



DURBAN: A CLIMATE FOR CHANGE

TRANSFORMING AFRICA'S FUTURE



COP17/CMP7
UNITED NATIONS
CLIMATE CHANGE CONFERENCE
DURBAN, SOUTH AFRICA



INTENTION OF THIS BOOKLET

Climate protection work, aimed at creating a safer, more sustainable, and responsive city has been undertaken by many sectors of eThekweni Municipality. The intention of this booklet is to provide delegates and other visitors to Durban attending COP17/CMP7 with a first point of reference for a range of these projects. It is not a comprehensive listing – but does give a sense of the broad range of cross-sectoral interventions that the Municipality is engaged in. It also highlights the fact that at the local level it is not possible to separate the climate protection agenda from the sustainability agenda.

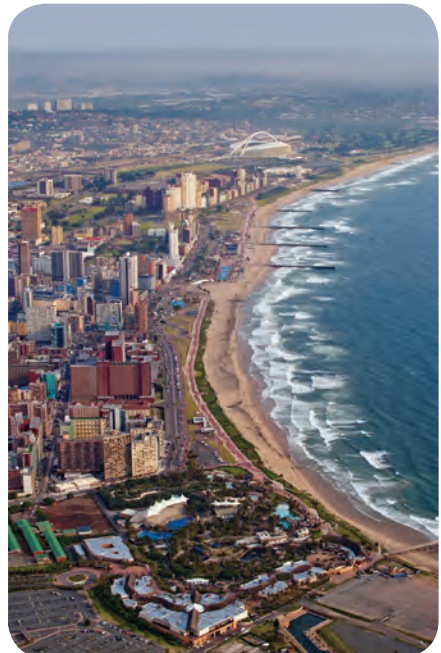
The information provided about the projects includes: a brief description of the climate challenge faced and the subsequent responses, key learning outcomes and contact details for further detailed information. Budget details are given VAT inclusive in South African Rands; \$1 = approximately R7 – 8.

The hope is that this evidence of clear, targeted and ambitious local action will inspire and encourage equally transparent, targeted and ambitious global outcomes amongst the parties present at COP17/CMP7.

THANKS

Thanks to local, national and international funding organisations that have contributed to projects showcased in this booklet.

The Durban Beachfront ►



Mayor's Foreword:



▲ Cllr James Nxumalo

As Durban readies itself to host the 17th United Nations Framework Convention on Climate Change (COP17/CMP7) we are reminded that the most significant threat to global welfare, economic development and poverty alleviation is climate change. Global environmental change at the scale threatened by climate change has the ability to undermine all the development gains made in South Africa since 1994 and to increase the plight of our already vulnerable communities. It puts at risk not only our city, our country and our continent, but the world.

One of the most significant challenges in South Africa is to educate ourselves about climate change, its impacts and how we should be responding. Each individual and each community needs to be empowered to act as a climate champion, and to be encouraged to work together to create a 'climate smart' city. As part of our COP17/CMP7 awareness raising efforts, this booklet is intended to inform readers of the climate protection work being undertaken by eThekweni Municipality in the fields of both adaptation and mitigation. The work documented here has made Durban a global leader in the field of climate protection and we hope it will inspire other cities in the Global South to take similar action.



His Worship Councillor James Nxumalo
Hounourable Mayor,
eThekweni Municipality

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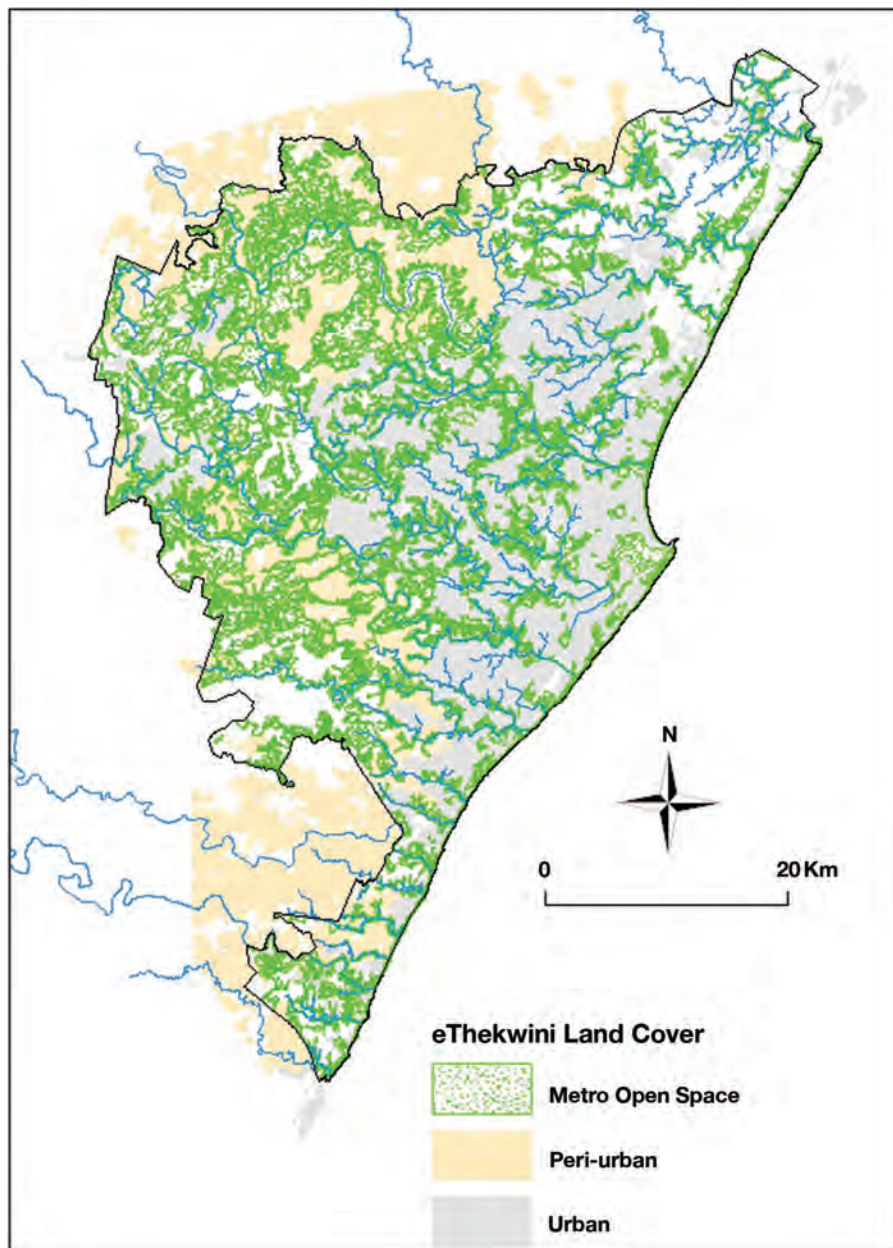
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Padding pools along the Durban Beachfront



Introduction:

Durban is an archetypal African city. It is the largest city and port on the east coast of Africa and is planned and managed by eThekweni Municipality. As with many cities in the Global South, Durban is faced with enormous developmental challenges. These include the provision of employment, education, ensuring adequate and equitable service delivery and addressing substantial infrastructural backlogs. Local communities are considered to be vulnerable to climate change impacts because of high levels of poverty and underdevelopment, and as a result their capacity to adapt to, and recover from, climate change related impacts is limited. They are also, in many cases, still directly dependent on ecosystem services as the basis for their survival and livelihoods.

