strategy had been formulated, a Councillor Workshop was held at the City Hall (See Figure 6). The purpose of this workshop was to ensure that all councillors within BCM were made fully aware of the Energy Strategy and its implications. Councillors gave input and agreed to pass the message regarding energy conservation and the Strategy itself to the broader community.



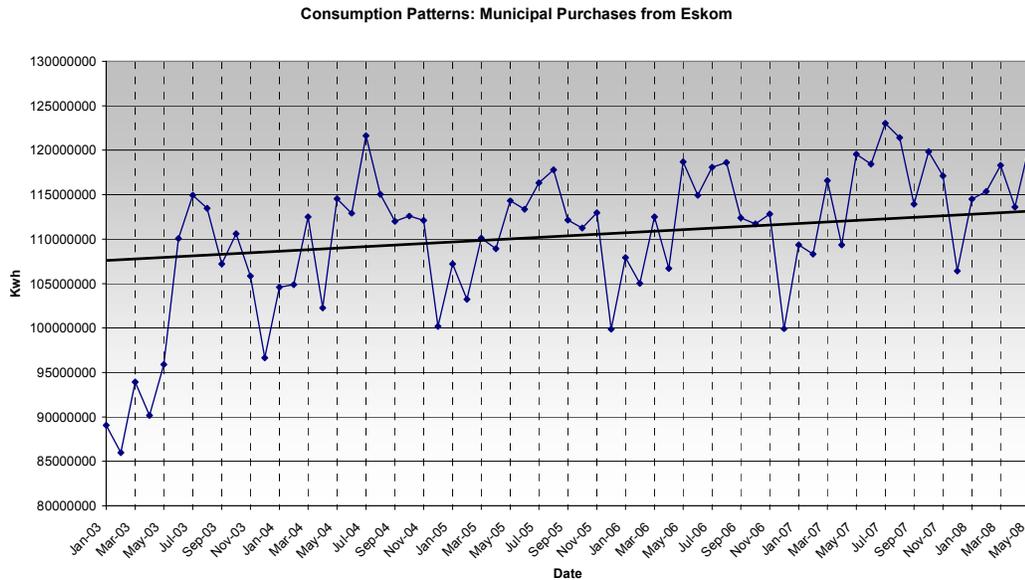
**Figure 6: BCM Councillor Workshop held at the City Hall.**

### 3 THE STATE OF ENERGY IN BCM

The development of the Energy Policy and Strategy has been informed by a State of Energy Report. The State of Energy Report helped to develop an understanding of patterns of energy use and supply in BCM. In particular the assessment has helped to develop a picture of how much energy is coming into BCM and in what form, how that energy is being used and by whom and what issues are currently experienced with regard to this energy usage.

Some preliminary findings are given below:

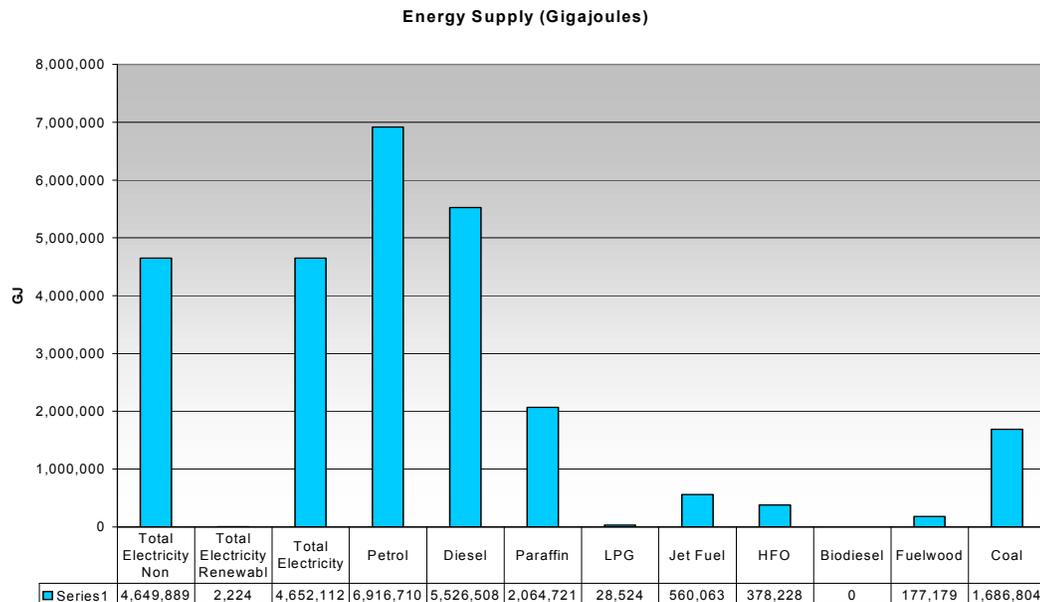
- In 2007, we used 1,292,253,456 kilowatt-hours of electricity in BCM. Assuming an average user cost of R0.25 per kilowatt-hour, this amounts to 323 million Rand;
- The consumption of electricity in BCM has increased continuously for the past five years (see Figure 7);
- In 2007 we used 402,354,920 litres of diesel, petrol and paraffin;
- Our total energy use in 2007 came to 21,990,849 Gigajoules. This is the same as burning 1.3 million tons of dry wood, or 9000 football fields of forest;
- Over half of all the energy used in BCM was for transport purposes;
- A third of energy used in BCM was for industrial and commercial use; and
- 10% of energy used in BCM was for household purposes.



**Figure 7: Kilowatt-hours of Electricity Supplied to BCM by Eskom on a Monthly Basis from Jan 2003 to May 2008 (Data source: Eskom)**

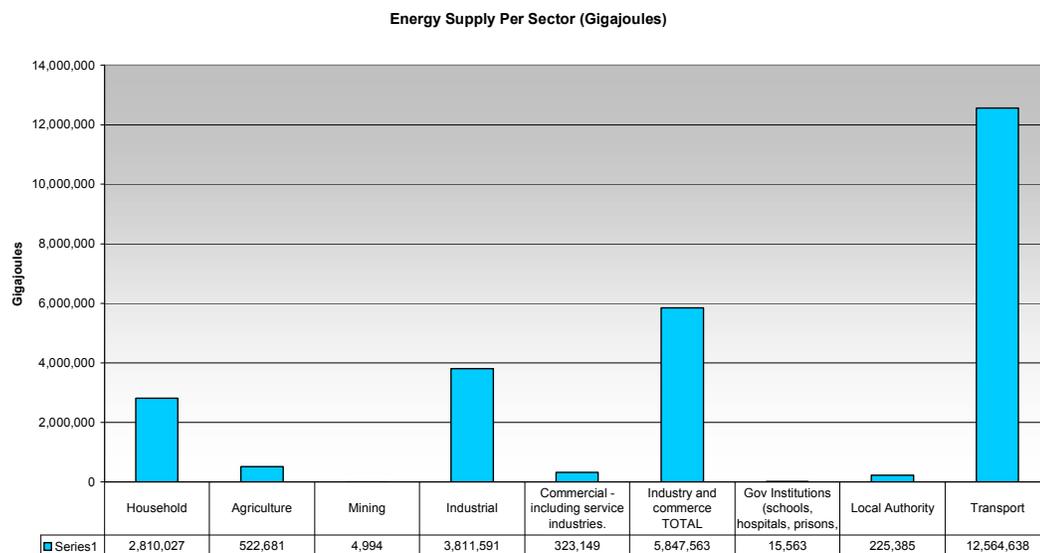
Energy supply takes a number of forms, including electricity, liquid fuels, LPG and natural gas, coal and biomatter. However, each energy form has a different energy value with respect to its physical mass or type. For example one kilowatt of electricity contains a different amount of energy in comparison to a litre of diesel or a kilogram of coal. Therefore, in order to be able to compare the different energy forms, the

different sources are expressed in a comparable unit, namely Gigajoule ( $10^9$  joules<sup>2</sup>). Figure 8 illustrates the different types of energy supplied to BCM in terms of Gigajoules.



**Figure 8: Quantities of Energy Supplied to BCM in Terms of the Energy Type, Expressed in Gigajoules**

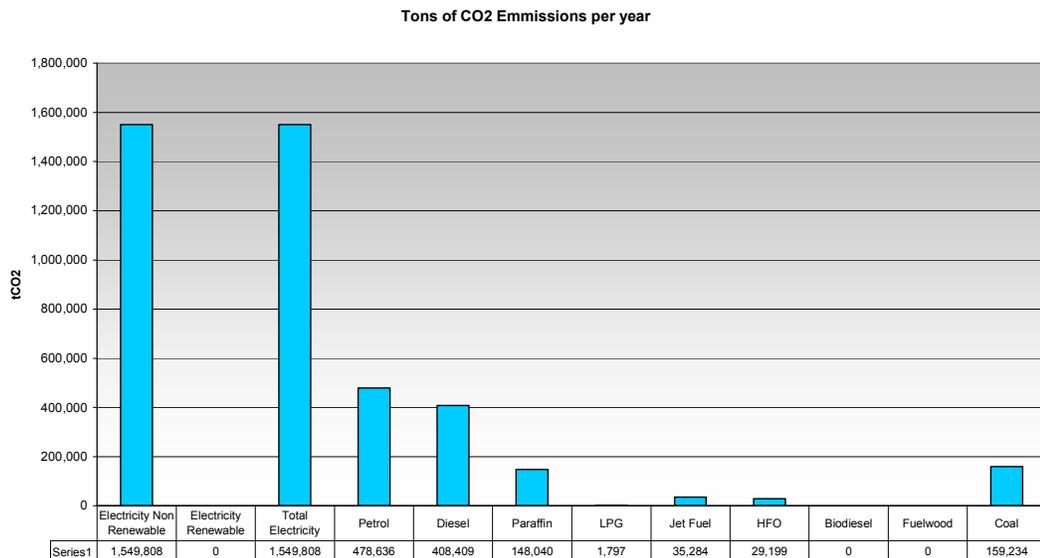
In addition to knowing what types of energy are used in BCM, it is also useful to know how this energy is being used. Figure 9 illustrates the energy consumed by different sectors in BCM (expressed in Gigajoules). Energy use is dominated by the Transport and Industrial and Commercial Sectors.



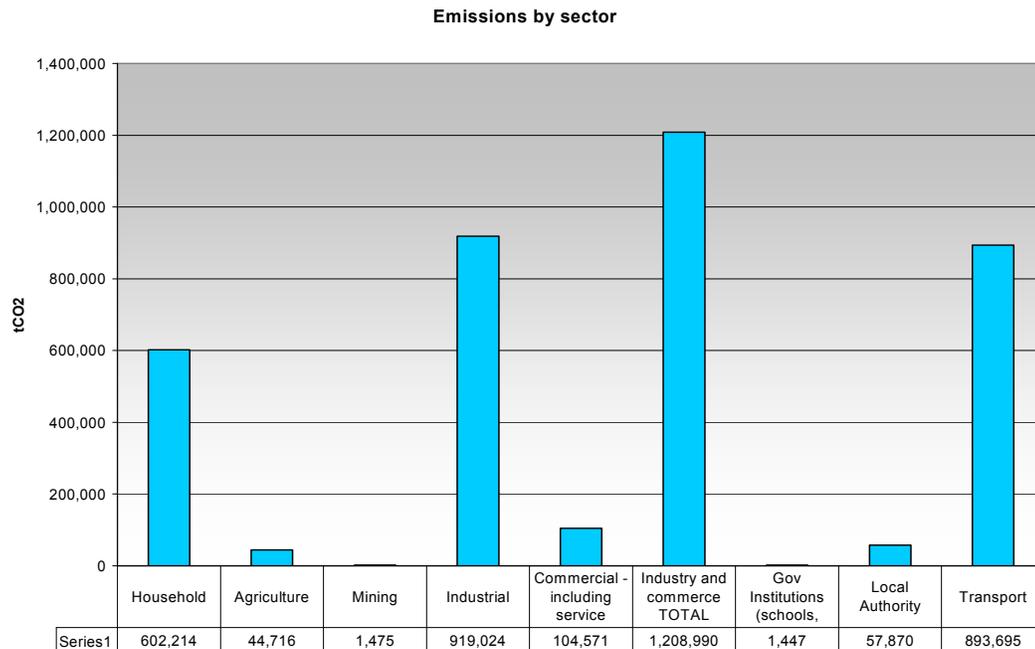
**Figure 9: Quantities of Energy Used by Different Sectors, Expressed in Gigajoules.**

<sup>2</sup> One joule is the equivalent of one watt-second. It is the amount of work done when one Newton weight is lifted over a distance of one meter.

The way we use energy in BCM has an impact on climate change. As an example, for every kilowatt-hour of electricity that we burn, a coal-burning power station releases just under 1kg of carbon dioxide and other gasses into the atmosphere. Carbon Dioxide and other gasses are also released when we burn petrol or diesel when driving cars and trucks, or when we burn wood and paraffin. These gasses in turn cause global warming and climate change. Last year 2,810,408 tons of Carbon Dioxide was released into the atmosphere because of the energy used in BCM. By far the most emissions were related to electricity use. Although only 20 to 30% of energy used in BCM is in the form of electricity, this causes 52% of all emissions. A very large proportion of electricity is used in the Industry and Commerce Sector, which means that the sector linked to the most Carbon Dioxide emissions, is the Industrial Sector, followed by Households. Figure 10 and Figure 11 illustrate the Carbon Dioxide emissions associated with energy type, and energy consuming sectors, respectively.

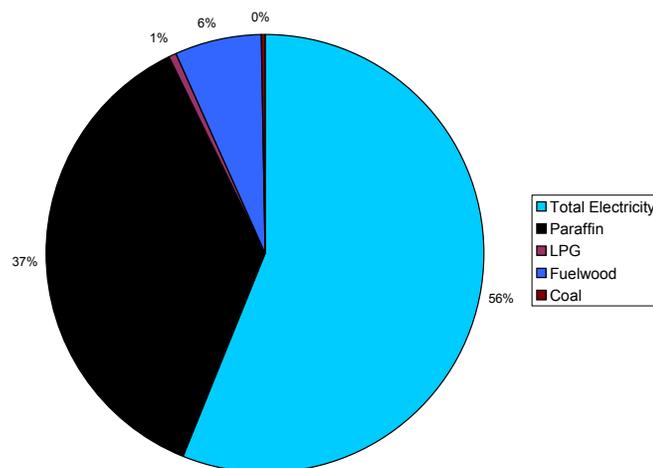


**Figure 10: Tons of Carbon Dioxide Emitted in 2007 During the Use of Different Energy Types in BCM.**



**Figure 11: Tons of Emitted Carbon Dioxide Caused by the Energy use in Different Sectors Within BCM (2007).**

Among the issues emerging from the State of Energy assessment was that an increasing proportion of households are becoming electrified. Households using electricity for cooking increased from 43.4% in 2001 to 59.6% in 2007. The use of paraffin decreased from 45.8% to 34.4%, while fuel-wood decreased from 6.7% to 3%, over the same period. Nevertheless the proportion of households without access to safe and affordable energy remains unacceptably high. In 2007 paraffin formed on average 26% of the household sector energy mix.



