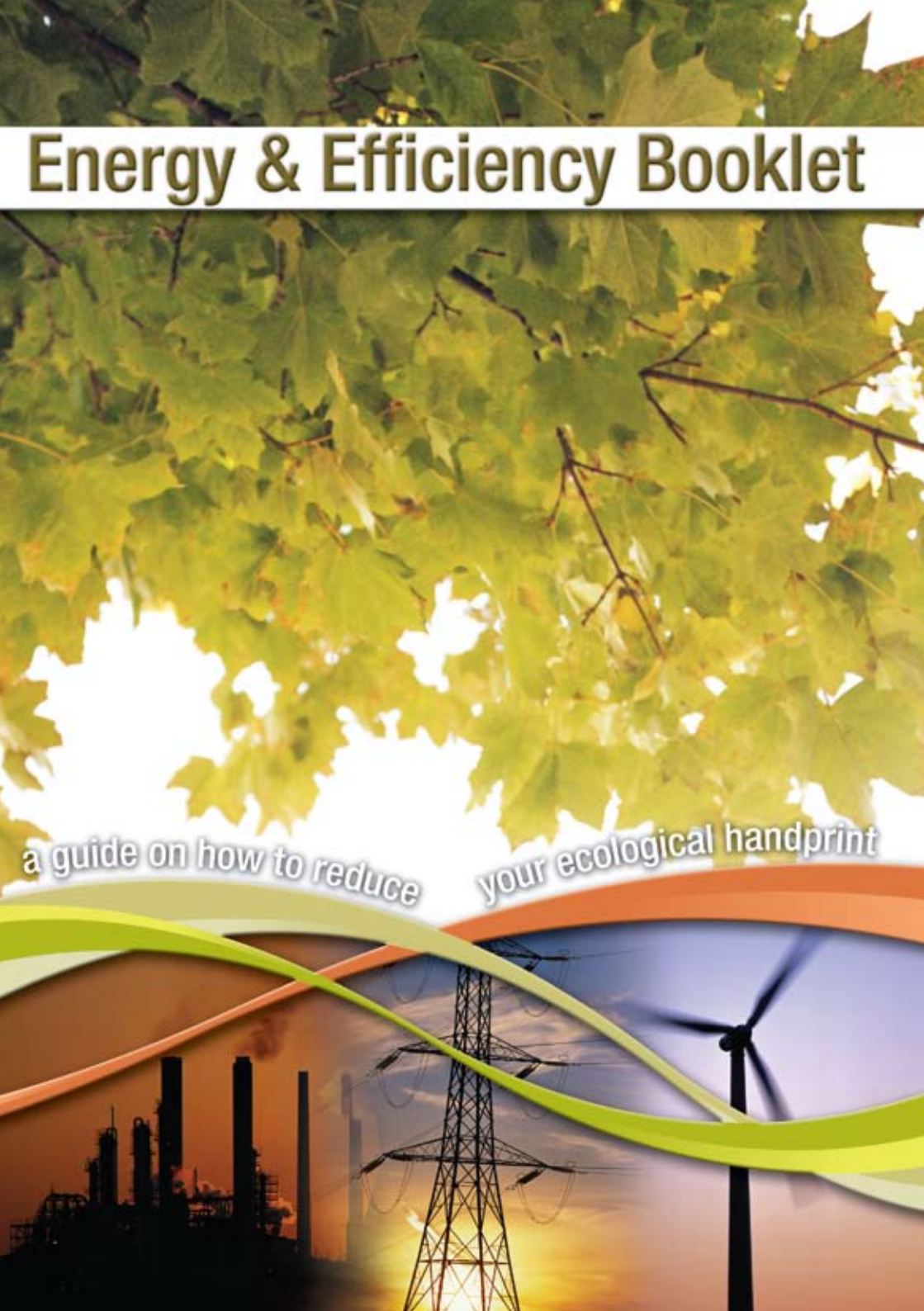


Energy & Efficiency Booklet

The cover features a collage of images. At the top, there are green and yellowing leaves. Below this, a white banner contains the title. The middle section shows a sunset or sunrise sky with silhouettes of industrial smokestacks on the left, a high-voltage power line tower in the center, and a wind turbine on the right. Two thick, wavy lines, one green and one orange, sweep across the bottom half of the cover, partially obscuring the industrial and renewable energy images.

a guide on how to reduce your ecological handprint



handbook

PURPOSE OF ENERGY EFFICIENCY & CLIMATE CHANGE HAND
BOOK/ BOOKLET

The purpose of this energy efficiency and climate change hand booklet and its supporting leaflets will help to advice EMM stakeholders on simple energy efficient measure. The booklet also captures some of the best practices within the EMM. The main focus is on Sustainable and efficient energy practices by residents business, industries and the municipality. The material demonstrates the interface between energy consumption and the changing climate conditions. In essence, highlights the environmental impacts of energy usage on climate change and its ripple effect on biodiversity, water resources and other environmental media.

foreword

EXECUTIVE DIRECTOR: MANDLA P SITHOLE

picture to come in here

Environmental Development Department

There are times in the history of our nation when our very way of life depends upon dispelling illusions and awakening to the challenge of a present energy and climate change crisis. In such moments, we are called upon to move quickly and boldly to shake off complacency, throw aside old habits and rise, clear-eyed and alert, to the necessity of big changes.

The energy and climate crisis, in particular, is getting a lot worse - much more quickly than predicted. World wide, transportation is the fastest-growing source of greenhouse gases. However, In South Africa, particularly in our City of Ekurhuleni, our major source of ambient air pollution is house hold energy sources like coal, according to our state of air quality report. There is also enough evidence from recent energy audits that shows a lot of energy inefficiency in most office buildings in both public and private sector within our city.

A recent case study highlights our City, Ekurhuleni implementing an energy retrofit project in its municipal buildings. Based on the adoption of the Policy on Energy Efficiency in Council Buildings and on Council Premises, and the participation in ICLEI's ('International Council for Local Environmental Initiatives') Cities for Climate Protection® (CCP) Campaign, the Ekurhuleni was able to implement different cost-saving and energy-saving measures in three municipal headquarters buildings. The project shows how small measures have significant outcomes in reducing energy use and subsequently reducing greenhouse gases (GHGs) and other air pollutant emissions. Further, it is as an interesting demonstration and test of an advanced lighting technology and energy efficiency equipment. An inter-departmental taskforce within the city government proved to be one of the keys to successful project implementation and to providing insights for its replicability in other South African municipalities.

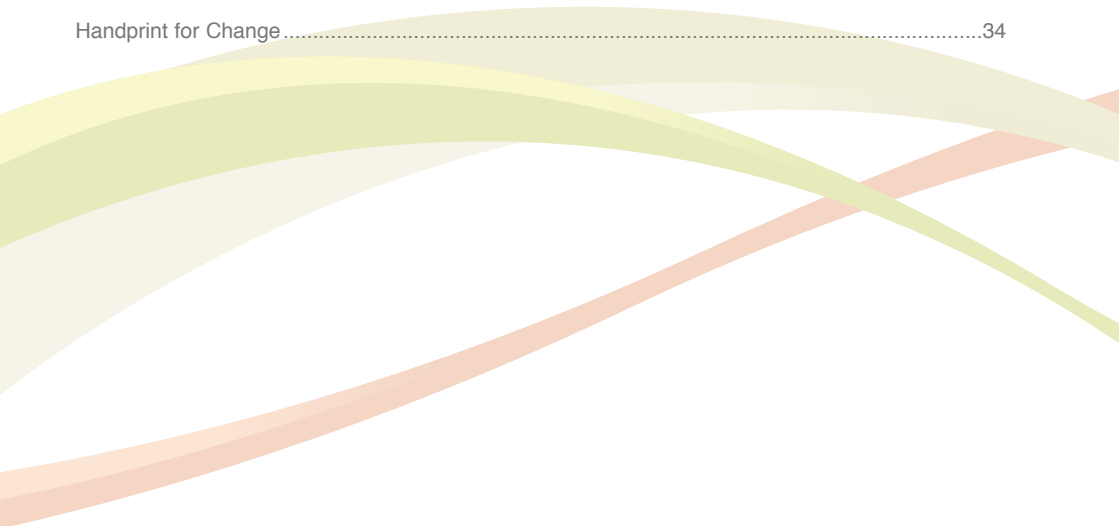
The creation of the policy on Energy Efficiency in Council Buildings and on Council Premises, the State of Energy Report, draft Energy Efficiency Strategy of Ekurhuleni, and the subsequently implemented retrofitting project are all part of an easily-replicable strategy that can be used in other South African cities interested in reducing energy costs and minimizing the negative environmental impacts of their municipal operations.