While mitigation remains the focus for less vulnerable developed countries, for African cities there is a need to balance this concern with a shift towards the more immediate need to adapt to unavoidable climate change and to deal with residual damage. Given the reliance of people upon intact ecosystems, it makes sense that African cities prioritise an ecosystem-based adaptation model of climate protection. This model can be enhanced by encouraging communities to take up stewardship of their ecosystems via the Community Ecosystem-Based Adaptation (CEBA) model being pioneered in Durban. Through CEBA, local “green collar” workers benefit both financially and from services provided by healthy, protected and well-managed local ecosystems, and becoming involved in improving the sustainability of their built environment. Thus local ecosystems and the communities become engaged in a mutually beneficial relationship that can provide the basis for the development of a new ‘green economy’. This will minimise the need for expensive investment in “grey infrastructure” and will bring little risk of maladaptation.



To address the climate challenge effectively will require the rapid and radical transformation of our societies and governance structures. The hosting of mega events, like the 2010 FIFA World Cup™ and the COP 17/CMP 7 climate negotiations can be used to drive this transformation by raising local, national and international awareness of climate change issues, to create and encourage political support for climate protection, and to catalyse the conversion to the green economy.

A number of important climate change related interventions were instigated as a direct consequence of hosting the 2010 FIFA World Cup™ in Durban; these included reforestation projects with mitigation, adaptation and social upliftment co-benefits, as well as urban greening initiatives and awareness raising. Hosting the United Nations Framework Convention on Climate Change COP 17/CMP 7 negotiations has extended these efforts, providing the opportunity to increase awareness of climate change and the climate protection work that is being done by eThekweni Municipality. It has also catalysed the development of novel approaches such as the CEBA concept. A number of the projects showcased within this booklet are the direct result of Durban's hosting of mega-events. These projects are clearly identified with a 🍷.

The broader sustainability challenge

The climate protection work undertaken by eThekweni Municipality is part of a broader drive to achieve local level sustainability and equity. Despite the challenges facing Durban, eThekweni Municipality has been at the forefront of re-imagining the unsustainable apartheid city, and rebuilding more just and sustainable urban and rural landscapes. Ten years ago, two-thirds of Durban's population had no access to street lighting, housing, water, electricity, tarred roads and sanitation. Today, the municipality is unique in South Africa in having:

- Provided over 150,000 houses for the truly poor; provided 9 kl of Free Basic Water to over 300,000 households; implemented the largest countrywide programme to reduce water loss from 40 to 33 %; provided 65 mWh free electricity per month to over 65,000 households; undertaken a major drive to extend sanitation and refuse-removal to all households, de-sludged over 45,000 VIP pit latrines and built over 300 ablution blocks; created over 10,000 jobs per year through poverty alleviation exercises; focussed upon inner city development and densification and provided clinic services to over 2.5 million people.
- Ensured that the city has consistently achieved the highest credit rating of a South African municipality; has the best record and highest spend of capital expenditure (106 %); has the best record of unqualified audit reports; has won several awards for management and service delivery; is recognised as the leading South African municipality for financial governance; has reduced the total debt in the 'more than 120 day' category from R 3,49 to R 3,43 billion; has achieved the highest per capita spend per resident on the operating budget (R 6,473), which compares favourably against the lowest municipality, Cape Town (R 5,553).

- Maintains its infrastructure by spending over 11 % of the budget on maintenance; earmarked 25 % of the city's capital budget for economic projects and platform infrastructure; built the largest fibre optic network cable in South Africa and developed its own world-class billing and revenue management systems; partnered with private landowners to unlock industrial, commercial and residential land in the north of the city; invested over R 3 billion over three years on water and electricity networks; revitalised tourism with the beachfront rehabilitation; invested over R 1 billion in building business opportunities in key nodes in former township areas, including Bridge City; bid successfully to host COP17/CMP7; developed an outstanding Infrastructure Assets Management system and invested substantially in infrastructure e.g. over 500 km of sidewalks, 81 pedestrian bridges and 300 km of new road lanes.
- Committed significantly to achieving environmental integrity through undertaking to hold carbon neutral FIFA 2010 World Cup™ and COP17/CMP7 events; become heavily involved in agriculture to ensure food security for the poor of the city with over 600 community gardens, a soya programme, aquaculture and the delivery of over 3,000 rainwater harvesting tanks to poor households; developed a comprehensive energy programme, undertaken an energy efficiency demand side management programme, solar water heater and renewable energy projects; undertaken regular greenhouse gas reporting, hosted various energy forums; launched invasive alien plant removal and indigenous reforestation programmes and now offers hiking and mountain bike trails in the Durban Green Corridor; with the trails being developed and maintained by local communities.

Although much still remains to be done, the local growth path is focused upon sustainable job-creation and development, especially within the green economy, and through pioneering initiatives like the Durban CEBA. The following pages contain details of the climate change focussed work undertaken by the municipality over the past ten years. The lessons learned here show how engineers are now thinking like environmentalists, how environmentalists are designing like town planners, and how town planners are now mobilising communities and stakeholders. In essence Durban is about “business unusual”, it is a city breaking down old barriers and using them to build new bridges to a ‘climate smart’ future.



▲ The Green Economy provides much needed employment

Greening Events Projects:

Project Title: Greening Moses Mabhida Stadium.

Location : Masabalala Yengwa Ave.

Budget : R 6,6 million to implement greening measures at the stadium and precinct.

Sector : Cross-sector including Built Environment, Tourism, Eventing, Parks, Hospitality, Energy, Water, Waste and Biodiversity.

Key Climate Change Challenge:

The generation of substantial Green House Gas emissions through the running and use of the stadium. Climate change awareness, resource and energy efficiency.

Short Project Description:

Greening the stadium has yielded significant cost savings to the municipality, and provided the strategic advantage of being able to offer a “green” event hosting venue. This includes a 30 % reduction in possible energy consumption through energy efficient architectural design, technologies and fittings, saving around R 1 million per annum. There has also been a 74 % reduction in possible water consumption, saving around R 0.7 million per annum. Carbon emissions from building the stadium are being offset through local reforestation and renewable energy interventions.

Key Learning:

Given the flagship nature of the project it has demonstrated the strategic and economic value of establishing a green legacy at scale in the city, and has raised the bar for all subsequent and related developments in terms of greening objectives. It has also raised awareness amongst the municipal team of the importance of adopting a new green vision when conceptualising future development. 🍌



▲ Aerial view of the Moses Mabhida Stadium.

Project Title : Greening of Training Stadia for the 2010 FIFA World Cup™.

Locations : King Zwelithini Stadium in Umlazi; Princess Magogo Stadium in KwaMashu and Sugar Ray Xulu Stadium in Clermont.

Budget : R 4,3 million.

Sector : Local communities; professional services; construction.