**Figure 12: Energy Types used by Different Households in BCM.**

Other significant issues emerging from the assessment are that:

- BCM is heavily reliant on outside sources of energy. This has implications for local energy security;
- BCM is heavily reliant on fossil fuels. Fossil fuels are finite. International oil supplies in particular are predicted to taper off within the next 30 to 50 years. This has important implications for BCM's local economy;
- Currently energy is used inefficiently in every sector. Simple interventions can make a big difference to the intensity of energy use in industry, in buildings, in municipal services and in households. This can easily lead to net financial savings;
- There are many opportunities for local renewable energy generation and energy efficiency projects. Linked to these projects are opportunities for external direct investment through carbon trading. Local energy generation and efficiency projects may also offer opportunities in terms of local manufacturing and job creation; and
- There are significant opportunities to reduce energy consumption by increasing the use of public transport. This requires an overhaul of the public transport system. Substantial effort and investment in local public transport has already been initiated.

A more comprehensive description of issues associated with energy in BCM is given in the next chapter.

## 4 OVERARCHING SUSTAINABLE ENERGY AND CLIMATE CHANGE ISSUES

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### 4.1 Overarching Issues

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The State of Energy Report highlighted numerous issues and opportunities associated with sustainable energy in BCM. The issues are detailed further in the introductory sections of the chapters dedicated to the Sector Strategies. However, a number of overarching issues or themes have emerged from the State of Energy Report. These are described below.

➤ **BCM is at risk in terms of Energy Security.**

- Most energy is imported into BCM.
- Almost all energy is derived from finite fossil fuel.
- Almost all energy is susceptible to excessive price volatility based on international conditions, placing the local economy at risk.

➤ **Energy is not necessarily used efficiently or sustainably.**

- Energy demand is increasing.
- Traditionally the focus has been on increasing supply, rather than managing demand.
- Energy has traditionally been cheap and available, meaning that there has been no incentive to use energy efficiently.
- BCM is currently not geared towards efficient use of energy.

➤ **The way in which we use energy is contributing towards global warming.**

- BCM causes the release of approximately 2.8 million tons of Carbon Dioxide per year. These releases contribute towards global warming and climate change.

➤ **There are many renewable energy, energy efficiency and carbon trading opportunities in BCM, but there is not necessarily an enabling environment to help implement these opportunities.**

- There is little capacity within BCM (local authority) to facilitate the exploitation of sustainable energy opportunities.
- The Municipal Finance Management Act prevents financial ring-fencing of projects undertaken by the local authority.
- The current national institutional framework for energy purchase and supply does not support independent power production and sale.

➤ **Currently, energy use is placing strain on the local economy, whereas sustainable energy options offer local economic development opportunities.**

- Electricity, liquid fuels and coal have seen excessive price volatility in the last year. These have had a negative ripple effect on the local economy.
- Local energy production supports local economic self reliance.
- There are manufacturing opportunities associated with renewable energy and energy efficiency.
- Carbon Trading under the Clean Development Mechanism forms a basis for foreign investment and the subsidising of local projects.

➤ **Currently, sustainable energy initiatives are planned and operated in an isolated and/or ad-hoc manner within the municipality.**

- There is the need for institutional coordination between different line functions in regard to sustainable energy initiatives in order to maximise the benefits and feasibility of projects.
- Sustainable Energy is a cross-cutting issue and does not sit clearly with any one department in BCM. There may be the need for a specific unit or post with a clear institutional framework to act as a coordinating body.

## 5 ENERGY POLICY AND SUSTAINABLE ENERGY PRINCIPLES

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A Sustainable Energy Policy and Strategy should be aligned with national and local policy and best practice. This chapter briefly defines national and local sustainable energy imperatives<sup>3</sup>.

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### 5.1 Summary of National Policy and Legislative Imperatives

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#### 5.1.1 International Agreements to which South Africa is Signatory

- The United Nations Framework Convention on Climate Change, and Kyoto Protocol.
- The World Summit on Sustainable Development Johannesburg Plan of Implementation.
- The Millennium Development Goals.

#### 5.1.2 Legislation Providing for Sustainable and Integrated Energy Planning, Including Climate Change Mitigation

- The Constitution of the Republic of South Africa (Act 108 of 1996).
- The National Environmental Management Act (Act 107 of 1998).

#### 5.1.3 Sector Specific Energy Legislation

- Petroleum products Act 1977.
- Eskom Act 40 of 1987.
- Electricity Act 41 of 1987.
- Electricity Amendment Act 58 of 1989.
- Nuclear Energy Act 3 of 1993.
- Electricity Amendment Act 46 of 1994.
- Electricity Amendment Act 60 of 1995.
- The 1999 National Nuclear Regulation Act.
- The 2001 Gas Act.
- The 2001 Eskom Conversion Act.
- Mineral and Petroleum Resources Development Act 2002.
- The 2002 Gas Regulator Levies Act.
- The 2003 Petroleum Pipelines Bill.
- National Energy Regulator Act 2004.
- Electricity Regulation Act 2006.

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<sup>3</sup> For a more detailed description of Sustainable Energy Policy and Legislation affecting BCM, see the BCM State of Energy Report, 2008.

#### 5.1.4 Integrated and Sustainable Energy Planning Policy

- The White Paper on Promotion of Renewable Energy (2004).
- National Energy Bill (2008).

The Minister of Minerals and Energy Affairs recently published in June 2008, the National Energy Bill, which provides the legislative backing for the objectives of the Energy White Paper. The objectives of the Bill are to:

- Ensure uninterrupted supply of energy to the public;
- Promote diversity of supply of energy and its resources;
- Facilitate effective management of energy demand and its conservation;
- Promote energy research;
- Promote appropriate standards and specifications for the equipment, systems and processes used for producing, supplying and consuming energy;
- Ensure the collection of data and information relating to energy supply, transportation and demand;
- Promote evidence-driven energy related sectors' policy formation;
- Provide for optimal supply, transformation, transportation, storage and demand of energy that is planned, organised and implemented in accordance with a balanced consideration of security of supply, economics, consumer protection and sustainable development;
- Provide for safety, health and environment matters that pertain to energy;
- Facilitate improvement of the quality of life of the people of the Republic;
- Commercialise energy related technologies;
- Ensure effective planning for energy supply, transportation and consumption;
- Promote sustainable development of South Africa's economy; and
- Ensure the fulfilment of international commitments and obligations pertaining to energy.

Furthermore the Bill specifies, **“the Minister may prescribe mandatory provision of any data and information reasonably required for the purposes of energy modelling and planning from any person.”** The production of the State of Energy Report is therefore directly in line with the reporting requirements of the Bill.

#### 5.1.5 Integrated and Sustainable Energy Strategies

- Integrated National Electrification Programme (INEP).
- The National Electricity Basic Services Support Tariff Policy.
- Integrated Household Clean Energy Strategy (2003).
- The DEAT National Strategy on Cleaner Production and Sustainable Consumption (2004).
- The DEAT National Climate Change Response Strategy (2004).
- National Energy Regulator of South Africa National Integrated Resources Plan (NIRP2, 2004). (NIRP3 is to be released shortly).
- Energy Efficiency Strategy of South Africa 2005.

- Draft bio-fuels industry strategy 2006.
- The DEAT Long Term Mitigation Scenarios (2008).

## **5.2 Sustainable Energy Principles for BCM**

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Taking into account the above imperatives, together with the opportunities and issues derived from the State of Energy Report, the following broad sustainable energy principles apply:

1. Ensuring local strategic energy security;
2. Ensuring responsible and sustainable energy resource use;
3. Ensuring equitable access to energy and resources that rely on energy (particularly transport);
4. Ensuring local responsibility towards reduced green-house gas emissions and combating climate change;
5. Ensuring an enabling environment for renewable energy, energy efficiency and carbon trading opportunities; and
6. Recognising the important role that energy plays in the local economy and the possible stimulus that energy projects may have in local economic development.

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## **ENERGY VISION**

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## 6 VISION AND GOALS FOR BCM

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An Energy Vision for BCM is introduced in chapter 8. An energy vision must be aligned with the overall vision and planning framework of the city. This chapter introduces the Integrated and sector planning context for BCM.

The BCM vision as described in the BCM Integrated Development Plan for the future is:

**A people-centred place of opportunity where the basic needs of all are met in a safe, healthy and sustainable environment.**

Two frameworks guide planning in BCM to achieve this vision, namely the Integrated Development Plan and the City Development Strategy.

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### 6.1 The Integrated Development Plan

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The Buffalo City planning system builds on a hierarchy of plans called sector plans (discussed under Section 7). The Integrated Development Plan (IDP) is the overall plan that pulls the sector plans into an integrated or cohesive unit. It makes sure that the different plans are well aligned and re-enforce each other in a way that makes the overall vision for BCM a realisable goal. The IDP, as an element of the Municipal Systems Act, forms a statutory framework for planning and budgeting over a 5-year period.

The Draft IDP for 2008/2009 sets out a hierarchy of objectives for the city in response to key issues and in pursuit of the vision for the city. The objectives are given below:

<b>BCM1</b>	Local, Provincial and National stakeholders support and work together to achieve the vision for Buffalo City.
<b>BCM2</b>	Effective, efficient and co-ordinated financial management and increased revenue – enabling BCM to deliver its mandate.
<b>BCM 3</b>	BCM's institution is capacitated and structured to enable efficient, effective and sustainable service delivery.
<b>BCM 4</b>	BCM creates an enabling environment for an economy that is growing, diversifying, generating an increasing number of sustainable employment opportunities, and contributing to increased incomes and equality.
<b>BCM 5</b>	Buffalo City is well structured, efficient, and supports sustainable human settlements, thus enabling residents to meet their physical, social, developmental, environmental, cultural and psychological needs (live, work, play).
<b>BCM 6</b>	BCM has a safe, healthy and sustainable environment protected for the benefit of present and future generations through securing ecologically sustainable development and use of natural resources, whilst promoting justifiable social and economic development.

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## 6.2 The City Development Strategy

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The City Development Strategy (CDS) sets long term objectives for the city over a 20 to 25 year planning period. Although the CDS is still being deliberated within Council and by key stakeholders. However, it continues to influence the strategic intent and direction of the Integrated Development Plan.

The city has set a number of strategic responses and interventions to ensure that the vision for BCM is made possible over a long term planning period. The responses are grouped into a number of areas for intervention aligned with the principles of the Sustainable Cities Network to which BCM belongs. These include:

1. **A well-governed city:** This implies decision-making and management is undertaken in a transparent and co-operative manner.
2. **A well-connected city:** This implies an easily accessible city, with sound infrastructure, including roads, rail, ports and airports. It also implies sound internal connectivity, particularly through the effective implementation of the Integrated Transport Plan.
3. **A productive city:** This implies a city with a sound and sustainable economy, built on solid and well maintained infrastructure, together with an enabling environment for industrial and commercial development. The City Development Strategy notes particularly that *“the productivity of the area is heavily reliant on the sustainable, sufficient and reliable supply of energy which BCM must assist in ensuring”*.
4. **An enabling and inclusive city:** This implies socially oriented interventions, with investment in people in terms of skills and education, and ensuring the value of a dignified life.
5. **A sustainable city:** This implies ensuring the long-term environmental sustainability of the area. This includes “the development of a strategy for on urban development from a climate change, energy-efficient and environmental perspective and the utilisation of wind and solar power for energy production”. A sustainable city would mean a “responsible contribution from the BCM side to the global issues of greenhouse gas emission and resulting effects associated with climate change and global warming”

The CDS and IDP form the guiding framework within which a vision for sustainable energy generation and use within the city should be developed.

## 7 BCM SECTOR PLANS AND THEIR IMPLICATIONS ON THE ENERGY POLICY & STRATEGY

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It is important that the Energy Policy and Strategy is aligned with the vision and objectives of the existing BCM Sector Plans. This chapter introduces the relevant sector plans and highlights their relationship and implications for the energy strategy.

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### 7.1 Spatial Development Framework

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The Spatial Development Framework is a legally binding document for all land-use management decisions, and illustrates the form and extent of development that Buffalo City Municipality wishes to promote.

#### 7.1.1 Vision and Objectives

The 2003 Spatial Development Framework (SDF) is based on the vision of the city, which at the time was:

*“Buffalo City Municipality – a people centred place of opportunity where the basic needs of all are met in a safe healthy and sustainable environment”*

Key objectives are highlighted in the SDF that are based in critical planning issues:

Issue	Objective
Spatial Fragmentation	A well structured, efficient and sustainable city, which has corrected historically distorted spatial development patterns
Rapid and Unmanaged Urbanisation	Adequate land and services for urbanising (existing and new) communities
Low density settlement density and urban sprawl	Higher density settlements
Uncoordinated spatial development	Environmentally sustainable and spatially coordinated sectoral practices.
Depletion of Natural Resources and Valuable Agriculture Land	Managed use of natural resources and agricultural land

#### 7.1.2 Implications for the Energy Strategy

The following notions are promoted through the objectives of the SDF, which have important implications for the Energy Strategy:

- The current spatial fragmentation has meant that transport distances (especially from home to work) are long and are therefore energy consuming;
- The lack of services (e.g. the absence of electricity) in certain areas forces communities to make use of more expensive and unsafe energy sources such as paraffin, fuel-wood. etc;
- Higher density settlements are favourable in reducing transport distances; and
- Natural resources are in some cases being depleted for energy generation (e.g. fuel-wood).

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## **7.2 Integrated Environmental Management Plan**

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Buffalo City is striving to build a local consensus in the support of recognised sustainable development principles and has accordingly prepared a comprehensive Integrated Environmental Management Plan (IEMP). The IEMP Policy acts as a framework and guides local government in its strive to promote sustainable development. The IEMP is based on existing national and international law and legislation and will be implemented through various sector plans and programmes identified in the Integrated Development Plan (IDP). The Policy also outlines the integrated approach for all projects within the municipality, guiding decision-makers at all levels to accessible and adequate information on adverse environmental effects of the activity in question. This approach enables the opportunity to improve, lessen or put a stop to the planned activity. Furthermore, the IEMP promotes public participation.

### **7.2.1 Vision and Objectives**

The IEMP Objectives are:

- Conduct a baseline assessment or audit of the state of the BCM environment;
- Ensure alignment of BCM activities with relevant environmental policy and legislation;
- Provide input on institutional arrangements relating to environmental management in BCM;
- Develop measures to manage high priority environmental issues in BCM;
- Ensure appropriate stakeholder and public participation and dissemination during the process;
- Identify cross-cutting issues relevant to environmental management in BCM.
- Develop an Environmental Policy for BCM;
- Promote environmental Capacity and Awareness in BCM; and
- Establish an effective and efficient system to monitor and measure progress in policy implementation.