This booklet is one of the many ways we are trying to alert our community of the impending energy and changing climate crisis descending upon us all, we all have to do our bit!



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background

INTERNATIONAL CONTEXT

South Africa signed and ratified the Kyoto protocol in response to the objectives of the United Nations Framework Convention on Climate Change (UNFCCC). Unlike many developed countries, South Africa is not obliged to meet the stated targets of emission reductions, but nonetheless, as the eighteenth worst polluter in the world, it needs to take steps to implement GHG emission reduction measures. There is also a possibility that South Africa will be required to meet targets in the next round of the Kyoto Protocol after 2012. The effects of climate change will be mostly felt in poor, developing countries because of their poor resilience to natural disasters (e.g. the Mozambique floods in 1999).

A number of cities internationally have developed energy and climate change strategies. The development of the Energy & Climate Change

Strategy for Ekurhuleni has been informed by a review of international best practice with regard to energy strategies. The following strategies in particular have been reviewed:

- City of Cape Town Energy & Climate Change Strategy
- Mayor of London's Energy Strategy: "Green light to clean power"
- Energy Strategy for Portland, Oregon
- Barcelona energy policies and strategies
- San Francisco energy policies and strategies
- Curitiba energy policies and strategies
- Leicester energy policies and strategies

NATIONAL CONTEXT

In SA as a whole the energy sector contributes approximately 15 % to the total GDP and creates employment opportunities for approximately 250 000 people. Large-scale, energy intensive industries dominate the South African economy and are to a large extent responsible for South Africa's having one of the planet's highest per capita energy consumption. The country's high energy demand is provided for through the use of amongst others, coal, fuelwood, electricity, liquid fuel and gas.

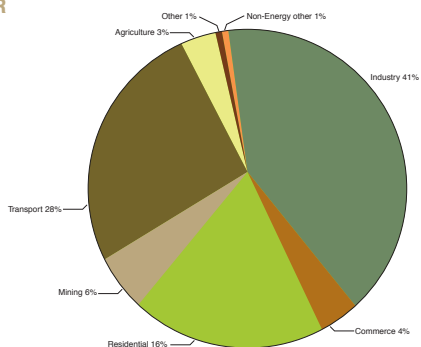
ENERGY USE IN SOUTH AFRICA BY SECTOR

Source: DME: Digest of South African Energy Statistics 2002

Energy in South Africa is dominated by electricity and liquid fuels supply for transport, the former mainly generated through the burning of coal in large coal-fired plants, the latter largely imported from oil producing countries.

The economy is considered energy intensive in comparison to other emerging economies. Industry accounts for approximately half the country's total energy consumption.

Households and transport make up most of the other half, while agriculture accounts for the remainder of South Africa's energy consumption. Due to the diversity of socio-economic groups in South Africa, there is still significant diversity in the role of energy in the life of ordinary South Africans. The Department of Minerals and Energy (DME) bears the primary responsibility for



developing energy policies in South Africa. The National Energy Regulator of South Africa (NERSA) is mandated to regulate the supply, transmission and distribution of electricity within the confines of the Electricity Act of 1987, as amended, the Energy White Paper of 1998, and Act 4 of the Electricity Regulation Act of 2006.

INTRODUCTION

The City of Ekurhuleni (the City) was formed in 2000 and is the fourth largest municipality in South Africa. Ekurhuleni is situated in the Gauteng province to the east of Johannesburg and south of Tshwane.

Ekurhuleni embraces some 88 wards, is heavily industrialized and is considered the economic engine of South Africa. The Ekurhuleni area consists of about 192 355 hectares of land and is occupied by about 2,7 million people occupying approximately 775 000 households. The pattern of households, as of 2004, is still characterized by a smaller, largely white suburban component occupying cores within larger, densely populated, predominantly black settlements arranged on the historical township model. Ekurhuleni is responsible for some 23% of the Gross Geographic Product of Gauteng with the inputs of some 33 000 business entities, including 8 000 industries, over 5 000 supporting enterprises and a bustling commercial sector. Ekurhuleni is an entity of globally competitive

business and industry. Ekurhuleni has the largest industrial and manufacturing base on the African continent, making it a centre for energy intensive activity.

One of the key performance areas identified for the City's Environmental Development department is the development of a strategy to institutionalise sustainable energy approaches and practices in the Municipality. This is a key step to move Ekurhuleni towards the goals of sustainable development.

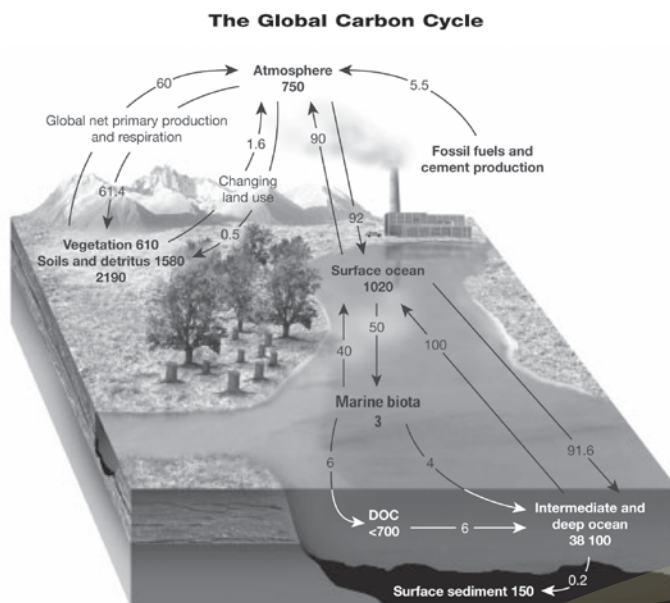
Ekurhuleni is also one of eleven participating South African cities in the Cities for Climate Change Protection (CCP) Programme of the International Council for Local Environmental Initiatives (ICLEI). The aim of the CCP programme is to mobilise cities to address both their own urban service priorities and those of the global climate change agenda. The CCP Programme requires that local authorities conduct an emissions inventory and forecast, set emission reduction goals, develop & implement

an emission reduction action plan, and monitor the results achieved. CCP internationally includes 550 cities representing some 8% global greenhouse gas emissions.

Energy efficiency is using less energy or electricity more efficiently – in other words, doing the same with less. More technically, energy efficiency is an improvement in practices and products that reduces the amount of energy necessary to provide energy services such as lighting, cooling, heating, manufacturing, cooking and transport.

The link between increasing concentrations of greenhouse gases in the atmosphere and the change in the planet's climate moved from a concern in the scientific community to an international public policy issue only during the last decade. Climate change will remain one of the most challenging issues facing the world well into the second millennium. Climate change is expected to have significant favorable and unfavorable economic, social, and environmental impacts. Scientists predict that climate change will occur at a rate that is rapid relative to the speed at which forest species grow, reproduce, and reestablish themselves and will have pronounced effects on forests.

The 1997 Kyoto Protocol to the 1992 United Nations Framework Convention on Climate Change increased the prominence of the role of forests in climate change and the urgency for related scientific knowledge. Before the Kyoto Protocol, most of research was focused on projecting climate change impacts on circumpolar boreal and temperate forests.