Key Climate Change Challenge:

To upgrade the three Durban training venues for the 2010 FIFA World Cup™ in a manner that minimised energy and water consumption and utilised green technologies and building materials. This reduced operating costs for the venues and demonstrated green technologies in previously disadvantaged areas of the city.

Short Project Description:

A best-fit greening intervention was determined for each venue to achieve energy efficiency, water conservation, waste management and climate protection using funds provided by eThe-kwini Municipality and Danish International Development Agency (DANIDA). Water conservation is achieved through the use of rainwater harvesting, flow restraint valves, intelligent pitch irrigation, the hi-tech pitch at KwaMashu and dual-flush toilets and tap aerators. Energy efficiency is achieved through heat pumps, motion detection lighting, daylight timer switches and flood control lighting. Environmental Management Systems were developed for maximum operational efficiency.

Key Learning:

Profiling green technologies at these training venues demonstrates a responsible approach to infrastructure provision that can be viewed by a broad stakeholder base. Stadia have particular use patterns which make renewable energy systems appear non-feasible in cost-benefit analyses. This is unfortunate as the iconic nature of the facilities make them powerful messaging tools. Basing decisions on which green technologies to employ for event venues simply on a financial cost benefit basis undervalues other potential benefits of such approaches.



▲ The Sugar Ray Xulu Stadium in Clermont.

Project Title : COPI7/CMP7 Event Greening Programme.

Budget : R 5,8 million.

Location : Municipality-wide.

Sector : Cross-sector including Built Environment, Tourism, Eventing, Parks, Hospitality, Energy, Water, Waste and Biodiversity.

Key Climate Change Challenge:

Climate change awareness, resource and energy efficiency, converting Durban to a climate smart event destination, addressing adaptation needs.

Short Project Description:

This programme aims to reduce the ecological impact associated with hosting the COPI7/ CMP7 event. The core focus areas are carbon-neutrality, resource- and energy efficiency, ecological footprinting, the production of event greening guidelines and an awareness campaign around responsible accommodation and tourism approaches. It has also provided a platform for the development of the Community-Ecosystem Based Adaptation (CEBA) concept. These interventions will have a legacy value at the local, national and international level.

Key Learning:

The hosting and greening of mega events can be used to 'leap frog' the understanding and progress on critical environmental and developmental issues and to provide a platform for generating new transformative ideas. 🙌

▶
The Green Event Guideline is a helpful, simple guide to hosting ecologically friendly events



Project Title : Green Guideline Series.

Location : Municipality-wide.

Budget : R 516,000.

Sector : Cross-sector including Built Environment, Tourism, Eventing, Parks, Hospitality, Energy, Water, Waste and Biodiversity.

Key Climate Change Challenge:

Climate change awareness, resource and energy efficiency, converting Durban to a climate smart event destination.

Short Project Description:

The Green Guideline series provides practical tools to guide individuals, businesses and institutions in living and working more sustainably in Durban. They are concise, practical and focused documents providing clear information about choosing appropriate “green interventions.” The series includes Energy Efficiency, Water Conservation, Sustainable Waste Management, Green Landscaping, Green Roof and Green Eventing.

Key Learning:

High demand for the series confirms the need for concise, simple and useful information that makes transformation and change to sustainability more understandable and accessible. 🍌



▲ The Green Guideline Series provides Durban residents with simple and useful information to convert to a greener lifestyle

Project Title : COP17/CMP7 Durban Responsible Accommodation Campaign.

Budget : R 200,000.

Location : Municipality-wide.

Sector : Cross-sector including Built Environment, Tourism, Eventing, Parks, Hospitality, Energy, Water, Waste and Biodiversity.

Key Climate Change Challenge:

Climate change awareness, resource and energy efficiency, converting Durban's tourism establishments to a climate smart event destination.

Short Project Description:

To be able to market itself as a green eventing destination locally and internationally, Durban will need to demonstrate its ability to host events in a climate responsible manner. In this regard, responsible tourism approaches, formal responsible tourism certification systems and awareness of climate change and the COP17/CMP7 event have been actively promoted amongst accommodation facilities via forums, educational material and easy-to-use self assessment tools. The Responsible Accommodation Campaign is a pilot project for COP17/CMP7 and it includes the adoption of the National Minimum Standards for Responsible Tourism and will provide the basis for further work post the COP.

Key Learning:

Structured and resourced capacity building opportunities are critical for promoting new ideas and encouraging action. 🍌

▶ This Project aims to reduce the tourism carbon footprint for the benefit of all communities



Natural Environment Projects:

Project Title : Buffelsdraai Landfill Site Community Reforestation Project.

Budget : R 13,163,689 to date.

Location : Buffelsdraai.

Sector : Community, Natural Environment, Water, Energy.

Key Climate Change Challenge:

Mitigation as a part of mega-event offset initiatives and adaptation to restore vital ecosystem goods and services.

Short Project Description:

This project was initiated in 2008 as part of the “Greening Durban 2010 Programme” to offset the municipality’s 2010 FIFA World Cup™ carbon footprint (307,000 tCO₂e). The reforestation occurs within the buffer zone of the Buffelsdraai Landfill site (and will result in the reforestation of ~ 521 ha) creating employment and vocational training opportunities. Locally indigenous trees are sourced from adjacent indigent communities using the ‘tree-preneur’ model whereby community members collect seed and grow trees which are then traded for food, school fees, building materials etc. resulting in social upliftment, mitigation and adaptation co-benefits in the most disadvantaged regions. The restoration of ecosystems services (e.g. improved water quality, reduced run-off and sediment loss) provide downstream benefits for all users.

Key Learning:

Addressing the climate change challenge in a truly sustainable way requires win-win-win solutions that address mitigation, adaptation and human well-being needs. 🍷



▲ Buffelsdraai Landfill Reforestation Project nursery

Project Title : Inanda Mountain Reforestation Project.

Location : Inanda.

Budget : R 4,1 million to date.

Sector : Community, Natural Environment, Water, Energy.

Key Climate Change Challenge:

Mitigation as a part of mega-event offset initiatives and adaptation to restore vital ecosystem goods and services.

Short Project Description:

Uncontrolled alien invasive plant encroachment and erosion are prevented by the reforestation of steep scarp slopes following alien species removal. The tree-preneur model is used to ensure social upliftment.

Key Learning:

The project is taking place on communal land managed by a traditional authority, engagement with all local community stakeholders as well as traditional and local government leaders. As a result reaching consensus on the restoration plan and associated activities, has been critical to project success, and has emphasised the need for strong partnerships in achieving climate protection. 🌱



▲ The Inanda Dam provides a scenic backdrop to this project

Project Title : Paradise Valley Reforestation Project.

Location : Pinetown.

Budget : R 3,3 million in 2011/12 financial year for invasive alien plant control.

Sector : Community, Natural Environment, Water, Energy.

Key Climate Change Challenge:

Mitigation as a part of a mega-event offset initiative and adaptation to restore vital ecosystem goods and services. Managing biodiversity and ensuring the sustainable supply of ecosystem services under a climate changed future.