Among the core environmental sectors of the IEMP is energy efficiency, which required the development of an energy efficiency policy and strategy.

### **7.2.2 Implications for the Energy Strategy**

Since energy efficiency is a core environmental sector within the framework of environmental management, the above objectives relate directly to a sustainable Energy Policy and Strategy.

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## **7.3 Public Transport Plan and Integrated Transport Plan**

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Buffalo City Municipality prepared a Public Transport Plan in 2002 to influence the public transport system and to predict the future roles of the various modes, i.e. commuter rail, conventional bus and minibus taxi.

The Plan provides guidelines for the transformation of the system over a period of time and the infrastructure to support these services.

Upon the outcome of the Public Transport Plan, the BCM Transportation Planning Department recently released their Integrated Transport Plan (ITP). The plan covers all forms of land transport, namely public transport, walking and cycling, freight transport, roads and transport infrastructure. Other important issues covered are traffic safety, the environmental impacts of transport, travel demand management and the transport needs of special categories of passengers.

### **7.3.1 Vision and Objectives**

The vision for the ITP is to achieve:

*“A fully integrated transport system to increase accessibility for all people and giving priority to public transport, non-motorized transport and traffic safety”.*

In order to achieve this vision, the following objectives have been set:

- Accessibility – The transport system must afford all citizens (including the elderly, learners and special needs people) the means to travel to destinations around Buffalo City;
- Social and economic development – A well functioning transport system must support social and economic development of Buffalo City;
- Safety – The current transport system is characterized by unsatisfactory traffic safety conditions. Infrastructure and services must be put on place to improve traffic safety especially for public transport users;
- Public transport is far more energy efficient than private transport and any promotion thereof has positive implications for energy conservation;
- Sustainability – The transport system has to be sustainable from an environmental as well as an economic point of view; and
- Humanizing the City – A transport system orientated towards people, and designed at the “human scale” so as to promote a safe, pleasant environment for walking, will contribute to a more attractive city – a city for people and not dominated by roads, congestion, pollution and lack of accessibility.

### **7.3.2 Implications for the Energy Strategy**

The following notions are promoted through the objectives of the ITP, which have important implications for the Energy Strategy:

- Environmentally sustainable transport involves the use of that transport which is not fuel intensive, and is not reliant on fossil fuels;
- Walking is an obvious energy efficient means of transport; and
- Traffic congestion causes unnecessary energy consumption.

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## **7.4 Integrated Waste Management Plan**

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Buffalo City Municipality prepared a first generation Integrated Waste Management Plan in 2003. The plan provides a description of current waste management practises and formulates strategies and objectives to address priority issues pertaining to waste management within the city.

### **7.4.1 Vision and Objectives**

The IWMP adopts the vision of the IDP and notes that the IDP identifies “negative environmental and health impacts due to unsustainable waste management” as a priority issue that needs addressing. The following objectives are therefore set:

- Comprehensive long-term waste planning;
- Efficient, effective and appropriate waste collection and treatment services in the entire BCM;
- The availability of landfills and transfer stations which comply with National and Local legislation and meet the long-term needs of BCM; and
- Reduction of waste by 35% by volume within 5 years through the implementation of waste reduction, re-use and recycling programmes and alternative treatment of waste.

### **7.4.2 Implications for the Energy Strategy**

Major energy expenditure is experienced in terms of collection, clearing of illegal dumping, street cleansing and waste disposal (the waste department currently operates 25 tipper and flat bed trucks, 35 compaction units, 1 skip loader and 3 load luggers).

Very little formal recycling is practised or encouraged by the municipality, although it has been recognised as a future integral component of the city’s waste management system. Recycling can be viewed as an important energy saving initiative as it reduces the quantities of waste handled and disposed of which ultimately reduces the energy requirements of transportation and disposal.

Landfill gas has been identified as a wasted resource in the city which can potentially be harnessed for electricity generation.

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## **7.5 Electricity Master Plan**

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An Electricity Master Plan is about to be commissioned by the BCM Electricity Department. The Master Plan will provide measures for addressing the household electricity backlogs, addressing aged electricity infrastructure as well as metering and clear definition of responsibility amongst participating parties. Alternative forms of energy generation and ways of introducing energy efficiency may be included.

It is of fundamental importance that the Electricity Master Plan is integrated with this energy strategy.

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## **ENERGY VISION, GOALS & OBJECTIVES**

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## 8 ENERGY VISION AND GOALS

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### 8.1 Introduction

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This section identifies an energy vision and six goals with associated objectives. The vision and objectives are closely related to those of the BCM IDP and the CDS.

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### 8.2 Energy Vision

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In keeping with sustainable energy principles, together with the IDP and CDS vision and planning objectives of the city, the following energy vision has been developed in response to identified energy issues and imperatives.

**A city that supports climate change mitigation, while ensuring a secure and affordable energy supply; which meets its development needs and stimulates local employment through increased energy efficiency and renewable energy measures for all.**

The vision may be translated to **ENERGY GOALS** as described hereafter:

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### 8.3 Energy Goals

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#### 8.3.1 Energy Security

**Goal 1: A city that has sustainable and secure long-term energy supply.**

Currently nearly all energy is imported into BCM from outside the municipal area and generally from outside the province. This is of strategic concern. To secure the supply of energy over the long-term, BCM must ensure that it can rely on a diversity of sources (including locally generated sources). At the same time BCM must improve the efficiency of energy use in order to reduce the impact of increasing energy costs.

**Objectives:**

1. Ensured energy security.
2. Reliable energy infrastructure.
3. Reduced reliance on finite fuels, by reducing the intensity of use through energy efficiency.
4. Reduced reliance on finite fuels and outside energy imports by promoting local renewable energy generation.

*Related IDP Objectives:* BCM 4, BCM 6

*Related CDS Principle:* A well connected city, a sustainable city;  
a productive city

### 8.3.2 Sustainable Energy Use

**Goal 2: A city that uses and manages energy in an efficient way, so that resources are not wasted and so that energy costs are reduced.**

BCM currently relies directly or indirectly on finite fossil fuels for most of its energy needs. Finite fuels are not renewable, which means that we must use what we have carefully and sparingly. By improving the efficiency of energy use, financial savings can also be achieved.

#### **Objectives:**

5. Sustainable energy reporting and principles included in city planning in order to inform future planning and development decisions.
6. Energy efficiency in local government.
7. Energy efficiency in industry and commerce.
8. Energy efficiency in the transport sector.
9. Energy efficiency in households.

*Related IDP Objectives:* BCM 4, BCM 5, BCM 6

*Related CDS Principle:* A well connected city, a sustainable city

### 8.3.3 Equitable Energy Access

**Goal 3: A city where all residents have fair access to energy that is affordable, safe and appropriate.**

A major component of urban poverty is energy poverty. A large proportion of poor households' income is spent on acquiring the necessary energy to survive. These households are often dependent on energy sources that are unsafe, unhealthy, expensive and inconvenient. A key guiding framework for equity in access to energy is the long-term mitigation strategy released by DEAT (Refer to Section 11).

#### **Objectives:**

1. All households to have access to safe, affordable, appropriate and sustainable energy sources.
2. Increased energy awareness in terms of safety, use and efficiency.
3. Fair access to public transport that is efficient, safe and reliable.

*Related IDP Objectives:* BCM 5, BCM 6

*Related CDS Principle:* An enabling and inclusive city, a well connected city

### 8.3.4 Climate Change Responsibility and Enabling Renewable Energy, Energy Efficiency and Carbon Trading Opportunities.

**Goal 4: A city that takes responsibility for its obligations to reduce its impact on climate change, by supporting clean and renewable energy production and use, and working towards a carbon neutral future.**

This goal specifically recognises the long-term mitigation strategy, developed by an inter-ministerial committee led by the Department of Environmental Affairs and Tourism (DEAT). The ultimate aim of the strategy is for carbon neutral production in future.

#### **Objectives:**

1. Adherence to national policy (e.g. DEAT's Long-term Mitigation Strategy) and international agreements regarding carbon emissions mitigation.
2. A well developed institutional framework within BCM, with capacity to support and/or facilitate public and private renewable energy, energy efficiency and carbon trading projects.
3. Incentives and penalties to improve renewable energy supply, energy efficiency and reduce climate change impacts.

*Related IDP Objectives:* BCM 6

*Related CDS Principle:* A sustainable city

### 8.3.5 Energy in the Local Economy

**Goal 5: A city where sustainable energy costs and activities are a stimulating factor in local economic development.**

Rather than "exporting" money in return for the import of energy, BCM can improve the local balance of trade by investing in local energy production and/or generation projects. This includes local production or manufacture of renewable energy or energy efficient technology. Associated with this are positive spin-offs in terms of local economic development and job creation.

#### **Objectives:**

1. A developed industry exploiting manufacturing, income generating and job creation opportunities associated with energy efficiency and renewable energy.
2. Carbon Trading financially supports renewable energy, energy efficiency and climate change projects.
3. The mix of energy supply options is optimised to be least cost.

*Related IDP Objectives:* BCM 4

*Related CDS Principle:* A productive city

### 8.3.6 Institutional Capacity

**Goal 6: A city where sustainable energy measures are supported by well developed institutional capacity.**

Sustainable energy is a cross-cutting issue which does not fit completely with any one line-function or departmental responsibility in BCM. Furthermore, renewable energy and energy efficiency are new concepts and BCM does not yet have a highly developed institutional capacity or framework to promote or facilitate the associated objectives. Institutional issues need to be considered in conjunction with other goals and measures contemplated in the strategy.

**Objectives:**

6. Sustainable energy measures receive adequate institutional support from BCM Local Authority.
7. An established BCM Integrated Sustainable Energy and Climate Change Post to facilitate the development of an institutional framework.
8. An established Integrated Sustainable Energy planning and facilitation stakeholder forum to guide and promote long-term sustainable energy in BCM.

*Related IDP Objectives: BCM 1, BCM 2, BCM 3*

*Related CDS Principle: A well-governed city*

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## **SECTOR STRATEGIES**

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## 9 SECTOR STRATEGIES: ENERGY SUPPLY

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### 9.1 Introduction

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This chapter provides a strategy for sustainable energy supply including renewable energy. Measures which are numbered according to the type of sector strategy are identified in relation to each objective and relevant goal.

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### 9.2 Key Energy Supply Issues

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- BCM has a heavy reliance on electricity generated from low-grade coal, causing high levels of greenhouse gas emissions (although these occur in the highveld region of RSA). In order to maintain a sustainable city profile, and to ensure energy security, there may be a need to augment BCM electricity supply with renewable sources of electricity such as biogas, wind and solar forms;
- The effects of the proposed amalgamation of Eskom and numerous municipal electricity supply entities into one Regional Electricity Distribution (RED) is unclear. This means that electricity and energy forward planning is hampered;
- Energy supply to BCM is dominated by fossil fuel sources. Fossil fuels are becoming increasingly expensive, which threatens the energy security of the city; and
- Half the energy supply in BCM is for transport (through petrol and diesel). To effectively improve the efficiency of energy consumption in the municipality, the transport sector should receive high attention.

#### 9.2.1 Renewable Energy, Energy Efficiency and Carbon Trading

- Although there are opportunities for renewable electricity production by Independent Power Producers (IPP), the Municipal Finance Management Act and National Tariff Regulations prevents BCM from paying higher amounts and charging higher tariffs to customers willing to pay a surcharge for the “green” power. This means that IPPs must compete with cheap, coal-generated electricity supplied by Eskom;
- There is no established legal and institutional structure for the purchase of “green electricity” from IPPs by BCM;
- There is no established legal and institutional structure for the transmission of electricity from an IPP to an independent consumer via the BCM network;
- Although Eskom offers a subsidy for solar water heaters, households still have to make a large capital outlay to purchase and install the units; and
- Although the Clean Development Mechanism (CDM) provides a means of subsidizing the generation of renewable energy, there are major administrative and legal requirements associated with registering a CDM project.

### 9.3 Objectives and Measures

<b>Goal 1</b>		
<b>A city that has sustainable and secure long-term energy supply.</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
Ensured Energy Security.	ES1) Undertake Integrated Resource Planning including further development of the electricity master plan (In terms of the Integrated Resources Planning Guidelines).	LA46)
	ES2) Explore the feasibility of natural gas supply to BCM (In line with Eskom 25 year gas plan) <sup>4</sup>	IC
Reliable energy infrastructure.	ES3) Conduct an audit of electricity infrastructure and maintenance requirements.	
	ES4) Ensure investment in and maintenance of reticulation infrastructure to avoid electricity supply issues and associated economic impacts.	LA4)
	ES5) Investigate, clarify and facilitate the technical and infrastructure requirements of IPP in terms grid feed-in (with particular emphasis on interfacing technology). Link with initiatives by national government in this regard.	ES24)
	ES6) Ensure adequate total supply chain infrastructure for liquid fuels (including requirements for biofuels should IDZ biofuels cluster become established).	
Reduce reliance on finite fuels and outside energy imports by promoting local renewable energy generation and production.	ES7) Identify and implement a renewable energy generation pilot project.	
	ES8) Conduct an overarching renewable energy feasibility study for BCM <sup>5</sup>	LA13)
	ES9) Facilitate the implementation of grid-connected renewable energy generation.	LA11)
	ES10) Investigate the feasibility of, local biofuels and biogas production and use, in coordination with IDZ biofuels industry intentions.	
	ES11) Where feasible, encourage the development of a bio-fuels industry in BCM.	
	ES12) Where feasible, facilitate the gradual replacement of sewage treatment facilities with independently operated bio-digestion and methane production facilities.	
	ES13) Explore interest from large business in engaging in renewable energy investment and production.	CI12)
<b>Goal 3</b>		
<b>A city where all residents have fair access to energy that is affordable, safe and appropriate.</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
All households have access to safe, affordable, appropriate and sustainable energy sources.	ES14) Continued rollout of household electrification programme.	LA17) BCM Electricity
	ES15) Clarify and develop appropriate BCM approach to Free Basic Alternative Energy for poor households as part of DME Free Basic Energy allocations (solar, LPG, gel-fuel).	BCM Disaster Management

<sup>4</sup> More information on natural gas pipeline from R. De Kock, Eskom.

<sup>5</sup> Eskom is currently conducting a similar study. BCM should build on this study. More information from V Van Niekerk, Eskom.