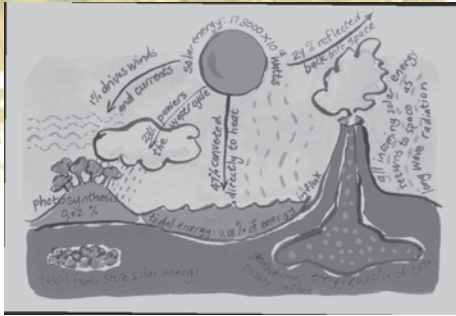


Carbon is exchanged between the atmosphere, the oceans, the terrestrial biosphere, and on geological time scales, with sediments and sedimentary rocks. Fossil fuel burning, cement manufacture, and changes in land use transfer carbon (as carbon dioxide) to the atmosphere.

In the figure, the size of each reservoir (numbers in bold) is in billions of tonnes of carbon. The magnitude of the flux (numbers within arrows) is in billions of tonnes of carbon per year. DOC = dissolved organic carbon.

Adapted from *Radiative Forcing of Climate Change* (IPCC 1994, p.12 and 13).

what is...



CLIMATE CHANGE?

According to the United Nations Framework Convention on Climate Change (UNFCCC) climate change “means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods” (UN 1992).

The Intergovernmental Panel on Climate Change (IPCC), which advises the world’s governments on climate change, defines climate change more broadly as “any change in climate due to natural variability or as a result of human activity” (IPCC 1995a, footnote 1). Climate change is one of the three main interrelated components of global environmental change. 1, 2 the others are atmospheric environmental change³ and land cover change.

ENERGY?

Energy cannot be seen and has no physical substance. We only know it is there because we can see its effects – heat, light, power to move vehicles – and we only value it for what it can do for us.

With fluctuating petrol prices and regular load shedding occurring in South Africa today and for many years to come, it is essential that we all adopt energy efficient behaviour. A lot of energy is wasted in South Africa. From industries to households, we use more energy than is necessary to fulfil our needs - either because of old and inefficient equipment, or because of bad habits



you can make a difference

Energy, water, waste and our biodiverse environment

Every time you switch on a light, drive your car, run water or put out your rubbish you’re making a decision that affects the environment. Natural resources – water, coal, oil, land, and fresh air – will run out if we use them up at a faster rate than they can replenish themselves. There are many indications that this is already happening.

The cumulative impact of households is significant. To make sure that there are enough resources to go around – enough for everybody now and in the future – we need to manage our resources well,

using what we have efficiently and fairly. Many of us are aware that we should be doing this, but are often unsure about what to do and how to do it. This handbook aims to provide you with information and practical actions to make a difference – to protect the environment, save money and make our homes safer places to live in.

The good news is that we can make a difference. Every kilowatt-hour (kWh) of electricity you don't consume saves over a kilogram of carbon dioxide (CO₂) that would otherwise be released into the atmosphere. Carbon dioxide (CO₂) is the greatest contributor to global warming; a process that scientists say has led to a rise in global average temperature by over half a degree Celsius over the past 30 years and could raise the earth's temperatures by 1, 4 – 5, 8 °C by the end of the century. Installing an 11-watt compact fluorescent light (CFL) in place of a 60-watt incandescent light bulb will save about 570 kWh over the life of the compact fluorescent – saving more than 570 kg of carbon dioxide.

EMM's Energy and Climate Change Strategy brings together various pieces of disparate information into a coordinated report. Various internal and external role-players have been consulted in the construction of the report. The set measures and targets were determined by relevant EMM departments.

EMM's energy and climate change strategy supports the social, economic and environmental well-being of the Metro via:

- The provision of adequate energy for economic growth.
- Supporting poverty alleviation by promoting clean, safe and modern energy to households.
- Saving money by improving the efficiency of energy use.
- Reducing harmful effects of energy use such as pollution and global warming, by providing cleaner, renewable energy sources.
- Promoting the use of more efficient transport, with a focus on public transport.

“

**EMM'S ENERGY AND CLIMATE
CHANGE STRATEGY BRINGS
TOGETHER VARIOUS PIECES
OF DESPERATE INFORMATION
INTO A CO-ORDINATED REPORT.**

”



summary

The heart of the strategy comprises a set of targets which have been developed to pursue specific goals which support the social, economic and environmental priorities of The City of Ekurhuleni. These targets are summarised in the below table. The City acknowledges that in order to meet these targets listed in this Strategy, support from local partners, national government, and international agencies will be necessary.

ENERGY TARGETS BY SECTOR

Sector	Targets
Transport	- Adopt the following targets in the EGDS for Ekurhuleni: - Reduce the travel times and the travel distances of commuters by 10-15% by 2025 (EGDS), based upon the 2004 baseline information. - Reduce, within the financial means of the City, the kilometers of the road network experiencing saturation levels higher than 90%, with 10% by 2025 (EGDS), based upon the 2004 baseline information. - Transport modal split shift: 10% of private vehicles shift to rail/public transport by 2020, based on the 2004 baseline information. - Include dedicated bicycle lanes on at least 20% of the roads identified for possible bicycle lanes by 2020 - Enforced bus-lanes and/or HOV or appropriate Public Transport lanes on suitable roads by 2020 - Adopt the National DME Energy Efficiency target: Energy demand in transport sector reduced by 9% by 2014
Industry, Commerce and Mining	- Increased energy efficiency in commerce & industry buildings in support of DME Energy Efficiency targets: 15% reduction in industry energy demand by 2014 (DME EE Policy targets). 15% reduction in energy demand in commercial buildings by 2014 (DME EE Policy targets) - The following targets to support above targets: - Commercial efficient lighting: all incandescent replaced with CFLs by 2015, and develop adequate CFL disposal plan. - All new buildings to comply with SAEDES (national building energy efficiency standards) from 2010.
Residential	- Increased energy efficiency in households: 10% reduction in electricity consumption by 2014. The following targets support this: - CFL use in 100% of households by 2025, 50% by 2015 - Develop By-law by 2008 requiring solar water heaters (SWH) and insulation in all new middle to high income housing 10% of all households to have SWHs by 2010, 50% by 2020. - Ensure that all low-income formal housing has insulated ceilings – new housing by 2010, retrofit existing by 2015. 10% reduction in CO2 emissions, in real terms, by 2015 (resulting from RE and EE/DSM implementation in households). - Develop policy that promotes green building of houses by 2008, with a by-law in the future. - Disseminate information on efficient appliances, SWHs, efficient building etc to all City residents through electronic media, City residents newsletter and billing system annually, starting in 2007 (immediately). Provide relevant information to particular user groups.
Agriculture	Increased energy efficiency in agriculture: 9% reduction in electricity consumption by 2014 (DME target).

Sector	Targets
City of Ekurhuleni	1. LED signals for all traffic lights by 2015, 20% by 2010 2. Increased vehicle energy efficiency of local government fleet by 2011. 3. Commence with the use of cleaner vehicle technologies for vehicle fleet and install a tank for refuelling by 2011. 4. Govt efficient lighting: all incandescent replaced with CFLs by 2010 5. Accessible CFL disposal system to be put in place by 2010 6. Reduce energy consumption by at least 5% in all municipal operations by 2010 7. Key staff in City departments 8. Approved green procurement policy by 2010 9. Approved green-building policy by 2008. 10. Reduction in GHG emissions of 10% by 2015 11. Video conferencing available to all staff by 2008. 12. Target training to the value of 1000 NQF points around energy efficiency to be delivered to staff in all departments involved with energy efficiency matters by 2012.
Energy Supply	1. Quantity of CO2 emissions reduced by 5% by 2010, 25% by 2020 2. All households to have access to electricity or alternative energy service option by 2012, inclusive of households not located close to the grid. 3. Diversify energy supply to include renewable and cleaner energy sources with a target of 10% by 2020 a. Implement landfill-gas projects by 2010



sustainable transport

“Every year the world observes
22nd September as International Car Free Day”

what is...