Short Project Description:

This is the official COP17/CMP7 ecosystem offset project for the local component of the event's footprint. Alien plant species are being removed and the area will be planted with locally indigenous tree species. This project will provide the catalyst for the development of a multi-stakeholder, catchment-wide management programme focusing on linking community and ecosystems in ways that provide the basis for the development of a green economy and that ensures poverty alleviation and the protection of biodiversity and the related ecosystem services.

Key Learning:

Transformative planning and management approaches are a key part of developing a 'climate smart' city. Key to success will be the ability of Public Private Partnerships to provide funding for local ecosystem-focused community employment opportunities that provide the foundation of a green economy. 🙌



▲ The Paradise Valley Reforestation Project is part of the Durban CEBA Initiative.

Project Title : Durban Metropolitan Open Space System (D'MOSS): Planning and Implementation.

Location : Municipality-wide.

Budget : R 2 million annual capital budget for land acquisition since 2002. This will increase to R 3,99 million in 2013/14.

Sector : Natural Environment.

Key Climate Change Challenge:

Ensuring that the climate change impacts on Durban's globally significant biodiversity and related ecosystem services are minimised.

Short Project Description:

The aim of D'MOSS (80,000 ha) is to protect the municipality's biodiversity resources and the related ecosystem services. The design of the system has recently been improved using systematic conservation planning techniques. The key challenge lies in securing and managing the system in a manner which is affordable and sustainable. Currently 89.1 % of D'MOSS is neither protected nor managed, 8.4 % is protected and managed whilst 2.5 % is protected but not managed.

Key Learning:

Credible and compelling scientific information and spatial planning tools are crucial in making the argument to conserve biodiversity. So too is the need to build inter-sector relationships, both within the municipality and with outside stakeholders such as tertiary institutions, to ensure effective implementation of the plan. Implementation of D'MOSS will be supported by the Durban CEBA programme.

► The Mangroves within the uMgeni Estuary are an excellent example of how the DMOSS system provides protection from climate change impacts like sea level rise



Project Title : EThekweni Municipality Systematic Conservation Plan.

Budget : R 100,000 in 2010/11 financial year.

Location : Municipality-wide.

Sector : Natural Environment, Development Planning.

Key Climate Change Challenge:

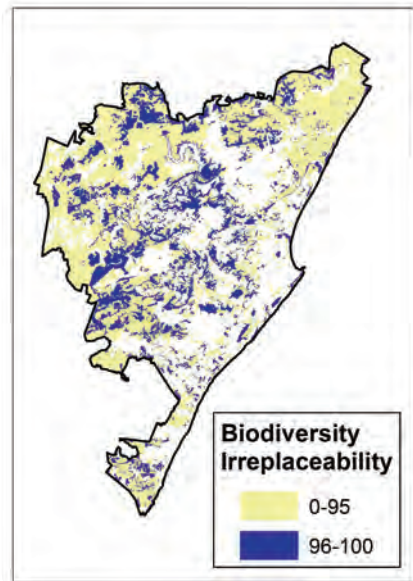
The aim is to improve the resilience of D'MOSS to climate change by ensuring that non-climate stressors such as habitat loss, loss of ecological viability and lack of connectivity are minimised. This is done through the use of Systematic Conservation Planning to identify priority biodiversity and ecosystem service areas, to optimize the representation and persistence of both.

Short Project Description:

Incorporation of a wide range of specialist input into a comprehensive plan that represents biodiversity pattern and process, the costs and opportunities that threaten and/or support these, and the ecosystem goods and services that these provide.

Key Learning:

Current biodiversity targets set at a national and regional scale are not appropriate to protect local level biodiversity.



▶ A screen shot of the SCP showing critical and irreplaceable biodiversity in eThekweni Municipality

Project Title : Non-User Conservation Servitudes (NUCS).

Location : Municipality-wide.

Sector : Natural Environment, Development Planning.

Budget : None.

Short Project Description:

NUCS registration is completed in favour of eThekweni Municipality but the land remains in private ownership and management. EThekweni Municipality provides rates relief where the land is appropriately managed. In this way conservation worthy land is secured by means other than land acquisition.

Key Learning:

Extension support to affected landowners must accompany the use of regulatory tools if the desired conservation outcome is to be achieved.



▲ Non-User Conservation Servitudes contribute towards the conservation of D'MOSS.

Project Title : Working for Ecosystems.

Sector : Natural Environment.

Location : Municipality-wide.

Budget : The Department of Environmental Affairs and Tourism provided R 3,5 million for this project in 2007/2008. EThekweni Municipality provided R 1,71 million in 2008/9; R 1,3 million in 2009/10; R 1,2 million in 2010/11 and has budgeted R 3,5 million in 2011/12.

Key Climate Change Challenge:

The spread of invasive alien species (IAS) is degrading natural habitats in both urban and rural environments with the consequent loss of biodiversity and ecosystem services. This situation is likely to be exacerbated by climate change.

Short Project Description:

This is a community-based environmental management and poverty alleviation programme currently operating in four municipal wards. The focus is on invasive alien plant control using an expanded public works model which creates job opportunities for the poor and unemployed. This type of approach is being utilised in the Durban CEBA initiative.

Key Learning:

The control and management of IAS is a long-term, multi-stakeholder process. An innovative approach to small enterprise development as part of the programme, accompanied by training, has already enabled the establishment of two small businesses that are now in a position to provide invasive alien plant services throughout the municipality. This programme is an important contributor to meeting poverty alleviation goals.



▲ Workers clearing invasive alien plant species to restore natural ecosystems.

Project Title : Working on Fire.

Budget : R 5 million to date.

Location : Municipality-wide.

Sector : Natural Environment.

Key Climate Change Challenge:

The spread of invasive alien plants and the loss of critically endangered natural grassland habitat in eThekweni Municipality, due to land transformation and fragmentation, is likely to be exacerbated by climate change due to increased photosynthetic rates of C3 plants (e.g. trees), compared with C4 plants (e.g. grasses). This will likely result in the conversion of grassland into woodland habitats.

Short Pproject Description:

Two roving teams undertake invasive alien plant control and fire management, primarily in grassland areas not receiving management. Periodic burning mimics pre-development conditions, which promotes grassland health.

Key Learning:

Highly mobile crews, good training, and experienced management have obtained excellent results in terms of outcomes achieved. Managing large scale natural landscapes is time and resource intensive.



▲ Fire management practices are essential for grassland maintenance

Project Title : Invasive Alien Plant (IAP) Control Programme.

Sector : Natural Environment.

Location : Municipality-wide.

Budget : R 9 million.

Key climate change challenge:

Invasive alien species (IAS) are recognized as a global threat to ecosystem health and economic resources. This threat may be exacerbated under future climate change scenarios and other drivers of global environmental change.

Short project description:

The eThekweni Municipality IAS Framework Strategy and Action Plan outlines the goals and means of delivery required to ensure coordination and prioritisation regarding the control and management of IAS in the city.

Key learning:

There is an urgent need for additional research into climate change impacts upon invasive alien species to avoid maladaptation or wasted expenditure.



▲ An Invasive Alien Plant control team

Coastal & Catchment Protection Projects:

Project Title : Sihlanzimvelo Project.