<b>Goal 4</b>		
<b>A city that takes responsibility for its obligations to reduce its impact on Climate Change, by supporting clean and renewable energy production and use, and working towards a carbon neutral future.</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
Adherence to national policy and international agreements (Including LTMS)	ES16) Define sector specific policy obligations in terms of renewable energy and energy efficiency.	
Incentives and penalties to improve renewable energy supply, energy efficiency and reduce climate change impacts.	ES17) Research and develop a protocol for a "green energy" tariff within BCM <sup>6</sup> .	ES23)
	ES18) Research and develop a protocol for municipal rates relief for renewable energy production projects.	LA37)

<b>Goal 5</b>		
<b>A city where sustainable energy costs and activities are a stimulating factor in local economic development.</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
A developed industry exploiting manufacturing, income generating and job creation opportunities associated with energy efficiency and renewable energy.	ES19) Assess and support local manufacturing and installation opportunities related to renewable energy plant and generation. Ensure support from local economic development agencies in this regard.	LA28)
	ES20) Local economic development agencies to investigate import substitution regarding energy imports and energy technology.	
Carbon Trading financially supports renewable energy, energy efficiency and climate change projects.	ES21) Ensure that all Carbon Trading opportunities are exploited in renewable energy generation projects.	LA32)
The mix of energy supply options is optimised to be least cost.	ES22) Ensure that Integrated Resource Planning is undertaken to pursue least-cost mix of options, including energy efficiency.	ES1)

<b>Goal 6</b>		
<b>A city where sustainable energy measures are supported by a well-developed institutional capacity.</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
An established BCM Integrated Sustainable Energy and Climate Change Post to facilitate the development of an institutional framework.	ES23) Post to ensure reduced beaucroatic and technical obstacles to small-scale independent power production.	LA14)
	ES24) Post to facilitate an enabling institutional framework for power purchase agreements between the municipality and IPPs.	LA14)
An established Integrated Sustainable Energy planning and facilitation stakeholder forum to guide and promote long-term sustainable energy in BCM.	ES25) Forum to facilitate improved institutional and private relationships and capacity associated with independent power production and sale.	LA48)

<sup>6</sup> Currently a draft Feed-in Tariff Study is taking place. BCM should refer to this study. More information is available from from V Van Niekerk, Eskom.

## 9.4 Targets

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6. 10% of total supply of energy to be renewable energy by 2018<sup>7</sup>
7. Overall energy saving of 12% per unit of production by 2015 from 2007 levels (in accordance with national target).
8. Quantity of CO<sub>2</sub> equivalent emissions does not increase from 2007 levels by 2012, and reduces 10% from 2007 levels by 2020.
9. Maintain electricity connection rate of 100% of formal households
10. 100% of informal households on developable land (not in road/power/other reserves or on private land) including TRA's (Temporary Relocation Areas) to be connected to electricity.

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<sup>7</sup> 1% per year.

## 10 SECTOR STRATEGY: TRANSPORT

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### 10.1 Key Transport Energy Issues

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#### Public Transport

- There are approximately 3,300 minibus and sedan taxi vehicles operating in the East London area. These taxis dominate the public transport sector, and any BCM driven Public Transport Plan will have to ensure a well managed relationship between themselves and taxi operators and associations;
- A Bus Rapid Transit system is being planned for the city as a public transport alternative. However, tight control of the system will have to be maintained, while public security throughout the transport system will be required to ensure its success;
- Metrorail (the internal passenger rail service) is a non-municipal function, which acts against an integrated public transport management approach; and
- Deficiencies in road infrastructure, such as lack of facilities for pedestrians and cyclists all impact on energy consumption (IDP, 08/09).

#### Municipal Fleet

- There is no monitoring (vehicle tracking system) or interrogation of the municipal fleet. This could lead to abuse of municipal vehicles, theft of fuels, and inefficiency in terms of operations, which have implications on promoting energy efficiency.

#### Freight

Freight is dominated by road, rather than rail, haulage and is therefore energy efficient. Inefficiency within the rail transport system (such as double handling and long delivery time) is currently a disincentive for rail freight. Rail freight is a national competency.

### 10.2 Objectives and Measures

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<b>Goal 1 A city that has sustainable and secure long-term energy supply.</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
Reduced reliance on finite fuels and outside energy imports by promoting energy efficiency.	T1) Implement measures to increase private vehicle occupancy by: <ul style="list-style-type: none"> <li>a) Identifying and implementing dedicated High Occupancy Vehicle (HOV) lanes with monitoring and enforcement through appropriate mechanisms;</li> <li>b) Awareness-raising programmes (ridesharing website including information on benefits);</li> <li>c) Encouraging and supporting lift clubs where possible;</li> <li>d) Institute car schemes to encourage efficiency – within local government as well as promotion in private companies (working with employers to encourage their employees use carpooling and other alternative modes of travel); and</li> <li>e) Lobby national government regarding car scheme/allowances to promote efficiency such as tax incentives.</li> </ul>	LA19)
	T2) Investigate measures required to support the purchase and use of fuel-efficient vehicles.	
	T3) Implement measures to increase the utilisation of public transport	
	T4) Continued development and implementation of the City Integrated Transport Plan.	

	T5) Support the implementation of the Bus Rapid Transit System.	
	T6) Continued attempts to incorporate passenger rail as the key component of the passenger transport network. Rail system should be reliable, efficient, safe, affordable in order to attract customer base	
	T7) Explore and establish an optimal form of an institutionalised Integrated Transport Authority to ensure coordination between rail, provincial and local transport authorities.	
	T8) Establish institutional support of national efforts to shift freight from road to rail.	
	T9) Review infrastructure needs based on changes in transport modal splits,	
Reduce reliance on finite fuels and outside energy imports by promoting local renewable energy generation.	T10) Investigate measures required to support local biogas consumption (i.e. support the creation of local biogas market).	CI19) LA12)

<b>Goal 2</b>		
<b>A city that uses and manages energy in an efficient way, so that resources are not wasted and so that energy costs may be reduced.</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
Sustainable energy reporting and principles included in city planning in order to inform future planning and development decisions.	T11) Ensure energy efficiency criteria are considered in BCM fleet procurement protocol. T12) Encourage public transport contracting to include fuel efficiency and emissions reductions in procurement process.	LA40)
Energy efficiency in the transport sector.	T13) As per Energy Efficiency in Goal 1. T14) Investigate feasibility of daylight savings and flexible working hours in terms of efficient energy consumption T15) Implement a community awareness campaign regarding fuel and transport efficiency	
Energy efficient principles adopted in city design and spatial planning (including compact city design and integration with transport planning).	T16) Spatial development planning should continue to incorporate transport efficiency in city design in terms of the following: i) reduced traffic congestion; ii) reduced distances from residential areas to the work place; iii) development around public transport nodes; iv) adoption of densification principles etc; v) non motorised transport; vi) Efficient and equitable access to public transport; and vii) public transport facilities to be energy efficient.	
	T17) T13) Develop public transport demand management plan which includes routing and schedule coordination.	
	T18) T14) Encourage National Ports Authority and ACSA to consider energy efficiency in their operations.	
	T19) T 15) Investigate measures for fleet monitoring of BCM fleet and implement monitoring system.	
	T20) T16) Optimise traffic control management system	

<b>Goal 3</b>		
<b>A city where all residents have fair access to energy services that are affordable, safe and appropriate.</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
Fair access to public transport that is efficient, safe and reliable.	T21) As per BCM Public Transport Plan.	
	T22) Plan and implement appropriate NMT infrastructure (walking and cycling networks) in both rural and urban areas.	

<b>Goal 4</b>		
<b>A city that takes responsibility for its obligations to reduce its impact on Climate Change, by supporting clean and renewable energy production and working towards a carbon neutral future.</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
Adherence to national policy and international agreements (e.g.: white paper on energy efficiency and LTMS).	T23) Ensure Regular State of Energy reporting. Cross reference with Institutional and Carbon Programme, compatible with ISO 9/14/18000 frameworks).	LA20)
	T24) Define policy obligations in terms of energy efficiency and renewable energy and guided by LTMS.	LA21)
	T25) Set targets for energy efficiency in the transport sector as per obligations.	LA22)
	T26) Adopt applicable National DME measures for efficiency in the transport sector.	
Incentives and penalties to improve renewable energy supply, energy efficiency and reduce climate change impacts.	T27) Investigate and implement Travel Demand Management (see Goal 1)	
	T28) Investigate and implement incentives for modal shift from private to public transport.	T3)

<b>Goal 5</b>		
<b>A city where sustainable energy costs and activities are a stimulating factor in local economic development.</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
Carbon Trading financially supports renewable energy, energy efficiency and climate change projects.	T29) Investigate carbon-trading opportunities in line with the latest feasible technology for BCM fleet and contracted public transport services.	

<b>Goal 6</b>		
<b>A city where sustainable energy measures are supported by well-developed institutional capacity.</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
An established BCM Integrated Sustainable Energy and Climate Change Post to facilitate the development of an institutional framework.	T30) Where feasible, post to support adoption of energy efficiency measures in transport sector.	

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### 10.3 Targets

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The following targets should be the focus of the transport sector. The targets support the national target of 9% energy demand reduction by 2015

9. 10% modal shift from private vehicles to public transport (rail and/or bus) by 2011.
10. Efficiency criteria in municipal fleet procurement process by end 2009 (T11).
11. Fuel efficiency and emissions reductions criteria in public transport service provider contracts by end 2009 (T12).

## 11 SECTOR STRATEGY: HOUSEHOLD ENERGY

### 11.1 Key Household Energy Issues

- Low household income is a barrier to a transition from poor energy choices to sustainable energy choices. For example a household may be electrified, but low-income levels prevent the household from purchasing new electrical appliances;
- There may be problems with mass rollout of energy interventions in the context of the Municipal Finance Management Act;
- Mass rollout of solar water heaters in low-income areas will have positive quality of life and energy saving results. However, commercially available solar water heaters are large and expensive. A locally manufactured, cheaper solution should be investigated;
- Heavy reliance on paraffin and wood fuel causes household and local air quality issues;
- There are disaster Management issues associated with paraffin, wood fuel and illegal connections in informal housing areas;
- Fuel types such as paraffin are more expensive than electricity. However certain households do not have access to electricity. This has social equity implications;
- There are local air quality issues associated with using paraffin, as against global air quality and greenhouse issues associated with using electricity;
- Higher income urban households have comparatively high energy consumption. Education, incentives and interventions to reduce consumption should be investigated; and
- The mechanism for enforcing solar water heater installations in new large or high value houses or units (as required by 2008 electricity regulations) are unclear.

### 11.2 Objectives and Measures

<b>Goal 1 A city that has sustainable and secure long-term energy supply.</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
	H1) Adequate investment in maintenance of electricity reticulation infrastructure supplying houses.	LA1)
Reduced reliance on finite fuels, by reducing the intensity of use through energy efficiency.	<b>Low Income Housing</b>	
	H2) Investigate financing and pragmatic options for mass rollout of energy interventions such as low-cost solar water heaters and retrofitted ceilings in low-income households (e.g. Grants, Eskom Subsidy, CDM and Fee for service through ESCOs).	LA7) H20)
	H3) Investigate incentives for thermal efficiency principles in design of low-income (RDP) and social housing (Investigate the adoption of national energy efficiency Design Guidelines).	
	H4) Support mass switching of light bulbs to CFLs as planned by Eskom <sup>8</sup> .	LA5)
	<b>Middle and High Income Housing</b>	
	H5) Investigate opportunities for encouraging uptake of solar water heaters by medium to high- income households (e.g. through by-laws, rezoning conditions or any planning approval – develop guidelines for BCM authorities in this respect).	LA36)

<sup>8</sup> Further information is available from R De Kock, Eskom.

<b>Goal 1 A city that has sustainable and secure long-term energy supply.</b>		
	<p>H6) Investigate possibilities for encouraging energy efficient buildings (including commercial and industrial buildings), especially among property developers. For example:</p> <ul style="list-style-type: none"> <li>i) By-laws;</li> <li>ii) Rezoning conditions;</li> <li>iii) Conditions to planning approvals;</li> <li>iv) Conditions to municipal service connections; and</li> <li>v) Incentives such as rebates on municipal rates or relaxation of restrictions.</li> </ul> <p>Policy and Guidelines for applying the above conditions and incentives by authorities must be developed.</p> <p>Policy and Guidelines should differentiate between retrofitting properties and greenfield developments.</p>	LA36)
	H7) Support energy efficiency in building design and operation, especially among property developers, by introducing incentives for the "Green Star SA" rating of buildings as developed by the Green-Building Council of South Africa.	
	<p>H8) Support and engage with Eskom regarding planned DSM measures, namely:</p> <ul style="list-style-type: none"> <li>i) Rollout of CFLs (600 000 in BCM);</li> <li>ii) Switching to aerated shower heads (100 000 to be rolled out in BCM);</li> <li>iii) Freezer blankets in households; and</li> <li>iv) Smart Metering in houses (restricted amperage and consecutive use of appliances).</li> </ul>	LA5)
	H9) Investigate and implement options for a tiered electricity tariff system in conjunction with smart metering.	
	H10) Capacitate BCM building approval department (architecture) to ensure energy efficiency design measures are taken into account for new structures. Cross reference.	LA40)
Reduce reliance on finite fuels and outside energy imports by promoting local renewable energy generation.	<p>H11) Investigate possibilities for encouraging property developers to include renewable energy generation in developments. For example:</p> <ul style="list-style-type: none"> <li>i) By-laws;</li> <li>ii) Rezoning conditions;</li> <li>iii) Conditions to planning approvals;</li> <li>iv) Conditions to electricity connections; and</li> <li>v) Incentives such as rebates on municipal rates or extra floor space in planning approvals.</li> </ul> <p>Policy and Guidelines for applying the above conditions and incentives by authorities must be developed.</p> <p>Policy and Guidelines should differentiate between retrofitting properties and greenfield developments.</p>	LA36)

<b>Goal 2 A city that uses and manages energy in an efficient way, so that resources are not wasted and so that energy costs may be reduced.</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
Energy efficiency in households.	H12) As for energy efficiency in Goal 1.	