SUSTAINABLE TRANSPORT?

Sustainable transportation concerns systems, policies, and technologies. It aims for the efficient transit of goods and services, and sustainable freight and delivery systems. The design of vehicle-free city planning, along with pedestrian and bicycle friendly design of neighbourhoods is a critical aspect for grassroots activities, as are telework and teleconferencing.



As transportation is an enabler of the economy and a crucial part of socio-economic development, Ekurhuleni Metropolitan Municipality should continuously endeavour to improve social conditions and enhance the quality of life of its citizens. Research into the area of public transport is therefore a crucial and necessary scientific building block in an attempt to address the transportation problems of Ekurhuleni.

On public transport day, private car users are encouraged to use public transport. The idea behind the use of public transport in South Africa is to reduce air pollution, road accidents and traffic congestion, which place a strain on the road infrastructure of the Cities in South Africa. Unless these challenges are addressed, the effects will continue to grow and negatively affect the economy locally and National.

With respect to air pollution, road transport is one of the main causes of this type of pollution in urban environments. It is responsible for over 40% of discharges of suspended particles into the atmosphere. The effects of these matters vary.

Some have an immediate impact, while others manifest themselves a few days after release into the atmosphere. Greenhouse gases form part of these substances. These gases, like carbon monoxide (CO) and nitrogen oxide (NO_x) are believed to cause the greenhouse effect, leading to a warming of the earth's atmosphere and subsequently global warming.

Regarding the promotion of public transport, the Gauteng government is planning to introduce transport corridors where buses and taxis will be able to move quicker between destinations than private cars and trucks. It is hoped that public transport will be speedier and more reliable. Other programmes and projects to promote a speedier and more reliable public transport system include the Gautrain Rapid Rail Link, which will start operating in 2010; new and safer taxis and a passenger information call centre.

Countries are unable to eradicate air pollution caused by traffic congestion but they can reduce air pollution and traffic congestion through the use of public transport.



household energy

“ Become more aware of your energy use.
Choose cleaner sources of energy and help prevent global warming ”

what is...

HOUSE HOLD ENERGY EFFICIENCY?

EMM invites you to help protect the planet from global warming by saving energy and choosing clean sources of energy. **Become more aware of your energy use** - When starting a diet, it's useful to become aware of what you're eating and when. Most of us are surprised to find we eat more and more frequently than we suspected. Take a week to track your house hold and transportation energy uses and you may be similarly surprised.

- **Conserve energy** – i.e. using less energy: It's not "shivering in the dark," but rather things such as turning out the lights when you leave the room. And it's really not so bad to wear a sweater or thermal underwear in the winter! You can also use less energy for transportation such as walking, bicycling, or taking the bus when possible.
- **Hang your laundry!** Electric clothes dryers use a LOT of energy. And unlike refrigerators (which also use a lot of energy), easy alternatives are available. In the summer, it's not only possible to hang your laundry on your "solar clothes dryer," but it's actually enjoyable - and sun-dried clothes smell so nice!



Even in the winter, it's possible to hang laundry indoors either on a basement clothesline, or on clothes racks. A bonus is that it helps humidify the house. If you're concerned about humidity, you can get a low-cost digital thermometer/humidity device that can tell you if your house is too humid. If you use gas forced-air, for example, it's more likely that drying your clothes indoors will help raise it to a comfortable level rather than being too humid.

- **Right to Solar / Open Air Dry**

Does your community or homeowners association forbid solar drying? Unlike in South Africa, where we are free to hang dry in the open air, some countries are not free to hang dry their clothes, however most of the developing countries like South Africa have a "Right to Dry" that guarantees the right of people to hang dry their clothes to save energy in this way. For more information about this initiative, visit <http://www.laundrylist.org>



- **Use energy more efficiently** For example, replacing your incandescent light bulbs with more efficient compact fluorescent bulbs.
- **Reduce your consumption**

All that “stuff” you buy required energy and resources to create it, ship it, and discard it away to the landfill. And for most South African households, our consumption levels represent a lot of energy, resources, and pollution.



In Ekurhuleni large sections of the population still use coal and wood, this represents a cause for concern with regard to air pollution and health risk potentials.

In the Vaal, comprehensive literature studies were followed-up by laboratory scale technical investigations, mainly on the impact of coal on the environment, the potential of low smoke fuels and community socio-economic studies. The main outcome of that investigation was that Low-smoke fuels Inter-alia have a role to play in reducing air pollution to acceptable levels. This led to others formulation of an integrated house hold clean energy strategy, which incorporates among others, measures such as low smoke fuels and manufacture and distribution and housing insulation and design, as well as also in the longer term measures such as cleaner fuels and stoves.

Recent research discoveries indicate that there are two primary reasons for the continued use of wood and coal fuels:

- (I) Rapid urbanization growth of informal settlements has exacerbated backlogs in distributing basic services such as electricity and waste removal, also
- (II) Various electrified households continue to use coal because of its cost effectiveness in space heating and its multifunctional nature as in cooking heating and lighting abilities. The proximity of coal mines and the well-established local coal merchants to Ekurhuleni has made coal relatively inexpensive and easily accessible to the community of Ekurhuleni.



Continued electrification of residential areas is ongoing and the full use of electricity for all household energy requirements remains the ultimate long term solution to problem. However, electricity is more expensive than coal and its price is rising. Also more expensive appliances are needed to extract electricity.

An alternative is the integrated household clean energy use approach as a transitory measure between coal and full use of electricity, with promotion of alternative cleaner energy forms.

The EMM approach has three phases namely:

1. Top- down Coal burning technique for those who still need to use coal,
2. The Use of Cleaner fuels,
3. Housing Design and Insulation.

It must be made clear that the above are phases, as no single solution has the potential to reduce the coal-based pollution to acceptable levels. This should be used as an integrated/overlapping three phased single strategy, whose ultimate aim is to reduce coal generated Environmental pollution and promote efficient house hold energy use.



1. TOP-DOWN COAL BURNING TECHNIQUE (BASA NJENGO MAGOGO)

The top down ignition of household coal fires is the least-cost option. It has the potential to reduce the smoke emissions of a low conventional coal fire by up to 50%. This is according to the National Department of Minerals and Energy's commissioned pilot scale report in Orange Farm, Johannesburg. The purpose of this pilot was to ascertain what processes are required for the success in promoting this new fire lighting technology, and what to avoid.

The top down technology is quicker to ignite (implying that cooking and heating can be enjoyed in a relatively short space of time compared with long wait when using the other conventional method). It burns longer for the same amount of coal and has been shown to use approximately 20% less fuel.

The Top-down Method is not new to some areas of Ekurhuleni, such as Etwatwa and Daveyton suburbs. The Challenge in Ekurhuleni is have those who are using this method to understand the benefits, the Environmental and Social impact of this coal burning technique and assist where and when necessary to perfect the technique through an Education and Awareness campaign.

Other areas unaware or not using the method have to be brought on board also with a more intense training and awareness campaign of this technique.

COMBUSTION PRINCIPLES:

The top down coal burning method is a technique which attempts to achieve a complete combustion, which means a completely smokeless fire is attempted.

This is not possible but a significant amount of smoke released is reduced whilst attempting to achieve a complete combustion with the Top- down method.

A complete combustion of any quality of coal is possible, but the conditions should be perfect to follow the principles of a complete combustion. This means when necessary there could be mechanical assistance i.e. pulverizing of low grade coal, feeding of air to the process and etc.

This is done by most industries. Besides pollution, industries have discovered that smoke is actually lost energy emitted in to the atmosphere, complete combustion saves energy and the environment.