Location : Inanda, Ntuzuma & KwaMashu.

Budget : R 15 million per annum over 3 years.

Sector : Water, Catchment and Stormwater Management, Community.

Key Climate Change Challenge:

Variable rainfall supply and an increased risk of flooding from more intense rainfall events, combined with degradation of river catchments due to development are likely to increase erosion. This will impact on drainage systems and water supply.

Short Project Description:

The Sihlanzimvelo Project is an integrated, systematic and sustainable approach to the maintenance of the 800 km of watercourses in eThekweni Municipality. The purpose is to ensure that all watercourses are restored to, and maintained at an appropriate environmental standard, thus safeguarding local communities.

Key Learning:

Communities (particularly the youth) residing in close proximity will be employed to restore and manage local streams and rivers. Participants derive benefit both in terms of employment and the improved ecosystem services from watercourse restoration. This project would, therefore contribute to the development of the Durban CEBA initiative.



▲ The Sihlnazimvelo Project aims to restore ecosystems for local community members

Project Title : Design Floodline Planning.

Location : Municipality-wide.

Budget : R 830,000 operational budget for 2011/12, this work is ongoing as budget allows.

Sector : Catchment Management, Water, Community, Development.

Key Climate Change Challenge:

A recent study of the impacts of climate change within eThekweni Municipality indicates that there will be a 15 % increase in the intensity of rainfall and a possible 20 % increase in stream flow. This suggests an increase in the severity and occurrence of flood events, putting existing settlements and infrastructure at risk.

Short Project Description:

Storm water pipe and culvert designs are being adjusted to accommodate the predicted increase in rainfall and stream flow intensities. Flood lines are being revised to accommodate this increase in order to ensure that new developments in or adjacent to rivers are not negatively impacted. Developers will be requested to include the 15 % increase in intensity of rainfall in their calculations for post development runoff, while using the existing rainfall curves for the pre-development runoff calculations.

Key Learning:

Climate change adaptation is another factor requiring attention in engineering design, not a standalone requirement. Where climate change considerations are used to guide the application of existing policies it is easier to get climate change incorporated into the design. An example of this is the adjustment of the design rainfall figures by 15 %.



▲ The red-line indicates the setback line for predicted future flooding

Project Title : Sea Level Rise Assessment.

Location : EThekweni Municipality coastline.

Budget : R 500,000 to date.

Sector : Coastal Policy, Natural Environment.

Key Climate Change Challenge:

Sea level rise resulting from climate change is expected to affect coastlines around the world. Given the key role that Durban’s coastline plays in the city’s economy, there is an urgent need to better understand the local level impacts of this change.

Short Project Description:

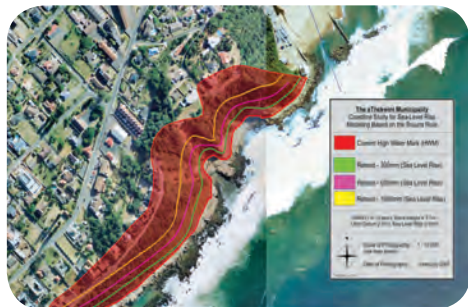
A number of sea level rise scenarios (30, 60 and 100 cm) were developed using both down-scaled global climate and semi-empirical models. These were used with wave run-up and shoreline regression models to determine possible future shoreline positions. Along portions of the coast the slip failure zones associated with steep dune systems were also mapped.

Key Learning:

The impacts of future sea level rise vary along the coastline. The most vulnerable areas identified are (1) the low flat sections of the coast such as the Central Beachfront and Isipingo Beach and (2) all estuaries along the coast. With the aid of this information it is possible to develop Shoreline Management Plans to address the future negative impacts.



▲ One of the predictions of climate change is an increase in sea levels



▲ Sea level rise has been modelled using the 30, 60 and 100 cm scenarios

Project Title : Durban Central Beachfront Dune Rehabilitation.

Location : Durban's 'Golden Mile' Beachfront.

Budget : R 6 million capital expenditure and R 1,5 million per annum operating expenditure.

Sector : Coastal Management, Economic, Health and Recreation.

Key Climate Change Challenge:

Protection of infrastructure against wave surge and climate change induced sea level rise. Management of wind-blown sand from beaches and the creation of an attractive green space.

Short project Description:

This project involves the augmentation and protection of existing dunes, where possible, through the extension of frontal dune zones. This is achieved by erecting sacrificial fencing (to aid dune development) and timber boardwalks (to define beach access points), as well as planting of indigenous dune plants. It has resulted in the establishment of a new frontal dune zone along extensive stretches of the Promenade and required the introduction of a regular maintenance regime.

Key Learning:

The value of dunes in managing wind-blown sand has led to the extension of this work in the South Beach and Bay of Plenty areas, but it has also highlighted the need for an ongoing maintenance regime. Various practical lessons have been learnt with regard to design, selection of materials and construction. 🙌



▶ Durban's "Golden Mile" is now protected by this dune rehabilitation initiative

Water Projects:

Project Title : Sliding Scale of Tariffs.

Location : Municipality-wide.

Budget : No direct costs to the municipality excluding staff time.

Sector : Water

Key Climate Change Challenge:

Erratic water supply, as a consequence of predicted climate change, will potentially compound challenges currently faced whereby increasing demand for potable water exceeds supply capacity.

Short Project Description:

A basic amount of water (9 kl) is provided free of charge to make water available to poor families in an economically sustainable way (i.e. via cross subsidisation). The subsequent introduction of a rising block, welfare maximising tariff structure has led to a fall in average household consumption for two reasons: high volume consumers cut wastage and more poor families using lower amounts of water were connected to the network. As such this project represents an important demand management strategy for the city.

Key Learning:

There has been a trend of decreasing consumption per connection (see graph): In 2004/05 the average consumption per connection was 1.47 kl/day. In 2010/11, it has decreased to 1.25 kl/day. In 6 years, eThekweni Water Services have added 79,469 new connections and sales have only increased by 14,537 kl/day. (0.18 kl/ new connection). Analysis of low-cost housing projects shows that these new connections use approximately 0.5 kl/day.



▲ Remarkable reductions in water consumption have been achieved using the sliding scale of tariffs system

Project Title : Non-Revenue Water Reduction: Water Pressure Management Programme.

Location : Municipality-wide.

Budget : ± R 20 million per annum.

Sector : Water, Energy.

Key Climate Change Challenge:

Durban is a water stressed city and the assurance of supply has dropped from the desired level of 1:100 to 1:16. Approximately 20 % of electrical energy consumed by eThekweni Municipality is related to the treatment and distribution of water. Improved efficiencies gained in this area thus have a direct impact on kilowatts consumed and Green House Gas emission levels.

Short Project Description:

This programme involves the installation of new pressure management devices, the optimisation of the settings on existing valves and the optimisation of existing pressure reducing valves using time or flow control. A recent innovation is the use of remote critical point sensing to control the pressures (i20).

Key Learning:

These projects have to be carefully managed to ensure that water supply is uninterrupted at all times. The Return on Investment is typically achieved within 3 months, sometimes within a week! Less water wasted mean less energy wasted.