<b>Goal 3 A city where all residents have fair access to energy that is affordable, safe and appropriate.</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
All households have access to safe, affordable, appropriate and sustainable energy sources.	H13) Continued rollout of low-income household electrification programme where appropriate.	LA4)
	H14) Options for Free Basic Alternative in the informal housing sector investigated and implemented (e.g. gel-fuel stoves promoted and made available - refer to gel-fuel feasibility study).	LA17)
Increased energy awareness in terms of safety, use and efficiency.	H15) Build on existing awareness and education programme regarding household paraffin, gas and fuel wood safety.	LA18)
	H16) Awareness and Education programme regarding electricity safety especially illegal connections and installations.	LA18)
	H17) Awareness and Education programme regarding the use of gel-fuel stoves or other safe alternatives.	LA18)

	H18) Focus on general awareness around household efficiency – across economic spectrum (build on existing awareness programmes).	
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<b>Goal 4</b>	<b>A city that takes responsibility for its obligations to reduce its impact on Climate Change, by supporting clean and renewable energy production and use, and working towards a carbon neutral future.</b>	
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<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
Incentives and penalties to improve renewable energy supply, energy efficiency and reduce climate change impacts.	H19) Investigate potential income from Carbon Trading to subsidise the mass-rollout of solar water heaters in low income households (Investigation should clarify mechanisms, and unpack ways in which different entities benefit).	
	H20) Investigate potential income from Carbon Trading to subsidise the mass retrofitting of ceilings in low income households (Investigation should clarify mechanisms, and unpack ways in which different entities benefit).	LA32)

<b>Goal 5</b>	<b>A city where sustainable energy costs and activities are a stimulating factor in local economic development.</b>	
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<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
Carbon Trading financially supports renewable energy, energy efficiency and climate change projects.	H21) Procurement for mass rollout of energy efficiency interventions such as solar water heaters should give preference to local manufacture and installation – as per council procurement policy.	LA28)

<b>Goal 6</b>	<b>A city where sustainable energy measures are supported by well-developed institutional capacity.</b>	
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<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
An established BCM Integrated Sustainable Energy and Climate Change Post to facilitate the development of an institutional framework.	H22) Integrated Sustainable Energy Post to facilitate development of policy and guidelines for incentives and penalties regarding household sustainable energy.	LA47)
An established Integrated Sustainable Energy planning and facilitation stakeholder forum to guide and promote long-term sustainable energy in BCM.	H23) Stakeholders in household sector to participate in sustainable energy forum.	LA49)

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### 11.3 Targets

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The following targets should be the focus of the household sector:-

9. 10% of all households to have solar water heaters by 2012, and 50% by 2015
10. All BCM-owned housing to have free CFLs by end 2009
11. 100% of all households to have CFLs by 2010
12. All new subsidised houses to have ceilings from 2010
13. All existing subsidised houses to have ceiling retrofits by 2015
14. Solar water heater by-law in force for new housing over a certain value (mid-  
hi-income target group) by end 2009
15. Planning permission for new housing over a certain value (mid- hi-income  
target group) to require consideration of energy efficiency in design and  
appliances
16. All informal unelectrified housing to have access to energy services through a  
delivery system linked to the Free Basic Alternative Energy grant.

The above targets support the national efficiency target of 10% saving in the residential sector by 2015.

## 12 SECTOR STRATEGY: LOCAL AUTHORITY

### 12.1 Key Local Authority Energy Issues



### 12.2 Objectives and Measures

Goal 1 A city that has sustainable and secure long-term energy supply.		
Objective	Measures	Linked Measure
Reliable energy infrastructure.	LA1) Ensure investment in, and maintenance of, local energy infrastructure.	
	LA2) Ensure preparation and implementation of Electricity Master Plan according to Eskom Integrated Resource Planning guidelines.	
	LA3) Explore all opportunities to ensure carbon trading and green funding/grants are invested into infrastructure improvements and maintenance (cross reference to institutional capacity).	LA32)
	LA4) Ensure continued investment/maintenance in municipal Infrastructure to reduce energy wastage.	
Reduced reliance on finite fuels, by reducing the intensity of use through energy efficiency.	LA5) Ensure rollout of second phase of BCM DSM process, including: <ul style="list-style-type: none"> <li>i) Retrofitting municipal buildings with energy efficiency measures (lighting, HVAC, electronic building management systems);</li> <li>ii) Continued installation of energy efficient lighting in street and traffic lights;</li> <li>iii) Ensure energy efficiency in the design and installation of new service infrastructure (water pumps, digesters, etc.); and</li> <li>iv) Continued roll-out of geyser shut-off switch programme in residential areas and/or installation of smart metering (cross reference to smart metering, housing sector).</li> </ul>	
	LA6) Implement energy waste reduction measures in service delivery (e.g. leak detection, non technical electricity loss, driver training).	
	LA7) Investigate appointment of Energy Services Company to facilitate implementation of energy saving measures.	

<b>Goal 1</b>		
<b>A city that has sustainable and secure long-term energy supply.</b>		
	LA8) Adopt Green Star SA rating system for all new municipal buildings.	
	LA9) Enforce sector specific energy reduction targets in accordance with Eskom 10% reduction mandate.	
	LA10) Undertake a study to identify where BCM has leverage in terms of existing policy, laws and by-laws in order to incentivise or enforce energy efficiency. Link to Institutional Capacity.	LA36)
Reduce reliance on finite fuels and outside energy imports by promoting local renewable energy generation.	LA11) BCM to facilitate potential renewable energy generation projects.	ES9)
	LA12) Investigate alternative fuels for fleet or plant.	T10)
	LA13) Undertake a study to identify the most prominent alternative/renewable energy opportunities for BCM (study should disaggregate between municipal and independent sources of alternative energy).	LA52)
An enabling framework for independent power production and purchase agreements.	LA14) Establish an approach to developing a framework for IPP and PPA.	LA47)

<b>Goal 2</b>		
<b>A city that uses and manages energy in an efficient way, so that resources are not wasted and so that energy costs may be reduced.</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
Energy efficiency in local government.	LA15) As for energy efficiency in Goal 1.	
	LA16) Generate Land use Policy that promotes Energy Efficiency and Mitigates Climate Change (E.G. Densification Framework).	LA40)

<b>Goal 3</b>		
<b>A city where residents have fair access to energy that is affordable, safe and appropriate.</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
Where appropriate, households have access to safe, affordable and sustainable energy sources	LA17) Clarify and develop appropriate BCM approach to Free Basic Alternative Energy for poor households as part of DME Free Basic Energy allocations (solar, lpg, gel-fuel). Measure should include a study on access to energy by poor households including flow of money).	
Increased energy awareness in terms of safety, use and efficiency.	LA18) Link with DME (Create Partnerships) to run awareness campaigns.	H15) H18)
Fair access to public transport that is efficient, safe and reliable.	LA19) Ensure support, continued development and implementation of the Integrated Transport Plan.	T4)

<b>Goal 4</b>		
<b>A city that takes responsibility for its obligations to reduce its impact on Climate Change, by supporting clean and renewable energy production and use, and taking advantage of carbon trading opportunities</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
Adherence to national policy and international agreements (e.g. Energy Bill, White paper on energy)	LA20) Ensure regular State of Energy Reporting and associated monitoring of targets in all sectors.	LA45)
	LA21) Define energy and LTMS policy obligations specific to line functions and define implementation plan.	

<b>Goal 4</b>		
<b>A city that takes responsibility for its obligations to reduce its impact on Climate Change, by supporting clean and renewable energy production and use, and taking advantage of carbon trading opportunities</b>		
efficiency, LTMS).	LA22) Set targets for the incorporation of renewable energy in the local energy mix as per obligations in terms of the White Paper on Renewable Energy and the DEAT Long Term Mitigation Scenario (Needs alignment with NERSA and Provincial Energy Forum/Summit).	LA11)
	LA23) Undertake a carbon footprint study at a macro-scale (including import/export flows) and suggest methods, strategies and projects to rationalise carbon impacts. Study should include carbon sequestration and/or carbon-offset opportunities and establish a framework pulling all opportunities together. Framework should align with LTMS.	
	LA24) Support of and coordination with, BCM Air Quality Management Plan in terms of emissions reductions.	
	LA25) Undertake a study to understand the impacts of climate change and develop mitigation strategies (with reference to provincial and national climate change strategies).	
Incentives and penalties to improve renewable energy supply, energy efficiency and reduce climate change impacts.	LA26) Reference to other sections on by-laws, incentives and penalties.	LA36) LA37)

<b>Goal 5</b>		
<b>A city where sustainable energy costs and activities are a stimulating factor in local economic development.</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
A developed industry exploiting manufacturing, income generating and job creation opportunities associated with energy efficiency and renewable energy.	LA27) Ensure involvement of Local Economic Development unit in Energy Planning and Energy Forum.	LA49)
	LA28) Procurement policy for energy related projects should consider job creation, skills development and SMME (green procurement).	
	LA29) Undertake integrated long-term energy planning to optimise fuel mix to reduce impact of changing energy costs.	LA22)
Carbon Trading financially supports renewable energy, energy efficiency and climate change projects.	LA30) Financially Ring fence Carbon Trading Projects to allow investment back into infrastructure.	LA38)
	LA31) Investigate "green" grant funding for green and sustainable energy projects.	
	LA32) Undertake studies to establish the value of, pragmatic approaches to, and mechanisms for, carbon funding. These should include investigation of a programmatic approach to CDM funding.	
	LA33) Ensure awareness rising within BCM regarding Carbon Trading opportunities.	LA41)
LA34) Carbon-trading opportunities should be actively engaged where opportunities exist.		
The mix of energy supply options is optimised to be least cost.	LA35) Suggested measure: Ensure that Integrated Resource Planning is undertaken to pursue least-cost mix of options, including energy efficiency	ES1)

<b>Goal 6</b>		
<b>A city where sustainable energy measures are supported by well-developed institutional capacity.</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
Sustainable energy measures receive adequate institutional support within BCM Local Authority.	LA36) Undertake a study to identify where BCM has leverage in terms of existing policy, laws and by-laws in order encourage or enforce sustainable energy measures.	
	LA37) Undertake a study to identify how BCM can offer incentives for sustainable energy initiatives.	
	LA38) Financially ring fence carbon trading Projects to allow investment back into infrastructure.	

Goal 6	A city where sustainable energy measures are supported by well-developed institutional capacity.	
	LA39) Line functions to report to Council with regards to sustainable energy initiatives.	
	LA40) Incorporate energy efficiency principles in land-use policy – e.g. Densification Frameworks in SDF process.	T16)
	LA41) Ensure capacity building and awareness amongst BCM staff with regards to sustainable energy.	
	LA42) Investigate the possibilities for a centralised sustainable energy centre as developed by NMMM (Nelson Mandela Sustainable Energy Efficiency Centre).	
An established BCM Integrated Sustainable Energy and Climate Change Post to facilitate the development of an institutional framework.	LA43) Establish an Integrated Sustainable Energy and Climate Change Post	
	LA44) Post to develop standardised energy reporting framework for line functions and council.	
	LA45) Post to ensure regular State of Energy reporting and monitoring of indicators.	
	LA46) Post to facilitate Integrated Resources Planning in terms of established guidelines.	
	LA47) Post to develop sustainable energy frameworks and guidelines where applicable (e.g. in terms of H6) and H11).	LA14) H6) H11) C12)
	LA48) Post to facilitate close interaction and coordination between relevant line-functions regarding sustainable energy issues.	
An established Integrated Sustainable Energy planning and facilitation stakeholder forum to guide and promote long-term sustainable energy in BCM.	LA49) Forum to facilitate participation in integrated energy planning by affected parties..	
	LA50) BCM to engage with partners in Europe (under International Relations Framework) specifically with regards to energy.	
	LA51) BCM to Engage with academic institutions regarding sustainable energy projects.	
	LA52) Pursue relationships with local and national energy role-players. Includes BCM participation in Provincial Energy Summit and/or forum.	

### 12.3 Targets

The following targets should be the focus for the Local Authority Sector:-

10. Sustainable Energy and Climate Change Post to be established by end 2009.
11. Sustainable Energy planning and facilitation stakeholder forum to be in place by end 2009.
12. All BCM buildings to have energy audits by end 2009
13. All BCM buildings to have efficient lighting retrofits by end 2009
14. All new BCM buildings to include energy efficiency in design and appliance aspects (in accordance with draft SANS codes and Green Star Rating system)
15. All traffic signals to be LEDs by 2010
16. All streetlights to be efficient (LED or Hi Pressure Sodium at least) by 2012
17. BCM procurement policy to include efficiency considerations by end 2009
18. Overall energy saving of 15% by 2015 from 2007 levels in BCM operations (buildings, streetlights, water pumping, sewage treatment) – in keeping with national targets.

## 13 SECTOR STRATEGY: COMMERCE AND INDUSTRY

### 13.1 Key Commerce and Industry Issues

- Electricity has traditionally been a cheap form of energy supplied to existing businesses and industry. As such businesses have well-established systems that are reliant on electricity. A change to other sources may be costly;
- In response to the electricity crisis and unreliable supply, many businesses have purchased generators which utilise petrol and diesel. While this reduces the load on the national grid, they are not considered efficient forms of energy and contribute to local air pollution impacts;
- Renewable power is currently more expensive in comparison to fossil fuel generated electricity;
- To date there has been little education or awareness drive to encourage businesses to consider more efficient forms of energy;
- There are no incentives to encourage the sector to consider more efficient forms of energy consumption in terms of production; and
- The legal implications of enforcing Electricity Demand Management in industry will have to be analysed.
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### 13.2 Objectives and Measures

<b>Goal 1 A city that has sustainable and secure long-term energy supply.</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
Reliable energy infrastructure.	CI1) Ensure energy infrastructure and supply meets sustained growth through Integrated Resource Planning.	LA46)
Reduced reliance on finite fuels, by reducing the intensity of use through energy efficiency.	CI2) Investigate conditions and incentives for commerce and industry to include energy efficiency in developments. For example: <ol style="list-style-type: none"> <li>By-laws;</li> <li>Rezoning conditions;</li> <li>Conditions to planning approvals;</li> <li>Conditions to electricity connections; and</li> <li>Incentives such as rebates on municipal rates or extra floor space in planning approvals.</li> </ol> Policy and Guidelines for applying the above conditions and incentives by authorities must be developed. Policy and Guidelines should differentiate between brownfield developments and greenfield developments. (Note: developments requiring connections over 100 KVA must demonstrate energy efficiency in building and process design: mandatory for Eskom, not yet mandatory under BCM).	LA36) LA37)
	CI3) Phase 2 demand-side management recommendations should adopted and rolled out in commercial building and industry (Includes non-essential load management such as HVAC and Pump Stations).	
	CI4) BCM to ensure adoption of SANS Energy Efficiency Standards (SANS 204)	
	CI5) Investigate incentives to encourage adoption of Green Star SA rating system in commercial and industrial buildings.	