The Recently improved Top-down coal fuel burning method adds nothing new except for the technique and approach. The apparatus are still the same commonly used, as in the usual low grade coal, fire wood and paper. The method detailed below can be used anywhere i.e. Stove, Braai, open floor, fire place or Mbawula.

THE TOP-DOWN METHOD

- 1.) First an (normally used or required quantity) amount of coal is placed at the bottom; heat grows steadily from top to bottom as coal is burnt from top-downwards.
- 2.) A sufficient enough paper is placed atop the coal, for ignition. A bit more than normal quantity of

firewood is placed on top of the paper and coal. Firewood feeding should be done progressively to a steadily growing flame or pre feeding can be done but should not hamper the growth of the fire, and then lastly a layer of coal is added atop the ignited wood; a small amount of smoke will come and go because of this layer.

3.) Afterwards a hot area of the fire is created atop the fire, this is good!

Why is this good?

Now any impurities coming up as smoke from burning coal as the fire heat grows downwards is burnt in this area before it escapes in to the open.

This hot area grows as more coal is burnt downwards and less and less smoke is released, and clearer and clearer our sky will be!



2. THE USE OF CLEANER FUELS

2.1. CLEAN COAL UTILIZATION

The principle thrust for clean coal utilization is addressing the high levels of air pollution provided by the combustion of coal in households. The use of top down method can be described as using coal as a cleaner fuel (in the interim).

2.2. GAS

South Africa currently has a small gas industry. With the availability of natural gas in neighboring countries, such as Mozambique and Namibia and the discovery of offshore gas reserves in South Africa, the gas industry in South Africa is undergoing rapid expansion.

Ekurhuleni is best positioned to have future infrastructure developments in housing with gas tubing to complement other sustainable energy forms such as solar and electrical.

Already there are major gas pipes going through Ekurhuleni from Mozambique to Sasolburg and other industries in The Metropolitan.

An integrated education and awareness campaign to be derived out of this strategy envisages encouraging the middle and high income groups of Ekurhuleni to make the best use of gas as much as possible, as most of these communities can afford and easily access gas refill substations. Most of those who do not use gas and can afford to, indicate that it is out of misconception of thinking gas as a hazard. Some just do not know the local and global implications of our continued dependence on coal fired electricity, and the benefits of switching to gas.

NATIONAL GAS DEVELOPMENT

A National Gas Infrastructure Development Plan has been drafted, the purpose of which is to provide government with a blueprint to strategize the development of infrastructure for future gas market developments. Awareness campaigns on the safe-use of gas, the economic, social and environmental benefits of the use of gas should be emphasized and sustained.

2.3. HYDROPOWER.

South Africa has limited potential for large-scale hydroelectric power generation. There are, however, an estimated 6000 to 8000 potential sites for small hydropower applications in the power range sub 100 MW, situated mainly on the eastern escarpment in Kwa-Zulu Natal and the Eastern Cape. There are, however, an estimated 175 000MW of untapped hydropower available within the Sub-Saharan region.

2.4. WIND ENERGY – BLOWING ELECTRICITY INTO YOUR HOME!

Wind as an energy source is only practical in areas that have strong wind areas and steady winds, **Ekurhuleni does not qualify**. In South Africa we have fair wind potential especially along the coastal areas of Cape Town, Nelson Mandela and Ethekwini. At present, however, wind is not used to generate electricity in this country. For the future it presents itself as a competitive energy source.

The most exciting thing about this is that wind energy, like solar energy, is a free renewable energy source. It will never run out!



2.5. SOLAR ENERGY (THE SUN)

The Southern African region, in fact the whole of Africa, is well endowed with sunshine all year round. The annual 24 hour global solar radiation average is about 220 W/m² for South Africa, compared to about 150 W/m² for parts of the United States and about 100 W/m² for Europe and the UK, making the local resource of the highest in the world. The solar resource is by far the most readily accessible in South Africa. It lends itself to a number of potential uses. Where possible consumers in Ekurhuleni, especially the medium, high income

communities and office parks and complexes are to be encouraged through awareness campaigns on this subject, to make the best use solar energy and save on conventional power.

South Africa is well-endowed with solar resources and most areas average more than 2500 hours of sunshine per year.

The country's solar equipment industry is developing. Annual PV, panel assembly capacity totals 6MW and a number of companies manufacture solar water-heaters.

Water heating accounts for a third to a half of energy consumption in the average household. In Ekurhuleni this derives mainly from electricity, being the most common energy carrier employed. Avoidance of this expenditure on household budgets could lead to significant improvements in disposable incomes of the middle and lower income sector.

Furthermore, the equivalent of a large coal fired power station (2000MW +) is employed to provide hot water on tap to the domestic sector alone. Since the inception of the accelerated national domestic electrification programme through grid extension, a major distortion of the national load curve has emerged, with the early evening load peak growing significantly. Modelling indicates that the introduction of solar water heat could ameliorate the situation substantially.

Switching from electrical to solar water heating could, therefore, have significant economic and environmental benefits. Economic benefits for the home-owner in reducing his/her energy bill, for the utility in obviating expensive generation capacity to address load peaks, and/or postponing the introduction of new base-load capacity. Also for the country in reducing greenhouse gas release and of scarce capital for the pressing needs.



SOLAR ENERGY CAN BE USED FOR THE FOLLOWING:

- **Solar electricity**

It can be harnessed through photovoltaic (PV) solar cells. Photo means light and voltaic means electricity. Electricity from the sunshine! Electricity from solar cells will go on for as long as the sun shines. So many things can be run by PV cells these days, for example, wrist watches, calculators, public streetlights and telephones. A Solar home system can be installed in a home. It allows the home owner access to lighting and powers a small T.V. set. During the day, energy from the sun is stored in the battery via PV panel. Extended light for approximately 3-4 hours per day allows for evening activities such as studying and adult education.

There are many more uses for this abundant solar energy, like Cooking with Solar Energy, Solar heating. Solar energy can be used for heating water in-house and pool by using a solar collector.

- **Solar Houses and Buildings**

Solar energy can also be used to heat the house directly.

housing design & insulation

“The most effective way of heating a house
is through the way it is designed and built.”

what is...

HOUSING DESIGN & INSULATION EFFICIENCY?

The most effective way of heating a house is through the way it is designed and built. When designing a house, architects should at least consider how best to trap the sun's warmth and keep it in the house, for example, through the use of north-facing windows.



Houses and buildings in Ekurhuleni as in most places of the country are seldom designed from an energy consumption, let alone energy efficiency, perspective. The energy characteristics of the low-cost housing are particularly bad, resulting especially in high levels of energy consumption from space heating in winter. The net result is dangerously high levels of indoor and outdoor air pollution in the townships, due mainly to coal burning. Research has shown that low-cost housing could be rendered 'energy smart' through the utilization of elementary "Solar Passive Building Design" practice, resulting in fuel saving of as high as 65%.

Such savings on energy expenditure would also have a major beneficial impact in improving the household cash-flow situation. The massive national low-cost housing programme provides a unique window of opportunity.

The most effective way of heating a house is through the way it is designed and built. When designing a house, architects should at least consider how best to trap the sun's warmth and keep it in the house, for example, through the use of north-facing windows.

The Department of Housing and the South African Bureau of Standards have been involved in amending the national housing standards, where necessary. Energy efficient homes may be constructed at the same direct cost (and lower life cycle cost) as energy wasteful houses. The challenge is to develop awareness for all in the establishments of Ekurhuleni including independent designers and builders and to ensure implementation of basic energy efficiency principle, in the reconstruction and development of new and existing townships or suburbs.

While previous generations may have been content to live in drafty houses, most people now want comfortable warm houses. A healthy house today is well-sealed, well-insulated and properly ventilated.

In Ekurhuleni as in many parts of the country this cannot discount the informal structures as this could be classified as the high-risk establishments, these structures feature as the least insulated considering the amount of air pollution coming out due to high demand of coal for space-heating and other uses,

the spaces within these structures are not big but the types of materials used to construct makes it impossible to keep the heat in cold temperatures or reasonable cool temperatures in very warm temperatures.