▲ The i20 pressure sensor helps reduce water loss in the municipality

Community Projects:

Project Title : Community Adaptation Plans (CAPs).

Budget : R 2.5 million.

Location : Amaoti, Ntuzuma and Ntshongweni.

Sector : Food sovereignty, Community Development, Water.

Key Climate Change Challenge:

Indigent communities that rely on ecosystem goods and services are most vulnerable to changing weather patterns as a consequence of climate change.

Short Project Description:

The CAP project had three sub-projects:

- 1) A social vulnerability and adaptation planning study, conducted in Amaoti, Ntuzuma and Ntshongweni, aimed at understanding how climate change impacts exacerbate daily challenges and risks faced by vulnerable communities.
- 2) An assessment of climate change impacts upon maize, including an investigation into the productivity of alternative staple crops under climate change conditions and their social acceptability.
- 3) Research into water harvesting options and the undertaking of a local level project focusing on water harvesting, water-wise landscaping and the improvement of a community garden were initiated at a school in Luganda.

Key Learning:

Social cohesion is critical in order for communities to be able to respond to the impacts of climate change in a coherent and integrated manner. There is a need for local champions to drive specific solutions to the challenges being faced.



▲ Community members enjoying the fruits of their labour

Project Title : Luganda School Water Harvesting and Micro Agricultural Water Management Technology.

Location : Luganda.

Budget : R 350,000.

Sector : Water, Agriculture.

Key Climate Change Challenge:

Erratic and periodically heavy rainfall making smallholder agriculture and market gardening difficult to sustain.

Short Project Description:

The project involves harvesting roof (clean) water from classroom roofs and surface (grey) water from school grounds into two separate storage tank systems. This water is used by members of the community in gardens established on school grounds, down slope from the water storage structures. Water is accessed by means of valves, with each gardener equipped with a valve key connected to a hose-pipe for watering crops throughout the year.

Key Learning:

Despite the success of Phase I, a lack of sustained institutional support and resourcing has put this pilot project at risk and provides a compelling argument for the Durban CEBA initiative as a means by which a structured and programmatic approach could guarantee ongoing adaptation action.



▲ Community gardeners benefit from the rehabilitation work

Project Title : Durban Green Corridor.

Location : uMngeni River catchment.

Budget : R 4,5 million (in addition to R 3 million from external partners) to date.

Sector : Tourism, Natural Environment, Economic Development.

Key Climate Change Challenge:

The loss of biodiversity and the degradation of ecosystems and water quality will mean the loss of critical ecosystem goods and services. This will be exacerbated by climate change impacts such as flooding causing increased erosion.

Short Project Description:

To rehabilitate and manage the open spaces of the uMngeni River catchment and to promote adventure sports, nature-based recreation and eco-tourism in a corridor linking the Drakensberg Mountains to Durban, thus forming the basis in the development of a greener economy. Four development zones are located at Isithumba in the Valley of 1000 Hills, Inanda dam, the uMngeni Estuary Green Hub (a 2010 World Cup™ initiated project demonstrating green technologies like solar energy panels, natural ventilation cooling systems and rainwater harvesting) and an international sister city climate change partnership in the uMhlangane River catchment. The main activities are invasive alien plant and pollution control, catchment and wetland rehabilitation, indigenous tree planting, environmental education, youth development through sports and the promotion of outdoor sports. The rehabilitation of ecosystems helps restore the services they provide and the employment increases community resilience to climate change impacts.

Key Learning:

Success requires the development of a sustainable community based eco-tourism and environmental management model for the entire catchment that involves a broad range of municipal and other stakeholders.

► The Green Hub has an energy and water efficient design and is an excellent tool for promoting awareness of climate change issues



Research Tools Projects:

Project Title : Wind Resource Map.

Location : Municipality-wide.

Budget : R 200,000.

Sector : Renewable Energy.

Key Climate Change Challenge:

Replacing fossil fuel-based energy supply with renewable energy alternatives.

Short Project Description:

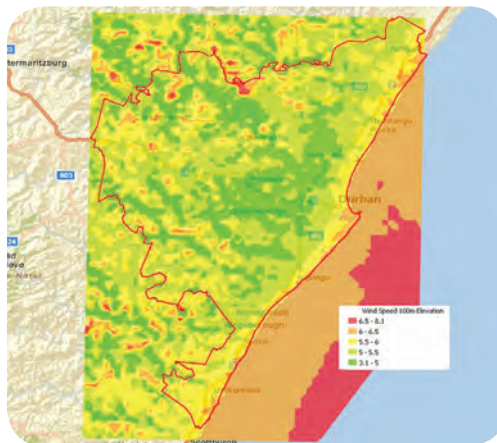
The eThekweni Energy Office has developed a municipal map highlighting wind power generation potential. Wind speeds $> 6.2 \text{ m.s}^{-1}$, which is sufficient for wind farms, were recorded in a number of areas. The study identified 10 sites for further investigation for the development of 20 mW wind farms. The situation is also favourable for smaller scale wind power production to power homes and smaller industries.

Key Learning:

While other regions within South Africa have greater wind potential than Durban, the wind map demonstrated that the city does have some potential for wind energy. More detailed site analysis is required for any wind project to determine the exact potential of a particular site.

URL: <http://www.kznenergy.org.za/projects.aspx?cat=92>

►
Output from the
wind resource
study.
Orange and red
pixels denote
suitable wind
conditions



Project Title : Municipal Adaptation Plans Cost-Benefit Analysis.

Budget : R 1,449,643.

Location : Municipality-wide.

Sector : Health, Water and Disaster Management.

Key Climate Change Challenge:

Multiple climate change challenges spanning the Health, Water and Disaster Management Sectors require the development of a structured and programmatic approach to adaptation planning. Limited funding and capacity requires that a means of prioritisation of adaptation actions is identified.

Short Project Description:

The adaptation planning process employed a multi-criteria assessment approach to ranking a list of adaptive responses in each of the three sectors. The final score was derived using a combination of merit (of the plan) and urgency. To further prioritise interventions in terms of implementation, an innovative cost-benefit analysis is being undertaken whereby the number of people benefiting from an intervention is used to assess priority instead of the usual financial metrics. This is a more suitable approach within cities of the Global South, such as Durban, where human need and adaptation are two sides of the development coin.

Key Learning:

The development of sector specific adaptation plans that are fully aligned with existing business plans, development objectives and available funding and skills is critical to success and the only practical means by which to begin mainstreaming the process of adaptation at the local level. The prioritisation of disaster risk reduction is also central to any municipal adaptation planning process.

▶
The Municipal Adaptation Plan will be an important tool for tackling climate change impacts like sea level rise



Project Title : Integrated Assessment Tool for Climate Change Adaptation.

Location : Municipality-wide.

Budget : R 4,211,859.

Sector : Water; Coastal & Catchment Management, Health, Natural Environment and Agriculture.

Key Climate Change Challenge:

There is a need for the development of tools which facilitate the spatial display and interrogation of climate impacts across a range of sectors and assist local government in evaluating the impacts on long-term planning and budgeting.