<b>Goal 1</b>		
<b>A city that has sustainable and secure long-term energy supply.</b>		
	CI6) Promote energy efficiency in large buildings in the following ways: <ul style="list-style-type: none"> <li>i) Improved efficiency in Heating, Ventilation and Air Condition (HVAC) systems;</li> <li>ii) Improved building thermal design (applicable only to new buildings);</li> <li>iii) Improved use of natural light;</li> <li>iv) Fitting of energy efficient lighting;</li> <li>v) Computerised building HVAC and lighting management systems;</li> <li>vi) Installation of geothermal heating and cooling; and</li> <li>vii) Installation of solar water heaters for hot water requirements</li> </ul> EE may be facilitated by ESCOs.	
	CI7) Promote energy efficiency in industrial processes in the following ways: <ul style="list-style-type: none"> <li>i) Installation of energy efficient lighting;</li> <li>ii) Investigation of pre-heating of water feeding into boilers with solar water heaters or geothermal heating;</li> <li>iii) Thermal savings, especially savings in the efficiency of steam generation and delivery systems;</li> <li>iv) Compressed air savings, especially in the efficiency of generation and delivery;</li> <li>v) The installation of high efficiency and correctly sized electric motors;</li> <li>vi) The installation of variable speed drives; and</li> <li>vii) The transfer or utilisation of energy sunk into or radiated from industrial cooling systems.</li> </ul> EE may be facilitated by ESCOs	
	CI8) Promote Green Rating System in tourism enterprises via BCM tourism and BCM planning departure process.	
	CI9) BCM to facilitate energy efficiency promotion and training in industry through the Establishment of a Sustainable Energy Efficiency Centre (investigate NMMM model). (SEEC to promote Industrial Ecology and Sustainable Reporting as part of energy efficiency).	LA42)
	CI10) Explore the Installation of meters (internet based) for benchmarking and monitoring of EE targets within BCM industries.	
Reduce reliance on finite fuels and outside energy imports by promoting local renewable energy generation.	CI11) Explore fuel switching and/or co-generation where sensible (e.g. Natural gas co-generation).	
	CI12) Investigate and promote appropriate renewable power supply investment options for large business and industry, particularly in terms of energy offsets (e.g. wind farm at Berlin, bio-methane generation at IDZ).	ES13) CI17)

<b>Goal 2</b>		
<b>A city that uses and manages energy in an efficient way, so that resources are not wasted and so that energy costs may be reduced.</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
Energy efficiency in industry and commerce should be improved.	CI13) As per Goal 1: Energy Efficiency.	

<b>Goal 4</b>		
<b>A city that takes responsibility for its obligations to reduce its impact on Climate Change, by supporting clean and renewable energy production and use, and working towards a carbon neutral future.</b>		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
Adherence to national policy and international agreements (e.g. white paper on energy efficiency).	CI14) Ensure commerce and industry sector feeds into State of Energy Reporting and contributes to monitoring of carbon targets.	CI10)
	CI15) Based on LTMS and DME Targets, define sector specific obligations in terms of energy efficiency and renewable energy and provide guidelines to commerce and industry.	

Incentives and penalties to improve renewable energy supply, energy efficiency and reduce climate change impacts.	CI16) Promote renewable energy and energy efficiency as an element of green procurement and accreditation – e.g. Green Directory <sup>9</sup>	LA28)
	CI17) Explore and promote local sustainable energy and carbon offsets applicable to commerce and industry (for example where an industry cannot reduce its energy consumption, it may consider investing in renewable energy generation or energy efficiency projects elsewhere).	LA23)

<b>Goal 5</b> A city where sustainable energy costs and activities are a stimulating factor in local economic development.		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
A developed industry exploiting manufacturing, income generating and job creation opportunities associated with energy efficiency and renewable energy.	CI18) LED unit to facilitate/promote the local manufacture of energy infrastructure and components or technology (e.g. solar panels, solar water heaters, components, wind turbines).	LA27)
Carbon Trading financially supports renewable energy, energy efficiency and climate change projects.	CI19) Explore the feasibility of, and promote, bio-digesters, bio-methane sales and/or flaring and generation from sewage works, dairy farms, abattoirs and feedlots to reduce methane emissions (subsidised by Carbon Trading opportunities).	LA23)

<b>Goal 6</b> A city where sustainable energy measures are supported by well-developed institutional capacity.		
<b>Objective</b>	<b>Measures</b>	<b>Linked Measure</b>
Sustainable energy measures receive adequate institutional support within BCM Local Authority.	CI20) Industry participation in proposed stakeholder sustainable energy forum.	LA49)
	CI21) BCM to facilitate/support training of technical staff in terms of energy efficiency measures and interventions.	
An established BCM Integrated Sustainable Energy and Climate Change Post to facilitate the development of an institutional framework.	CI22) Post to facilitate strategic planning (e.g. development of an integrated energy resource plan) to ensure that energy supply meets requirements of industrial growth.	LA46)
	CI23) Establish a workable framework to support Independent Power Production and Power Purchase Agreements in BCM (for example reduce beaurocratic obstacles to IPP and PPA).	LA47)
An established Integrated Sustainable Energy planning and facilitation stakeholder forum to guide and promote long-term sustainable energy in BCM.	CI24) Forum to encourage annual sustainable energy reporting with the support of representative bodies such as BKCOB and IDZ, in terms of frameworks such as: <ul style="list-style-type: none"> <li>i) National Business Initiative Energy Accord;</li> <li>ii) JSE Socially Responsible Investment Index; and</li> <li>iii) ISO 14001.</li> </ul>	
	CI25) Promote BKCOB and Large Business participation in stakeholder forum.	

<sup>9</sup> Requires the meaning of “green” to be defined – perhaps tie into Institute of Waste Management directory.

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### 13.3 Targets

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The following targets should be the focus for the Industry and Commerce Sector:-

6. All industrial and commercial large users to have undertaken energy audits by end 2010.
7. All commercial facilities to have efficient lighting (e.g. CFLs) by end 2009.
8. All new buildings with demand over 100kVA to demonstrate energy efficiency measure application in building and processes by 2009.
9. All new buildings to demonstrate energy efficiency considerations by 2010, via adoption of SANS codes and/or GreenStar building rating system.
10. Overall energy reduction of 15% per unit of reduction in commercial and industrial sectors by 2015 (in keeping with national target).

## 14 IMPLEMENTATION APPROACHES

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The targets set out in the Sustainable Energy Strategy have been defined primarily to provide points of focus around which BCM departments can cooperate for the implementation of the goals and measures to achieve the Sustainable Energy vision.

The targets provide a tangible way of “measuring” the implementation of the strategy, while at the same time allowing for the apportioning responsibility for tasks associated with that target.

The following section sets out a way-forward or an approach for achieving selected targets defined in the strategy. It should be emphasised that these are approaches for selected targets which might represent the first steps in working towards the Sustainable Energy Vision for BCM.

The Implementation Plans are neither prescriptive nor rigid, but rather provide an example of how Departments can come together to achieve an energy target.

It is important to note that although many of the Goals, Measures and Targets are not mentioned in the Implementation Approaches described below, they remain equally important. An important starting point is that **relevant Departments should select priority measures and targets and motivate for budgets for achieving these. It is also important to ensure that relevant targets and or measures are added to the IDP Objectives of each Department.**

## 14.1 Implementation Approach: Supply

<b>TARGET:</b> 10% of total supply of energy to be renewable energy by 2015
<b>Definition:</b> The BCM Energy Balance for 2015 should show that 10% of the energy mix is from renewable sources.
<b>Current figures &amp; projections:</b> <i>Renewable energy supply to MBSA in 2007 was 617 714 Kwh</i>

<b>IMPLEMENTATION APPROACH</b>			
	<b>Department(s) Responsible</b>	<b>Target date</b>	
ES17) Develop a protocol for a "green energy" tariff within BCM – to be developed in line with NERSA renewable energy Feed-in Tariff Study.	BCM Electricity	2010	
ES18) Research and develop a protocol for municipal rates relief for renewable energy production projects	BCM Planning and BCM Electricity	2010	
ES21) Ensure that all Carbon Trading opportunities are exploited in renewable energy generation projects.	BCM IEMP and Sustainable Energy and Climate Change Post	From 2008	
ES23) Sustainable Energy Unit/Post to ensure reduced beurocratic and technical obstacles to small-scale independent power production.	BCM Electricity and BCM IEMP and Change Post	From 2009	
ES24) Sustainable Energy Unit to facilitate an enabling institutional framework for power purchase agreements between the municipality and IPPs.	BCM Electricity and BCM IEMP and Sustainable Energy and Climate Change Post	From 2009	
<b>Monitoring:</b>	<b>Department(s) Responsible</b>	<b>Target date</b>	
Renewable energy data record to be developed. Renewable Electricity Statistics to be specifically recorded. Renewable energy supply to be reported in regular State of Energy Reporting.	BCM IEMP and Sustainable Energy and Climate Change Post to record general renewable energy data. BCM electricity to specifically record renewable electricity sources.	From 2009	

## 14.2 Implementation Approach: Transport

<b>TARGET: 1.</b> 10% modal shift from private vehicles to public transport (rail and/or bus) by 2011.			
<b>Definition:</b> 10% decrease in modal share of private vehicles by 2011, and bus transport modal share increased correspondingly.			
<b>Current figures and projections:</b> Modal split for transport from ITP:			
<b>Private Vehicles</b>	<b>Public Transport</b>		
38%	62%		
	<b>Rail</b>		
	9%		
	<b>Minibus taxi</b>		
	83%		
	<b>Bus</b>		
	8%		
Number of private vehicles registered in BCM in 2004: 191 355.			
<b>IMPLEMENTATION APPROACH</b>			
Improved rail service that will form the most important component of the "trunk" public transport network.	Department of Transport	Target date	2015
Implementation of the Bus Rapid Transport (BRT) system as a public transport alternative.	BCM Transportation Planning	Target date	2011-2020
Investment into cycle paths and pedestrian facilities.	BCM Transportation Planning	Target date	2010
<b>Monitoring:</b>		<b>Department(s) Responsible</b>	<b>Target date</b>
The City's Transportation Planning Department will annually report transport modal split and progress with reaching target, via the Transportation Modelling.	BCM Transportation Planning	Target date	2010

<b>TARGET: 12 Efficiency criteria in municipal fleet procurement process by end 2009.</b>			
<b>Definition:</b> In terms of the procurement process a preference rating should be allocated to prospective service providers that demonstrate energy efficiency for the supply of vehicles and plant to BCM.			
<b>Current figures and projections:</b> No current procurement incentives towards energy efficiency. In 2007 the municipal fleet consumed 870 859 litres of petrol and 1 164 874 litres of diesel.			
<b>IMPLEMENTATION APPROACH</b>			
Develop points scoring system, which provides a preference incentive for energy efficiency.	Department(s) Responsible	BCM Procurement Department Sustainable Energy and Climate Change Post	Target date 2010
Implementation of revised procurement system.	Department(s) Responsible	BCM Procurement Department	2011
<b>Monitoring:</b> Annual quantities of petrol and diesel utilized.	Department(s) Responsible	BCM Stores/ Finance	Target date 2009 (yearly)

### 14.3 Implementation Approach: Household

TARGET: 10% of all households to have solar water heaters by 2012, and 50% by 2015																			
<p><b>Definition:</b> Of the total number of formal households in 2012, 10% will have solar water heaters. 50% of all households to have solar water heaters by 2015.</p> <p><b>Current figures &amp; projections:</b></p> <table border="1"> <thead> <tr> <th>Year</th> <th>Number of households</th> <th>% SWH</th> <th>Households with SWH</th> </tr> </thead> <tbody> <tr> <td>2007</td> <td>208388</td> <td></td> <td></td> </tr> <tr> <td>2012</td> <td>214456</td> <td>10%</td> <td>21446</td> </tr> <tr> <td>2015</td> <td>224568</td> <td>50%</td> <td>112284</td> </tr> </tbody> </table>				Year	Number of households	% SWH	Households with SWH	2007	208388			2012	214456	10%	21446	2015	224568	50%	112284
Year	Number of households	% SWH	Households with SWH																
2007	208388																		
2012	214456	10%	21446																
2015	224568	50%	112284																
IMPLEMENTATION APPROACH																			
Implement and promote a sustainable energy household pilot project.																			
H21), H3): Commission Report: Financing and pragmatic options for mass rollout of SWH in low-income households ( Grants, Eskom Subsidy, CDM and Fee for service through ESCOs)																			
H7) BCM to develop Policy and Guidelines for applying conditions and incentives for SWH installations including:																			
i) By-laws;																			
ii) Rezoning conditions;																			
iii) Conditions to planning approvals;																			
iv) Conditions to municipal service connections; and																			
v) Incentives such as rebates on municipal rates or relaxation of restrictions.																			
Policy and Guidelines should differentiate between retrofitting properties and greenfield developments.																			
H11) Capacitate BCM building approval department (architecture) to ensure energy efficiency design measures are taken into account for new structures.																			
H24) Synthesize options, incentives and subsidies available for sustainable energy measures in households. Ensure marketing and awareness of the above.																			
Monitoring:																			
Above deliverables to be monitored.																			
Total number of installed SWH to be reported in regular State of Energy reporting (data from supplier																			
Department(s) Responsible	Target date	Department(s) Responsible	Target date																
IEMP	2009	IEMP	2009																
IEMP BCM Housing	2009	IEMP BCM Housing	2009																
BCM Planning BCM Electricity BCM Architecture	2009	BCM Planning BCM Electricity BCM Architecture	2009																
BCM Architecture	2009	BCM Architecture	2009																
IEMP	2009	IEMP	2009																
Department(s) Responsible	Target date	Department(s) Responsible	Target date																
Sustainable Energy and Climate Change	From 2012	Sustainable Energy and Climate Change	From 2012																

surveys and BCM approvals).	Post..
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<b>TARGET: All new subsidized houses to have ceilings from 2010</b>			
<b>Definition: All new subsidized houses being constructed from 2010 onwards are to have ceilings.</b>			
<b>Current figures &amp; projections:</b> Housing backlog as from 2004: 75 000 units.			
<b>TARGET: All existing subsidised houses to have ceiling retrofits by 2015</b>			
<b>Definition: All existing subsidized houses to be retrofitted with ceilings by 2015.</b>			
<b>Current figures &amp; projections:</b> Number of subsidized houses requiring ceilings to be determined.			
<b>IMPLEMENTATION APPROACH</b>			
New subsidized houses to receive ceilings as per Coastal Condensation Fund.			
Survey of low-income households requiring ceilings to be undertaken.			
H3) Investigate financing and pragmatic options for mass rollout of retrofitted ceilings in low-income households (e.g. Grants, Eskom Subsidy, CDM and Fee for service through ESCOs).			
<b>Monitoring:</b>			
Number of new subsidized houses with ceilings, and number of retrofitted ceilings to be recorded in regular State of Energy reporting).			<b>Target date</b> From 2010
<b>Department(s) Responsible</b> IEMP Sustainable Energy and Climate Change Post.			<b>Target date</b> From 2010

<b>TARGET: 100% of all households to have CFLs by 2010</b>			
<b>Definition: All households to have at least 60% of inside lights being CFLs or other fluorescents.</b>			
<b>Current figures &amp; projections:</b>			
Number of households in 2010:		214456	
<b>IMPLEMENTATION APPROACH</b>			
H5 and H9)	BCM Support of mass switching of light bulbs to CFLs as planned by Eskom	<b>Department(s) Responsible</b>	<b>Target date</b>
H7)	Policy and Guidelines for applying energy efficiency conditions and incentives by authorities must incorporate conditions for CFLs	BCM Electricity BCM Planning	Current 2010
<b>Monitoring:</b>			
CFL use status to be reported in State of Energy Report. CFL use stats may be determined by mini-survey.		<b>Department(s) Responsible</b>	<b>Target date</b>
		IE/MP Sustainable Energy and Climate Change Post.	From 2010