The four most common wall types are wood-frame, zinc sheaths or cardboard or pre-cast frames with pre-cast walls and solid brick.

A well insulated house is a bit like dressing for the weather. A wool sweater will keep you warm if the wind is not blowing and it is not raining. On a windy, rainy day, wearing a nylon shell over your wool sweater helps keep you reasonably dry and warm. A house is similar.

There many different materials that can be used to insulate the different types of houses. Again here the strategy is to give the high risk areas a sustained intense education and awareness campaign, these are mostly informal and low-income areas of Ekurhuleni. For the other areas a less intense awareness campaign is to be employed on the best space heating and heat retention methods with good house insulation, without compromising proper ventilation, with probable carbon monoxide poisoning.

HOW TO BE ENERGY EFFICIENT AT HOME

A simple way of improving energy efficiency is to change behaviour. This could be simple acts such as turning off the lights or equipment when they are not in use, or reducing the temperature setting when you use the washing machine (reducing the temperature in the washing machine from 60oC to 30oC will reduce the energy consumption by almost 50%). See practical steps to being energy efficient at home.

The efficiency of an appliance or technology is determined by the amount of energy needed to provide the energy service. For instance, to light a room with an incandescent (traditional) light bulb of 60 W for one hour requires 60 Wh. A compact fluorescent light bulb (CFL) would provide the same light at 11 W and only use 11 Wh. This means that you save 49 Wh for each hour your light is turned on. A compact fluorescent light bulb is therefore over five times more efficient than an old-fashioned incandescent light bulb. The efficiency of appliances improves as new models are developed by the manufacturers.

INSULATING YOUR HOUSE

While previous generations may have been content to live in drafty houses, most people now want comfortable warm houses. A healthy house today is well-sealed, well-insulated and properly ventilated.

A well insulated house is a bit like dressing for the weather. A wool sweater will keep you warm if the wind is not blowing and it is not raining. On a windy, rainy day, wearing a nylon shell over your wool sweater helps keep you reasonably dry and warm. A house is similar. On the outside, underneath the brick or siding, there is an air barrier that does the same thing as the nylon – it keeps the wind from blowing through. Then there is the insulation (like your sweater) and then a vapour barrier, which helps keep moisture away from the house structure where it can do damage.



SIGNS OF INSULATION PROBLEMS

In the winter	In the summer
Walls cold to touch	Uncomfortably hot inside air
Cold floors	High cooling costs
High heating costs	Ineffectiveness of air conditioning system
Uneven heating levels within building	Mold growing in basement
Mold growing on walls	

TYPES OF INSULATIONS

1. FIBERGLASS:

- the products are like fibrous blankets, about 1.2m (48 in.)
- long and wide enough to fit snugly between wall studs.
- a very light fibrous fill, usually pink or yellow.

ADVANTAGES:

- they are readily available.

DISADVANTAGES:

- can be affected by air movement in attics.

2. MINERAL WOOL:

- it is as same as fiberglass

ADVANTAGES:

- somewhat better fire resistance and soundproofing qualities than fiberglass.

3. COTTON:

- the disadvantage of cotton is that it is not readily available.

4. TYPE I AND II (EXPANDED) POLYSTYRENE OR EPS

- These are white board of small (about 8mm – 0.3 in. – diameter) foam beads pressed together.

DISADVANTAGE:

- typically no HCFCs used in production. Must be covered.

5. RIGID FIBERGLASS:

- a dense mat of fibers, typically less rigid than the polystyrene.

DISADVANTAGES:

- drains water away and sometimes hard to find.

SPRAY APPLIED

- All spray-applied insulations fill cavities very well. They must be applied by specialized contractor.

1. WET SPRAY CELLULOSE:

- a soft, spray foam that expands into the cavity.

ADVANTAGES:

- can act as the air barrier.

DISADVANTAGES:

- must be covered.

2. POLYURETHANE:

- a foam that expands into the cavity and sets up fairly rigid.

ADVANTAGES:

can act as the air barrier and vapor retarder and HFC used in production must be covered.

EFFECTIVE INSULATION SYSTEMS

Effective insulation systems slow the movement of heat and deal with the movement of moisture at a reasonable cost. To do this they have:

- An air barrier which prevents the movement of interior or exterior air through the system.
- Carefully filled cavities which leaves no gaps in or around the insulation and which do not compress the insulation.

WALL INSULATION FOR NEW CONSTRUCTION

Adding rigid (board stock) insulation to the outside face of the studs minimizes thermal bridging as does spacing the studs at 610mm (24") rather than 406mm (16") where possible.

WALL INSULATION FOR EXISTING CONSTRUCTION

The three most common wall types are wood-frame, zinc sheaths or cardboard and solid brick. In a wood frame wall, insulation (loose fill and some foam) is typically blown into the cavities through holes that have been drilled through the drywall, sheaths or cardboard or siding.

HIGH INCOME HOUSEHOLDS

- Attic insulation

The attic is often the most cost-effective place to add insulation. Usually, a contractor blows loose fill into and over the top of the ceiling joists. For the do-it-yourself, batts laid sideways on existing insulation are an easy alternative.

Check ceiling light fixtures, the tops of interior walls and penetrations such as plumbing stacks for air leakage.

- Basement insulation

Basement walls are unique because they must handle significant flows of moisture flows from both inside and outside the house.

The basement walls are kept at room temperature protecting the structure, reducing the risk of interior condensation and increasing comfort.

IS IT COST-EFFECTIVE TO INSULATE?

The right insulation system can save you money, reduce the amount of energy you use and make your home more comfortable. Keep in mind that installation cost (including changes to the framing, cladding and finishes) are usually the most expensive part of an insulation project. The local climate has an impact on the cost-effectiveness of any insulating project.

Check the cost, heat loss and heat gain of all available options. Review all details to ensure that moisture movement is handled correctly. You can then select the right insulation system. When in doubt, consult a professional.

FINAL ANALYSIS

If your home is poorly insulated, it usually pays to upgrade the insulation. If you are building a new home, it makes sense to insulate well now so you don't need to retrofit later.

- Energy efficiency in business and industry

Energy efficiency and reduction in operational costs is becoming critical in the energy intensive industry. Along with higher energy prices, companies are also facing stricter local legislation with respect to CO₂ emission rights and eco-taxes or fines. Companies throughout the world are benefiting from efficient energy usage.

- What industries can do to be energy efficient?

Doing Energy Audit can be a good start, this is to identify the cost-effective options to improve the energy efficiency of a specific facility. This can be done at several levels of detail, depending on the situation or specific needs of the facility. A thorough energy audit includes the utility systems, energy sources, process- and waste streams and performances / efficiencies of equipment being used. Measures can range from simple insulation to more radical process changes.

It would be advisable to have the audit conducted by an independent process & energy specialist and extremely well qualified to conduct energy audits in the general process industry. This could give the facility a good report in process design, simulation and energy optimization.

The EMM can assist local industries understand Energy benchmarking which has gained importance due to the Kyoto protocol. EMM as the industrial hub of the country is in a better place to take the lead in showcasing how to use the national allocation of CO2 emission rights and CO2 emission trading.

OFFICE BUILDINGS

Energy footprint vs. energy hand print

What is the handprint?

What is the footprint?

Practical Guide: How to use the hand print & footprint balance as a tool to monitor energy efficiency at work and at home.

Benefits of using energy more efficiently:

- It reduces your electricity bill
- It makes more available energy to provide supply to the remaining population
- It limits and reduces the environmental impacts and hazards to human health of current energy use
- It increases the resilience and efficiency of our economy
- It postpones the building of new power plants, and frees up capital for other investments

Other sustainable energy sources: waste to energy



BURNING WASTE FOR ENERGY

A growing number of projects are being proposed for South Africa under the label of 'Waste to Energy' where waste (such as anatomical hospital wastes, bio-hazardous wastes, electronic scrap, municipal/ domestic and industrial waste, worn out tyres, solvents, plastics and sludge) is burned instead of coal.