Short Project Description:

This project involved a detailed analysis of multiple sector impacts (using downscaled temperature and rainfall projections) and the development of a standalone software platform for the spatial display and interrogation of sector impact modules.

Key Learning:

In an attempt to produce a tool which could be easily utilised and which was still technically comprehensive, the overall outcome is a platform that is too difficult for decision makers to utilise and not sufficiently sophisticated to provide meaningful technical guidance to more expert users. This has highlighted the difficulty of developing an appropriate climate protection tool box for local government. Further work is thus required to determine an appropriate way forward.



▲ Screenshot from the Integrated Assessment Tool

Project Title : Low Carbon Durban Research Project.

Location : Municipality-wide.

Budget : R 2.1 million.

Sector : Transport, Electricity, Development Planning.

Key Climate Change Challenge:

To develop a strategic level understanding of the key interventions required to enable eThekweni Municipality to pursue a low carbon development pathway.

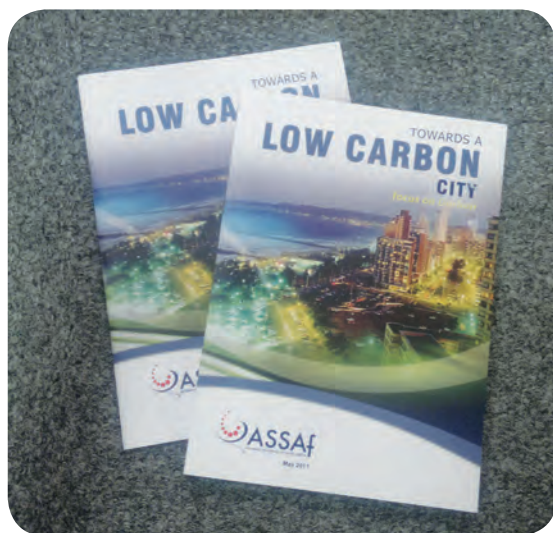
Short Project Description:

The Low Carbon Durban Research Project utilized the expertise of prominent scientists from the Academy of Science of South Africa and other international scientists to develop a Low Carbon Durban Report to assist Durban's transition to a low carbon city.

Key Learning:

Key Recommendations include:

- Ensuring a shift towards a green economy with climate change co-benefits.
- Giving urgent attention to the transport sector in the transition to a low carbon Durban.
- Promoting low carbon consumption and the implementation of low carbon land use planning.
- Ensuring the integration of mitigation and adaptation activities. The need for visionary leadership and a multi-level governance approach.



▲ The “Towards a Low Carbon City” report aims to provide decision makers with the information to guide the city towards a low carbon future

Developing Institutional Capacity:

Project Title : Disaster Operation Centre.

Location : Municipality-wide.

Budget : R 42 million.

Sector : Disaster Management across all sectors.

Key Climate Change Challenge:

Over and above the response to technological and human made disasters, this centre was established to help pre-emptively identify and counter the threats posed by climate change and climate variability, including severe storms and extreme heat events.

Short Project Description:

The Municipal Disaster Management Centre was activated on 1st June 2010. This centre co-ordinates risk management and disaster response throughout the municipality. Coordination capability has been enhanced by the installation of 240 CCTV cameras, as well as a mobile camera.

Key Learning:

This system operated successfully during the 2010 FIFA World Cup™ with successful coordination of all functions. 🙌



▲ Inside the Disaster Operation Centre during the 2010 FIFATM World Cup

Project Title : Establishment of eThekweni Municipality's Energy Office.

Location : Municipality-wide.

Budget : R 2,4 million to establish the office; R 5,57 per annum.

Sector : Climate Change Mitigation.

Key Climate Change Challenge:

Prior to the establishment of the Energy Office, the responsibility for Energy Efficiency, Renewable Energy and Climate Change Mitigation was not clearly defined within municipal structures, and there was no clear policy directing energy related city matters.

Short Project Description:

Using DANIDA funding, eThekweni Municipality embarked on a concerted energy efficiency drive, which resulted in the establishment of the Energy Office in 2008 and the finalisation of the eThekweni Energy Strategy in February 2009. In January 2010, the eThekweni Council adopted the eThekweni Energy Strategy, which clearly articulated the mandate and responsibility of the Energy Office. As a result the Energy Office now initiates key strategic energy interventions in the Residential Sector; Local Authority and Public Sector; Industry, Commerce and Agribusiness Sector and the Transport sector.

Key Learning:

The key challenge during the establishment of the Energy Office lay in identifying the institutional home for the unit. The responsibility of the Energy Office covers a range of sectors therefore institutional reporting lines need to cover a range of departments. The importance of a comprehensive and pragmatic energy policy for the city emerged as a key learning. The eThekweni Energy Strategy has ensured that much of the planning and research for renewable energy and energy efficiency targets has already been completed. The actions are very pragmatic and implementable and go a long way to creating a framework for the operation of the Energy Office in the city.

Project Title : Establishment of eThekweni Municipality's Climate Protection Branch.

Location : Municipality-wide.

Budget : Approximately R1 million per annum.

Sector : Climate Change Adaptation.

Key Climate Change Challenge:

Addressing the range of cross-sectoral and developmental impacts associated with the projected changes in temperature, rainfall and sea level rise that are associated with climate change in Durban necessitated the creation of an adaptation-dedicated branch.

Short Project Description:

The Climate Protection Branch was established in 2007 and is housed within the Environmental Planning and Climate Protection Department. The work undertaken by the branch has contributed towards Durban being considered a global leader in climate change adaptation through the implementation of novel and innovative work streams focused on community, municipal and ecosystem-based adaptation. This work has contributed substantially towards the development of the Durban CEBA initiative.

Key Learning:

Much of the work undertaken over the past five years has involved a "learning by doing" approach. It is recognised that climate change adaptation solutions identified for a particular impact, or within a community, will not necessarily be transferable to other communities or cities. The hosting of COP17 has provided an important opportunity to raise awareness of adaptation issues amongst local residents and international visitors to the city.

Project Title : EThekwini Metro Connect.

Location : Municipality-wide.

Sector : ICT service provision throughout all sectors of eThekwini Municipality.

Key Climate Change Challenge:

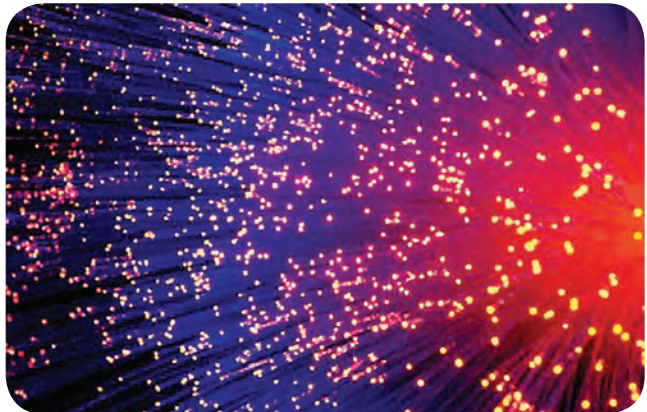
Utilising digital products to increase efficiency and reduce emissions associated with avoidable travel and printing.