#### 14.4 Implementation Approach: Local Authority

<b>TARGET: Sustainable Energy and Climate Change Position to be established by mid 2009.</b>			
<b>Definition: A Sustainable Energy and Climate Change Post should be in place specifically to support the implementation of the Energy Policy and Strategy, but also to facilitate, coordinate and promote Sustainable Energy and Climate Change Initiatives in general.</b>			
<b>IMPLEMENTATION APPROACH</b>			
Interim Task Team to be established to implement strategy.	Department(s) Responsible	IEMP	Target date
Function and Terms of Reference for the Post to be developed, agreed upon and adopted by council.		IEMP	2009
Appropriate posts to be created.			
	Department(s) Responsible	IEMP	Target date
Establishment of Post and posts filled.			2009

<b>TARGET: All BCM owned buildings to have Energy Efficiency Retrofits by end 2010</b>			
<b>Definition: BCM to undertake Energy Audits and implement Energy Efficient Retrofits in BCM Owned Buildings.</b>			
<i>Current figures &amp; projections: Number of BCM Buildings:</i>			
<b>IMPLEMENTATION APPROACH</b>			
Undertake an energy audit in all BCM owned buildings, and generate a technical and financial plan for retrofitting the buildings with Energy Efficient measures.	Department(s) Responsible	BCM IEMP, BCM Buildings.	Target date
Implement energy efficient retrofit plan.		BCM Buildings	2010
Building maintenance to ensure light bulb replacements are CFL where appropriate as part of building maintenance.		BCM Buildings	From 2009
LA3) Explore all opportunities to ensure carbon trading and green funding/grants are invested into infrastructure improvements and maintenance (cross reference to institutional		BCM IEMP	2009

capacity).			
LA7) Investigate appointment of Energy Services Company to facilitate implementation of energy saving measures.	BCM Buildings, BCM Electricity.	2009	
LA41) Ensure capacity building and awareness amongst BCM staff with regards to sustainable energy.	BCM IEMP	From 2009	
<b>Monitoring:</b>	<b>Department(s) Responsible</b>	<b>Target date</b>	
Post retrofit energy audit. Energy savings to be reported in State of Energy Report.	A Sustainable Energy and Climate Change Post.	From 2009	

## 14.5 Implementation Approach: Commerce and Industry

<b>TARGET:</b> All new buildings with electricity applications over 100kVA to demonstrate energy efficiency measure application in building and processes by 2009.			
<b>Definition:</b> All new commercial and industrial buildings within the urban edge of Buffalo City to demonstrate energy efficiency measures in design as part of the approval process. This is mandatory for all new ESKOM connections > 100kVA.			
<b>Current figures and projections:</b> 4 134 740 GJ were used by the Commerce and Industry Sector in BCM in 2007 (approximately 1/3 of all energy).			
<b>IMPLEMENTATION APPROACH</b>			
Develop policy guidelines outlining potential energy efficiency implementation measures for buildings for developers in line with ESKOM's policy.	Department(s) Responsible BCM Planning BCM Electricity Department IEMP Sustainable Energy and Climate Change Post.	Target date 2010	
Develop a protocol for the review of energy efficiency measures within electricity applications.		2010	
Training and capacity development of BCM review staff.		2011	
Investigate an incentive system to encourage a green star rating system in commercial and industrial buildings.	Sustainable Energy and Climate Change Post.	2011	
<b>Monitoring:</b>	<b>Department(s) Responsible</b>	<b>Target date</b>	
Policy guidelines as above.	Sustainable Energy and Climate Change Post	From 2010	

## **15 DEPARTMENTS RESPONSIBLE FOR IMPLEMENTATION OF MEASURES**

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This chapter recommends Departmental responsibility and/or leadership with regards to the implementation of the sector specific measures detailed in Chapter 7. Table 2 describes general departmental responsibilities within BCM. Table 3 recommends leadership and support roles among BCM Departments with respect to the measures. It should be noted in Table 3 that similar measures have been grouped to form one measure as indicated in the column: Associated/Subsidiary Measures.

**Table 2: Description of Departmental Functions in BCM.**

Directorate/Division/ Department or Branch	Function within BCM	Relevance to the Sustainable Energy Strategy	Relevant Sector Plan
<b>TIEMP Unit</b>	<p>Functions Include:</p> <ul style="list-style-type: none"> <li>• Develop Environmental Policies and Strategic Plans;</li> <li>• Promote legal compliance and best practice guidance;</li> <li>• Promote sustainable development initiatives;</li> <li>• Coordinate Environmental Programme;</li> <li>• Facilitate Environmental Reporting; and</li> <li>• Promote Environmental Education and Awareness.</li> </ul>	<p>Should Champion sustainable energy utilisation and climate change mitigation within the municipality. Guidance to municipal departments in regard to Sustainable Energy and Climate Change policy and legislative compliance.</p>	<p>Integrated Environmental Management Plan.</p>
<b>Environmental Services</b>	<p>Responsible for, among others, Air Quality Monitoring and Pollution Control.</p>	<p>Environmental Health Services facilitate vehicle and industrial emissions monitoring and control. Data repository for emissions data and energy consumption data in terms of directly fired fossil fuels (Coal, Diesel, HFO, LPG etc).</p>	<p>National Air Quality Management Framework.</p>
<b>Waste Management Services</b>	<p>The management of</p> <ul style="list-style-type: none"> <li>• Refuse removal;</li> <li>• Street sweeping;</li> <li>• Public conveniences; and</li> <li>• Waste disposal sites.</li> </ul>	<p>The Waste Management Department is mandated to improve the efficiency of waste generation, minimisation, collection and disposal in terms of the National Environmental Management: Waste Management Bill. This has implications in terms of improved energy expenditure around solid waste management. Waste management would also participate projects associated with biomethane recovery from landfill, or avoidance of biomethane emissions from landfill.</p>	<p>Integrated Waste Management Plan.</p>
<b>City Planning</b>	<p>To manage growth and change in the entire Buffalo City Municipal area; facilitate the preparation of development strategies and policies; manage the use of land and manage the shape of the built environment.</p>	<p>City Planning plays a pivotal role in the design of an energy efficient urban landscape, particularly through Spatial Development Frameworks. City Planning also has an impact on energy in terms of the development of land-use policy. Promotion of sustainable energy in planning approval process.</p>	<p>Spatial Framework Development</p>
<b>Architecture</b>	<p>The Architectural Department consists of four branches:</p> <ul style="list-style-type: none"> <li>• The Building Control Branch deals with the submission and approval of building plans and site inspections of all building work in the city;</li> <li>• The Commercial Advertising Signage Control Branch deals with the submission and approval of advertising signage, the identification of and removal of illegal advertising signage, and applications to lease sites for signage display;</li> <li>• The Architectural Services Branch deals with the design and erection of municipal buildings; and</li> <li>• The Building Maintenance Branch deals with the maintenance of municipal buildings.</li> </ul>	<p>The architecture department can play an important role in influencing energy efficient building and process design and operation through developing and implementing appropriate approval criteria, incentives and penalties. Architectural Services and Building Maintenance play an important role in the energy efficient design, construction and operation of energy efficient buildings. Promotion of sustainable energy in planning approval process.</p>	
<b>Housing</b>	<p>To create sustainable human settlements so that all residents have access to housing</p>	<p>BCM Housing can play an important role in facilitating</p>	

Directorate/Division/ Department or Branch	Function within BCM	Relevance to the Sustainable Energy Strategy	Relevant Sector Plan
Local Development	opportunities, which include rental accommodation or permanent residential structures. Secure tenure ensures external privacy, protection against the elements and access to potable water, adequate sanitary facilities and domestic energy supply.	sustainable energy interventions in low cost housing, including the mass role-out of ceiling retrofits and appropriate solar water heaters.	Local Economic Development Strategy.
Economic	Facilitation and participation in local energy related development projects. Facilitate the participation of SMMEs in sustainable energy generation and manufacturing enterprises.	Facilitation and participation in local energy related development projects. Facilitate the participation of SMMEs in sustainable energy generation and manufacturing enterprises.	Local Economic Development Strategy.
Transportation Planning	<ul style="list-style-type: none"> <li>• Compilation, design, implementation and monitoring of an integrated transport plan.</li> <li>• Compilation, design, implementation and monitoring of roads infrastructure master plan.</li> <li>• Compilation, design, implementation and monitoring of a transportation policy.</li> <li>• Compilation of the annual Buffalo City Municipality Integrated transport Plan.</li> <li>• Public transport facilities and transport infrastructure planning.</li> <li>• Facilitating public participation including a Transport Forum.</li> </ul>	Transport Planning would play an important role in promoting a modal shift from private to public passenger vehicles through appropriate integrated transport planning and the implementation of the Bus Rapid Transit system.	Public Transport Plan and Integrated Transport Plan.
Electricity	Responsible for providing electricity supplies, streetlighting and associated services to BCM within the urban edge.	Responsible for implementation of phase one and two of the BCM Electricity Demand-Side Management plan, as well as facilitating the implementation of the Eskom Energy Conservation Scheme. Plays an important role in IPP Power Purchase Agreements, Wheeling Agreements, and IPP Electricity Grid Feed-in.	Electricity Master Plan.
Water and Scientific Services	<ul style="list-style-type: none"> <li>• The management and control of water, wastewater operations and services.</li> <li>• The purification and treatment of potable and wastewater.</li> <li>• The acquisition, storage and distribution of water and the collection of wastewater.</li> <li>• The administration and financial control of water, wastewater and scientific services.</li> <li>• The governance of water regulations, planning and tariff setting for the region.</li> <li>• The provision of laboratory and scientific services.</li> <li>• The control of industrial effluent.</li> <li>• The planning and construction of minor works.</li> </ul>	Can play an important role in improving water utilisation efficiency through leak detection. Can play an important role in improving the energy efficiency of pumping, treatment of potable water, and treatment of waste-water through the introduction of energy efficient technology. Introduction of sewage bio-digestion could result in biomethane energy production while reducing greenhouse gas emissions.	Water and Sanitation Master Plans.
Financial Services	Responsible for efficient and effective financial management of the city. Departments include: <ul style="list-style-type: none"> <li>• Asset and Risk Management;</li> <li>• Budget and Treasury; and</li> <li>• Revenue Management.</li> </ul>	Municipal Finance Management Act guidance in terms of renewable energy tariff feed-in, carbon trading revenues. Guidance in terms of energy efficiency incentives built into rates and tariff policy and application.	
Legal Services.	Function: <ul style="list-style-type: none"> <li>• To provide legal support to Council, management and staff in the discharge of their responsibilities generally;</li> <li>• To assist in the provision of legal advice and in the formulation of by-laws, policies and procedures to ensure that the municipality complies with all relevant</li> </ul>	Can facilitate the generation of by-laws that promote energy efficiency and/or renewable energy generation. Can provide guidance in terms of renewable energy, energy efficiency and carbon trading public-private partnerships.	

Directorate/Division/ Department or Branch	Function within BCM	Relevance to the Sustainable Energy Strategy	Relevant Sector Plan
	<p>legislation as well as its constitutional mandate;</p> <ul style="list-style-type: none"> <li>• To provide a vibrant, effective and professional legal service to the Buffalo City Municipality;</li> <li>• To co-operate with other spheres of government in developing sound working relations and minimise areas of dispute or potential dispute in the legal context; and</li> <li>• Enhancing organisational efficiency by establishing a corporate governance compliant environment that enables the municipality to achieve its objectives.</li> </ul>		

**Table 3: Recommended Departmental Responsibilities with Respect to Sector Plans and Measures Detailed in the Strategy.**

Directorate		Health and Safety	Public	Development Planning and LED	Engineering Services	Financial Services					
Department/Branch/Division				Development Planning	Transport Planning & Operations						
	Associated/Subsidiary Measures	IEEMP Unit (Sustainable Energy and Climate Change Post Air Quality and Pollution Control	Waste Management Services	City Planning	Architecture	Housing	Local Economic Development	Transport Planning	Electricity	Water and Scientific Services	Legal Services
<b>Energy Supply</b>											
ES2)	Explore the feasibility of natural gas supply to BCM (In line with Eskom 25 year gas plan)[1]								Lead		
ES3)	Conduct an audit of electricity infrastructure and maintenance requirements.								Lead		
ES5)	Investigate, clarify and facilitate the technical and infrastructure requirements of IPP in terms grid feed-in (with particular emphasis on interfacing technology). Link with initiatives by national government in this regard.										
ES6)	Ensure adequate total supply chain infrastructure for liquid fuels (including requirements for biofuels should IDZ biofuels cluster become established).										
ES7)	Identify and implement a renewable energy generation pilot project.	Lead							Lead		
ES9)	Facilitate the implementation of grid-connected renewable energy generation.	LA11							Lead		
ES10)	Investigate the feasibility of, local biofuels and biogas production and use, in coordination with IDZ biofuels industry intentions.						Lead				
ES11)	Where feasible, encourage the development of a bio-fuels industry in BCM.						Lead				
ES12)	Where feasible, facilitate the gradual replacement of sewage treatment facilities with independently operated bio-digestion and methane production facilities.								Lead		
ES15)	Clarify and develop appropriate BCM approach to Free Basic Alternative Energy for poor households as part of DME Free Basic Energy allocations (solar, LPG, gel-fuel).										
ES16)	Define sector specific policy obligations in terms of renewable energy and energy efficiency.	Lead									
ES17)	Research and develop a protocol for a "green energy" tariff within BCM									Lead	Sprt
ES18)	Research and develop a protocol for municipal rates relief for renewable energy production projects.	Lead								Lead	Lead
ES19)	Assess and support local manufacturing and installation opportunities related to renewable energy plant and generation. Ensure support from local economic development agencies in this regard.						Lead				
ES20)	Local economic development agencies to investigate import substitution regarding energy imports and energy technology.						Lead				
<b>Transport</b>											
T1)	Implement measures to increase private vehicle occupancy by: a) Identifying and implementing dedicated High Occupancy Vehicle (HOV) lanes with monitoring and enforcement through appropriate mechanisms; b) Awareness-raising programmes (ridesharing website including information on benefits); c) Encouraging and supporting lift clubs where possible; d) Institute car schemes to encourage efficiency – within local government as well as promotion in private companies (working with employers to encourage their employees use carpooling and other alternative modes of travel); and e) Lobby national government regarding car scheme/allowances to promote efficiency such as tax incentives.							Lead			
T2)	Investigate measures required to support the purchase and use of fuel-efficient vehicles.	Lead						Lead			
T3)	Implement measures to increase the utilisation of public transport	T28						Lead			
T4)	Continued development and implementation of the City Integrated Transport Plan.	LA19						Lead			
T5)	Support the implementation of the Bus Rapid Transit System.	Lead						Lead			
T6)	Continued attempts to incorporate passenger rail as the key component of the passenger transport network. Rail system should be reliable, efficient, safe, affordable in order to attract customer base							Lead			
T7)	Explore and establish an optimal form of an institutionalised Integrated Transport Authority to ensure coordination between rail, provincial and local transport authorities.							Lead			
T8)	Establish institutional support of national efforts to shift freight from road to rail.										
T9)	Review infrastructure needs based on changes in transport modal splits,							Lead			
T10)	Investigate measures required to support local biogas consumption (i.e. support the creation of local biogas market).	Lead									
T11)	Ensure energy efficiency criteria are considered in BCM fleet procurement protocol.										
T12)	Encourage public transport contracting to include fuel efficiency and emissions reductions in procurement process.										
T14)	Investigate feasibility of daylight savings and flexible working hours in terms of efficient energy consumption	Lead									
T15)	Implement a community awareness campaign regarding fuel and transport efficiency	Lead						Lead			
T16)	Spatial development planning should continue to incorporate transport efficiency in city design in terms of the following: i) reduced traffic congestion; ii) reduced distances from residential areas to the work place; iii) development around public transport nodes; and iv) adoption of densification principles; etc. v) non motorised transport vi) Efficient and equitable access to public transport vii) public transport facilities to be energy efficient				Lead						