This briefing looks more closely at why this is the case, the consequences of burning waste for energy and the alternatives to this trend.

About 70% of South Africa's energy needs are met from coal (including over 92% of electricity generation and about 30% of transport fuels). Although cheap by international standards, buying coal involves significant costs for energy-intensive processes. For example a single cement kiln can burn up to 180 000 tons of coal a year.¹ Coal becomes more expensive the further you are from the coal mine. According to a recent Environmental Impact Assessment Report into the feasibility of using waste (or 'alternative fuels') in a cement kiln, between 35 to 50% of coal can be replaced a year, depending on the composition of the waste. This means a cement company will avoid the costs of 40 000 to 90 000 tons of coal just for one of its cement kilns.

When you consider that this waste is either free, or that companies are paid to take it – then a central reason for burning waste for energy becomes clear – to make money. Indeed, there's a real risk that companies will be paid to import waste into SA from countries that have more stringent standards



on burning waste for energy than SA does. We have already seen companies importing materials regarded as waste in their country of origin (and thus attracting waste disposal fees) under the guise of recycling – since very small percentages of usable materials may be economically recoverable under local economic conditions and environmental regulation.

After the World Summit on Sustainable Development there was a global commitment to 'triple bottom line accounting' i.e. to development that included social and environmental factors in addition to economic considerations. As a consequence, wastes to energy projects are being re-packaged to highlight selected social and environmental benefits. So, for example, waste to energy projects are promoted by industry because they:

- “reduce the environmental impacts of using coal...as well as reduce the amount of waste material that would traditionally be disposed of to landfill or incinerated.”²
- Are “in line with initiatives of National Government, particularly the National Waste Management Strategy (NWMS) which focuses on waste prevention, waste minimization and the re-use of waste materials.”

CONSEQUENCES OF BURNING WASTE FOR ENERGY

However, as shown below, burning waste for energy has many negative consequences and would legitimize the generation of waste when we should be re-designing production to avoid waste.

From the outset, it's important to note that the consequences of burning waste for energy depend on what waste is being burned. Certain wastes, e.g. biomass such as agricultural waste, can be safely burned for energy, although bio-digestion to produce gas as a fuel and compost is generally preferable.

When waste has chlorine or metal in it (as in plastics, tyres and solvents), burning it doesn't destroy the toxins. Instead it displaces some to 'landfills in the sky' and concentrates the rest to create toxic ash. In addition, when waste is burned new pollutants are formed, including organochlorines (such as dioxins and furans) – which are the most toxic pollutants known, causing cancer, birth defects and impaired child development. Air pollution does not become acceptable just because the heat energy of incineration is utilized.

With standard waste incineration the ash is dumped in landfills, from which the toxins will eventually leach or leak into groundwater – the quality of the landfill lining will determine how long this will take (assuming no flooding or subsidence). In cement kilns the ash becomes part of the product, but there are no proposals to label such cement as containing toxins, even these may be released (off-gas) over time. Some pollutants will be captured in pollution-control technology, such as filters, that will be land filled.

Burning waste for energy also entrenches bad waste management practices. As described below, there are a number of alternative ways to dealing with waste that are environmentally, socially and economically beneficial. However, these require changes in existing waste management, rather than the strengthening and support of such practices.



ALTERNATIVES TO BURNING WASTE

There are a number of alternatives to burning waste for energy. When considering these alternatives we need to question 'How is waste created?' The answer is that we make waste by mixing a wide variety of materials like garden refuse, glass, tins, plastic and paper together. By throwing all these materials together, we lose access to their inherent energy (energy used in production) that could be exploited through re-use or recycling.



When deciding whether to burn, re-use or recycle material we need to consider the energy balance.

Energy balance refers to how much energy was used to make the material, and how much is available for use at the end of the product's life – either by re-using (bottles, bags), recycling (metals) or from burning it for the calorific value. For example, it makes better energy sense to recycle paper than to burn it and make virgin paper, due to all the energy involved in wood cultivation, transport and pulping.

- With this in mind, one alternative to burning waste for energy is to separate waste at source i.e. separate garden refuse, glass, tin, plastic and paper, and encourage recycling and reuse. While it would be expensive to start up waste separation, the long-term benefits in terms environmental, social and economic costs (because money would be saved) would fully compensate for this initial outlay. Government procurement policies requiring recycled content would stimulate demand for recycled product that is currently disadvantaged by scale.
- All organic wastes could be bio-digested, producing both methane-rich gas and compost. While released methane significantly contributes to global warming, it can be captured and used for power and/or heat generation, which greatly reduces the contribution to climate change (methane has 23 times the global warming impact of carbon dioxide, which is released when the methane is burned).
- Another intervention is cleaner production. There has been great progress internationally as production processes and products are re-designed to avoid waste, or to change waste streams so that they are suitable as input to other processes. However, this is only economically attractive where cheap dumping or incineration options are penalised. South Africa has committed to cleaner production and sustainable consumption in policy, but this will mean nothing without full-cost accounting and ruling out cheap-and-dirty waste management options.

ENERGY FROM LANDFILL GAS

One form of 'Waste to Energy' project currently being considered by many municipalities is to capture the gas released by rotting organic matter in landfills and use it to generate electricity. The Department of Minerals and Energy recently released a draft document on the potential of landfill gas (which is mainly methane) for power generation. According to the document, of the 453 landfill sites in SA, 53 could potentially be used to generate power.

Not only could this be environmentally friendly, with the right technology, but money can also be made by selling electricity and "carbon credits" – greenhouse gas emission reduction units generated because, instead of being released into the atmosphere and contributing to global warming, methane is captured and used.

The challenge with such projects is to ensure that they do not perpetuate current unsustainable

waste management practices and/or unacceptable impacts on local communities. Also, only about a third of methane from the decomposing biomass material in municipal landfills is captured. If all the biodigestible (organic) matter was separated at source, all the resulting gas could be used, with compost as a by-product. The prospects of short-term financial return for municipal management, even if it is through foreign investment, should not prevent implementation of sustainable waste management and optimal resource use. There may also be better uses for the gas than burning in an inefficient open-cycle gas turbine.

Issue	Comment	Priority
Strategy & Policy		
Transportation		
Transportation demand sector is the major energy user and major pollutant.	Large component of energy is used for transport – not much is known about the use of energy in the transport sector – energy needs to be a specific variable that is address in all the transport planning activities, especially related to personal transport.	High
Awareness building is needed for the public to understand the consequences of energy intensive transport.	Mindsetshift will likely be an issue (“all South Africans want cars and want to drive alone”), with a need for different programs addressing different income groups.	High
Limited availability of public transport (alternatives to taxis).		Medium
Congestion should be addressed through the construction of new infrastructure and Travel Demand Measures.		High
Carpooling should be encouraged.	Perhaps through the use of designated lanes, with monitoring and enforcement through CCTV systems at key point.	High
Implications of the new national policy on exhaust emissions should be assessed from EMM's perspective.	SA government is to supply clean petrol and diesel by 2006. Implications for fleet upgrade / replacement should be addressed.	High
Need for roadworthiness tests of current vehicles in EMM (trucks, taxis and private cars) to assess emissions and fuel efficiency.	Need to be monitored in terms of infrastructure and policy implementation once national policy has been established. Municipal bylaws can assist in enforcing roadworthiness requirements.	High
Need for alternative, environmentally friendly modes of travel to be available and safe (bicycle, pedestrian options) for EMM residents.		High
Need for alternative, environmentally friendly fuel (methane, ethanol, hydrogen, fuel cells, diesel from sunflower oil, etc.) and vehicle technology (hybrid/electric vehicles), to be more readily available to EMM residents.		High
Implications of new policy on exhaust emissions on EMM will have to be examined.		High

Electricity		
Rollout of the incorporation of municipal electricity undertakings into Regional Electricity Distributors (REDs), which will incorporate Eskom distribution. Objective is to induce efficiency into electricity supply chain and national tariffs. Several municipalities, including Cape Town and Polokwane, have signed on already.	Implications for EMM RED include: • Contestable customers (large power users will have the opportunity to select suppliers) • Responsibility for planning for future capacity and need for integration in planning between generation, transmission and distribution. • Planning for O&M of infrastructure • Potential for increase in electricity price (carried through from generation) – end user affordability.	High
Need for a centralised and accurate electricity database, consolidating technical, financial and geospatial information.	Could also be used for tariff analysis, DSM planning, policy development, planning and marketing.	High
Need to maintain/improve quality of electricity supply	Contributing factors include lack of funds for preventive maintenance, vandalism, illegal connections, and potential lack of supply capacity nationally after 2007. Impacts on industrial commercial and residential consumers. If perception of lack of reliable electricity supply persists, investment (especially industrial development) could start to follow perceived reliable electric supply.	High
Sufficient funds should be made available for repair and maintenance for the distribution system.	Some substation repairs have taken months to effect as funds were not allocated, affecting supply customers.	High
Sufficient capex and opex need to be made available for the development of new infrastructure.	This will take on even greater importance with the rollout of the REDs.	High
Electrification policy should be tied to socio-economic development of the region.	EMM should ensure close liaison with DME on planning of future electrification rollouts.	High
Environmental and Health Issues		
Coal is used extensively in low income households. Emissions from coal at the household level are extremely high.	Impacts are on householder health as well as environment. EMM could implement mechanisms to support the DME's initiative to introduce LPG into lower income homes. Incentives could be considered to make LPG more accessible, as well as awareness programs concerning the health effects of coal and IP.	High
Illuminating paraffin is a potential source of fire in low income homes.		High



Total Population (Census 2001)	2 480 277
- Population: Northern SDR	770 913
- Population: Eastern SDR	780 812
- Population: Southern SDR	926 905
Total Population (Estimated: 2010)	3 200 000
Number of households	745 115
Unemployment Rate	26 – 32%
Total number of Wards (Ward 2005)	88
- Number of Wards: Northern SDR	27
- Number of Wards: Eastern SDR	29
- Number of Wards: Southern SDR	32
Date of Metro Establishment	5/12/2000
Cities and towns amalgamated	9
Industries	8 000
Supporting Enterprises	5 000
Commercial Enterprises	19 000
International Airports: Johannesburg International Airport (JIA)	1
Metro Area in km	1 924 km ²
% of national GDP	18 %
% GDP from Manufacturing	28 %
Major Highways: N3, N12, N17, R21 and R24	4
Major Metropolitan Projects (including Blue IQ-projects contribution)*	
JIA Industrial Development Zone (Blue IQ-project)* (R190 million)	
Wadeville-Alrode Manufacturing Corridor (Blue IQ-project)* (R72 million)	5
Gauteng Rapid Rail Link (Blue IQ-project)*	
Germiston-Daveyton Activity Corridor (GDAC)	
R21 Corridor	
Tourism Development	

Fact Sheet

COAL

“Presently 95 percent of energy in South Africa is still generated from coal. Next year Eskom will officially announce the date upon which they will bring to an end an era of coal – the day when the last coal-fire power station will be built to switch over to climate friendlier technologies.

The first example is that of nuclear power. Eskom will be building at least 20,000 MW of nuclear generated power. The first nuclear power plant should be commissioned between 2015 and 2020.

SOLAR ENERGY

The second new technology is solar energy. We have a very big rollout of solar power in this country, especially with respect to solar panels at household level. In 5 years time most of the hot water geysers might run on solar power. Government might deliver subsidies on solar panels to replace household geysers.

ENERGY EFFICIENCY

The third “new technology” is making energy more efficient. The new energy efficient gloves are an example. One of the things Eskom is also doing is to bring back mothballed or decommissioned power plants to service. It takes about 5 years to get a power station up and running again, which is about half the time it takes to build a new station. This saves time and resources. Nobody else in the world has the experience of de-mothballing power stations. It is a new engineering field, produced in Africa.

The private sector also has a big role to play. For example: A paper mill uses a whole lot of power. The plant lets off a lot of excess steam. If you're letting off steam, or heat of any kind, then you are actually throwing away energy. If they capture this energy and build an adjacent power plant to turn the excess heat into electricity, then Eskom will buy this power from them and pump it into the Eskom electricity grid.

Initially when Eskom put out tenders for these sort of co-generation projects, they hoped to win 1000 MW worth of commitment from the private sector. They received 5000 MW which is a very large amount. To put this into perspective, the biggest power stations in the world produce only 5000 MW of power.” Robert Rutman, CREDIT SUISSE, Energy Access a Priority as African Growth Surges, 18 February 2008.

Handprint for change

TRANSFORM OUR ECOLOGICAL HANDPRINTS

The 4th International Conference on Environmental Education was held in Ahmedabad, India on 26/27 November 2007.

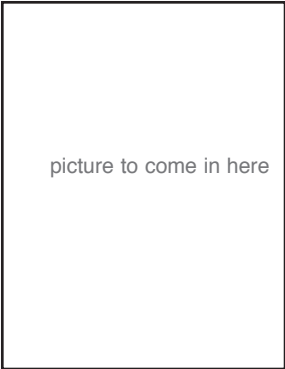
HANDPRINT OF CHANGE.

This is a handprint of a little girl, Srija from a school in Hyderabad, Andhra Pradesh, India.

An important concept introduced at the Ahmedabad conference in 2007 was that of the ecological handprint.

The concept of a Handprint is to decrease human footprints by taking more action towards Education for Sustainable Development.

According to the handprint concept we need to shrink our ecological footprint so that it will have no impact, and we need to start healing the planet and transforming our ecological handprints. We need to increase the good that we do for the planet. The positive impacts are measured in handprints. These impacts are concerned with three aspects of sustainability: environment, society and the economy.



picture to come in here

LIST OF ABBREVIATIONS			
ACSA	Airports Company South Africa	LED	Light-emitting diode (highly efficient light bulbs with prolonged-life)
AQMP	Air Quality Management Plan	LPG	Liquid petroleum gas
ARC	Agricultural Research Commission	MSA	Municipal Services Act
CBD	Central Business District	MI	Municipal Infrastructure (for the City)
CCC	Customer Care Centre	MWe	Mega-Watt equivalent
CCTV	Closed Circuit Television (surveillance cameras)	NDOT	National Department of Transport
CDM	Clean Development Mechanism (for carbon trading under the Kyoto Protocol)	NCPC	National Cleaner Production Centre
CEF	Central Energy Fund	NERI	National Energy Research Institute
City	The City of Ekurhuleni	NERSA	National Energy Regulator of South Africa
CFL	Compact Fluorescent Lamp	NMT	Non-motorised transport
CO2	Carbon Dioxide	PTP	Public Transport Plan (for the City)
CP	Cleaner Production	RE	Renewable Energy
DEAT	Department of Environment and Tourism	SAEDES	South African Energy Demand & Efficiency Standards (National Building EE Standards)
DME	Department of Minerals & Energy (national)	SARCC	South African Rail Commuter Corporation
DSM	Demand-side management	SDF	Spatial Development Framework (for the City)
eCO2	Equivalent carbon dioxide greenhouse gas contribution	SMMEs	Small, medium and micro enterprises
EE	Energy efficiency	SOER	State of Energy Report for Ekurhuleni
IP	Illuminating paraffin	SOV	Single-occupancy vehicle
IS	Infrastructure Services	SUV	Sports Utility Vehicle
JIA	Johannesburg International Airport	TDM	Travel Demand Management

COVER