LA37) Line functions to report to Council with regards to sustainable energy initiatives.		Lead												
LA38) Incorporate energy efficiency principles in land-use policy – EG Densification Frameworks in SDF process.	LA16				Lead									
LA39) Ensure capacity building and awareness amongst BCM staff with regards to sustainable energy.		Lead												
LA40) Investigate the possibilities for a centralised sustainable energy centre as developed by NMMM (Nelson Mandela Sustainable Energy Efficiency Centre).		Lead												
LA41) Establish an Integrated Sustainable Energy and Climate Change Post		Lead												
LA42) Post to develop standardised energy reporting framework for line functions and council.		Lead												
LA43) Post to ensure regular State of Energy reporting and monitoring of indicators.	T23, LA20, C114, C124	Lead	Sprt											
LA44) Post to facilitate Integrated Resources Planning in terms of established guidelines	E1, E22, LA29, LA35, C11, C22	Lead												
LA45) Post to develop sustainable energy frameworks and guidelines where applicable (e.g. in terms of H7) and H12).		Lead												
LA46) Post to facilitate close interaction and coordination between relevant line-functions regarding sustainable energy issues.	T30, H20, LA21	Lead												
LA47) Forum to facilitate participation in integrated energy planning by affected parties. Cross cutting.	E25, H26, C120, C125													
LA48) BCM to engage with partners in Europe (under International Relations Framework) specifically with regards to energy.		Lead												
LA49) BCM to Engage with academic institutions regarding sustainable energy projects.		Lead												
LA50) Pursue relationships with local and national energy role-players. Includes BCM participation in Provincial Energy Summit and/or Forum.		Lead									Lead			
<b>Commerce and Industry</b>														
C14) BCM to ensure adoption of SANS Energy Efficiency Standards (SANS 204)		Lead			Lead									
C15) Investigate incentives to encourage adoption of Green Star SA rating system in commercial and industrial buildings.					Lead									
C18) Promote Green Rating System in tourism enterprises via BCM tourism and BCM planning departure process.					Lead			Lead						
C19) BCM to facilitate energy efficiency promotion and training in industry through the Establishment of a Sustainable Energy Efficiency Centre (investigate NMMM model). (SEEC to promote Industrial Ecology and Sustainable Reporting as part of energy efficiency).		Lead												
C112) Investigate and promote appropriate renewable power supply investment options for large business and industry, particularly in terms of energy offsets (e.g. wind farm at Berlin, bio-methane generation at IDZ).	ES13	Lead									Lead			
C115) Based on LTMS and DME Targets, define sector specific obligations in terms of energy efficiency and renewable energy and provide guidelines to commerce and industry.		Lead												
C116) Promote renewable energy and energy efficiency as an element of green procurement and accreditation – e.g. Green Directory														
C117) Explore and promote local sustainable energy and carbon offsets applicable to commerce and industry (for example where an industry cannot reduce its energy consumption, it may consider investing in renewable energy generation or energy efficiency projects)		Lead												
C118) LED unit to facilitate/promote the local manufacture of energy infrastructure and components or technology (e.g. solar panels, solar water heaters, components, wind turbines).								Lead						
C119) Explore the feasibility of, and promote, bio-digesters, bio-methane sales and/or flaring and generation from sewage works, dairy farms, abattoirs and feedlots to reduce methane emissions (subsidised by Carbon Trading opportunities).		Lead												
C121) BCM to facilitate/support training of technical staff in terms of energy efficiency measures and interventions.		Lead									Lead			
C123) Establish a workable framework to support Independent Power Production and Power Purchase Agreements in BCM (for example reduce beaurocratic obstacles to IPP and PPA).		Lead									Lead			

## 16 SUSTAINABLE ENERGY AND CLIMATE CHANGE MITIGATION POST

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Sustainable energy and climate change are cross-cutting issues which require the participation and cooperation of a diversity of line-functions in BCM. Furthermore, renewable energy and energy efficiency are new concepts and BCM does not yet have a highly developed institutional capacity or framework to promote or facilitate the objectives and measures outlined in this Strategy. Therefore, critical to the successful outcomes of the goals and measures contemplated in this document, and to the effective coordination between departments in regard to Sustainable Energy and Climate Change, is the establishment of a Sustainable Energy and Climate Change post within BCM.

It is foreseeable, given the importance of sustainable energy and climate change mitigation in the future development of this country, that the Sustainable Energy and Climate Change Mitigation Post may evolve to become a unit in itself. However, until such time, it is recommended that the position fall within the BCM Integrated Environmental Management Planning Unit, which is well suited to accommodating a post of such a nature.

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### 16.1 Imperatives for the Post

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In addition to the requirement for a post in the *measures* of this strategy, the Sustainable Energy and Climate Change Mitigation Imperatives detailed in Section 1.1.3 and in the State of Energy Report provide an overwhelming case for the establishment of a Sustainable Energy and Climate Change Post. However, perhaps the strongest imperative for the establishment of the Post, is the implications of the Climate Change Mitigation Vision and mandate adopted by Cabinet in July 2008 (see text box in section 1.1.3). For example the vision requires that:

- Greenhouse Gas emissions must peak, plateau and decline. This means it must stop growing at the latest by 2020-2025, stabilise for up to ten years and then decline in absolute terms;
- Measurable, reportable and verifiable domestic emission reduction and limitation outcomes must be implemented;
- The Start Now strategic option as outlined in the LTMS will be further implemented. This is based, amongst others, on accelerated energy efficiency and conservation across all sectors, including industry, commerce, transport and residential, inter alia through more stringent building standards; and
- Ambitious and mandatory (as distinct from voluntary) targets for energy efficiency and in other sub-national sectors must be set. Each sector will be required to do work to enable it to decide on actions and targets in relation to this overall framework.

In order to ensure that BCM keeps abreast of, and complies with the policy and legislation that will be developed as an outcome of the vision and policy framework, it is vital that a Sustainable Energy and Climate Change Mitigation Post be filled as soon as possible.

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## 16.2 Aims of the Post

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The aim of the post would be

- To develop, implement and control a Climate Change and Sustainable Energy Programme for BCM, drawing from the recommendations of this strategy;
- To facilitate compliance with sustainable energy and climate change mitigation policy and legislation within BCM, and to ensure that BCM keeps abreast of developments in climate change and sustainable energy policy and legislation;
- To facilitate a continued focus on Sustainable Energy and Climate Change priorities within BCM;
- To take the lead in pursuing sustainable energy and climate change goals that are cross-cutting or overarching and/or not specific to any particular line-function;
- To coordinate between line-functions and sectors where certain goals, measures and targets require the participation and cooperation of more than one line-function; and
- Where necessary, to support line-functions in achieving relevant sustainable energy and climate change measures and targets.

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## 16.3 Specific Responsibilities of the Post

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In addition to taking the lead in pursuing sustainable energy in BCM in general, the post must execute the following specific functions:

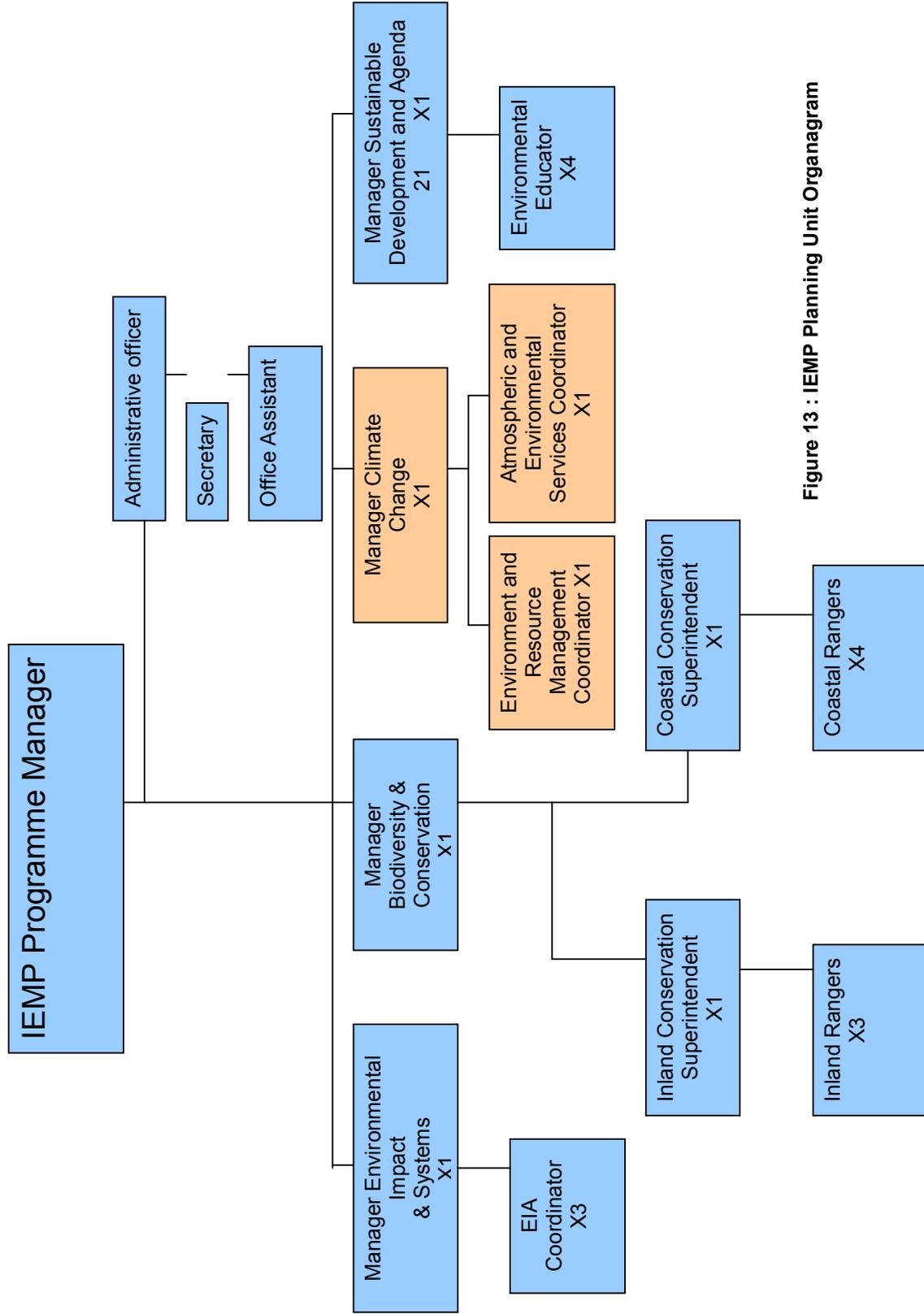
- Attend BCM management meetings and assist departments in setting short and long-term sustainable energy and climate change goals;
- Explain, interpret and justify sustainable energy and climate change policies to Council, Heads of Department/other Directorates and the private sector;
- Develop a standardised energy reporting framework for line functions and council, and ensure the collation of energy related data in a single repository;
- Facilitate the establishment and regular monitoring of energy and climate change indicators;
- Coordinate and manage regular State of Energy reporting;
- Promote and facilitate integrated resources planning within BCM in terms of established national guidelines;
- Develop sustainable energy and climate change institutional frameworks and guidelines where applicable;
- Facilitate the establishment of a sustainable energy and climate change task team, made up of relevant representatives of BCM line functions, which will meet on a regular basis to ensure that the goals and measures set out in this strategy are being pursued;
- Plan, organise and control climate change and sustainable energy programmes and projects, including the generation of reports. This includes responsibility for the execution of certain measures as defined in Section 0 to 13 of this strategy; and
- Assist where necessary in ensuring that BCM complies with the Eskom Power Conservation Programme.

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## 16.4 Seating of the Post

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It is recommended that the post be seated within the Integrated Environmental Management Planning Unit, and occupy the position designated: **Manager: Climate Change**. The post will be directly answerable to the IEMP Programme Manager. The post will be situated within the IEMP structure according to the diagram as illustrated in Figure 13.



**Figure 13 : IEMP Planning Unit Organogram**

## 17 CONCLUSION & RECOMMENDATIONS

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This report documents a Strategy and Policy for sustainable energy and associated climate change mitigation for the BCM. Implementation of the strategy will require substantial effort, initial capital outlay as well as institutional restructuring.

However implementation of the strategy will have the following benefits for BCM:

- BCM will be at the forefront of local government in terms of ensuring a sustainable city is planned for;
- Long-term financial savings can be met with energy efficiency in terms of municipal operations;
- Investment in energy related concerns can be a stimulus for local economic growth and job creation;
- BCM will be able to meet ESKOM's 10% load reduction mandate, thereby negating the need for load shedding;
- BCM can make a valuable contribution towards climate change mitigation; and
- BCM can comply with national policy and legislation.

The following is recommended as a priority:

- An energy and climate change forum be established involving officials in BCM to take the process forward in the interim. This forum should be headed by the BCM IEMP Unit and the BCM Electricity Department;
- Line functions/ Departments within BCM must take responsibility for those measures assigned to them;
- The Sustainable Energy and Climate Change Post to be established within the BCM IEMP Unit be advertised and filled as soon as possible; and
- A Strategy for long-term climate change adaption be prepared by the BCM IEMP Unit and that budget should be reserved accordingly.

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## APPENDIX 1: ENERGY MODELING REPORT

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**DOCUMENT CONTROL SHEET**  
(FORM IP180/B)

**CLIENT** : BUFFALO CITY MUNICIPALITY  
**PROJECT NAME** : BCM ENERGY POLICY AND STRATEGY **PROJECT No.** : J28015  
**TITLE OF DOCUMENT** : ENERGY POLICY AND STRATEGY DEVELOPMENT  
**ELECTRONIC LOCATION** : P:3230/J28015/Tasks/Reports/BCM Energy Strategy 9

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<b>REVISION</b>	NAME	NAME	NAME
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