Short Project Description:

MetroConnect is a layer 2 VPN municipal next generation fibre network spanning eThekwini Municipality. It provides e-government services to both its internal stakeholders and to Durban's residents, making Durban a true digital city. MetroConnect facilitates substantial increases in productivity by connecting the city's wide array of services, through offices such as libraries, clinics and emergency services, amongst others, with multiple outlets connected to a central network that provides an information super-highway.

Key Learning:

By providing its own data services, eThekwini Municipality has achieved significant cost savings, while dramatically increasing the bandwidth available to its offices. There are further savings on voice costs as offices are migrated to VoIP services. CAD documents from the City Engineers, historically too large to share over the network can now be transferred across the city in seconds, and diagnostic imaging such as MRI scans in hospitals can be viewed in real time. Services to municipal offices have improved which directly benefits all the residents of Durban.



▲ Durban has embraced the power of fibre optic to convert to a digital city

Durban Botanic Gardens Projects:

Project Title : Durban Botanic Gardens: A Climate Change and Biodiversity Awareness Centre of Excellence.

Location : Durban Botanic Gardens.

Sector : Parks and Gardens, Community, Natural Environment, Urban Agriculture.

Key Climate Change Challenge: A general lack of awareness of climate change and an understanding of the value of biodiversity and healthy ecosystems in buffering communities against the impacts of climate change.

Short Project Description:

A number of awareness raising initiatives have been developed at the Durban Botanic Gardens. These informative and interactive displays address issues related to climate change, including the value of biodiversity, water conservation, food security and renewable energy. Projects include: The Renewable Energy Project (budget = R 300,000) where two large solar panel arrays have been installed and connected to the Visitors Complex power supply.



▲ The solar PV arrays power the visitor's centre at the Botanic Gardens and help raise awareness of the value of renewable energy

The system tracks with the movement of the sun thereby increasing solar power generation by up to 30 %. The Perma-culture Centre and Food Garden Network (budget = R 250,000). This centre has been running permaculture programmes since 2008. A training and working garden functions as an interpretive space to explore the idea of a cultivated ecosystem and how this links to ideas around environmental resilience.

Interpreting Grasslands and Biodiversity (Budgets R 50,000 and R 200,000). Loss of grassland systems has caused a major loss of biodiversity and an increase in carbon emissions. A new grassland garden features a range of local indigenous grassland species and interpretation boards to highlight the important environmental value of grassland ecosystems. Interpreting biodiversity and plant conservation issues is an educational priority. Several exhibits in the Gardens focus on explaining the concept of biodiversity, local implications with ideas for inspiring responsible action.



▲ Informative signs help create awareness of the permaculture garden initiative

Key Learning:

Public spaces such as a Botanic Gardens can provide key climate protection focal points in cities at which communities can be exposed to transformative ideas and can interact with practical demonstrations of how it is possible to live and develop in a more 'climate smart' way.



▲ The interactive displays in the biodiversity and grasslands gardens provide an excellent educational experience for school goes

Transport Projects:

Project Title : Integrated Rapid Public Transport Network (IRPTN).

Location : Municipality-wide.

Budget : Not yet finalised, but billions of Rands during first phase.

Sector : Transport.

Key Climate Change Challenge:

Duplication of transport services and a lack of integration result in the wasteful usage of scarce resources, increased pollution and increased carbon emissions.

Short Project Description:

The development an extensive and inclusive public transport network plan which will ultimately allow residents easy access and mobility throughout the municipal area. A part of this network is already in place – the People Mover system of buses covers the entire central business district and is a cost-effective and reliable way of travelling within the city centre.

Key Learning:

Besides the implementation of the People Mover; this project is still in the planning phase. In a city facing developmental challenges, obtaining funding for implementation is a major obstacle to realising this network.



▲ The People Mover is a cheap, reliable and comfortable way of travelling around the city centre

Project Title : Electric Bicycles Pilot.

Location : Municipality-wide.

Budget : R 18,000.

Sector : Transport, Energy.

Key Climate Change Challenge:

Mitigating carbon emissions associated with transport.

Short Project Description:

Three electric bicycles were purchased by eThekweni Municipality in 2010 in order to establish if they were a suitable mode of transport for any of the various transport requirements of the municipality. The three bicycles were rotated amongst a variety of staff and departments. Reports and interviews were completed with users to determine potential applications of electric bikes within the municipality.

Key Learning:

Electric bikes do not appear to be practical for travel over long distances; however inner-city distances of around 20 km are suitable. The following potential uses were identified for electric bikes:

- 1) Commuting of staff living in close proximity to their offices
- 2) Travel between municipal offices where the distances are relatively short
- 3) Metropolitan police patrols. With regard to the latter, an additional ten have been purchased for a larger pilot of metropolitan police patrols.



▲ Electric bikes are an excellent low carbon way of patrolling the Durban Beachfront for the city police service

Project Title : Non-motorised Transport Green Circuit and Key Building Connections: Phase I.

Location : M4 route over uMgeni Estuary , KE Masinga, Bram Fischer and John Zikhali Roads.

Budget : R 23 million.

Sector : Transport.

Key Climate Change Challenge:

Reducing the use of motorised transport for inner city trips thereby reducing the transport-related carbon emission footprint in the city.

Short Project Description:

This project involves the provision of cycling infrastructure and lanes to connect natural environmental resources and key city infrastructure in the Durban central business district. This includes the widening of the bridge across the uMgeni Estuary on the M4 route.

Key Learning:

The need to make cyclists more visible to motorists, as well as exposing people moving between defined start and end points to cycling and walking as alternative modes of travel. A key learning was identifying entry barriers and constraints to cycling in Durban and exploring solutions or mitigating measures to these.



▲ The bridge across the uMgeni Estuary has been widened to accommodate cyclists

Built Environment Projects:

Project Title : Priority Zone Facilities Management.

Location : Durban Central Business District.

Budget : R 34 million to date.

Sector : Public Realm and the Built Environment.

Key Climate Change Challenge:

To maximise the efficiency of city management in order to ensure the sustainability of operational systems, which will in turn reduce environmental and climate impact.

Short Project Description:

The project is a pilot programme aimed at developing a Proficient Integrated Urban Realm Management Model that could be replicated across the municipality in key strategic or economic nodes. The vision of this architectural and urban management product is to create a holistically healthy urban environment for all residents of Durban. This includes a city that is efficient and responsive, that attracts property investments and tourism, and that creates opportunities for its residents whilst always meeting their needs.

Key Learning:

Efficient public and social realm management will bring about significant stability in a city, catalyzing a greater sense of awareness, accountability, ownership/ stewardship and pride in the built and natural environments.



▶
Aerial view of the Priority Zone green roof

Project Title : Green Roof Pilot Project.

Location : 166 K.E. Masinga Road.

Budget : R 1,587,903 to date.

Sector : Built Environment, Storm Water.

Key Climate Change Challenge:

Urban heat island effect and run-off from impermeable urban surfaces are predicted to increase due to climate change. Loss of natural areas in the city has resulted in a loss of biodiversity and lost opportunities for ecosystem-based adaptation.

Short Project Description:

The green roof pilot project commenced in 2008 and is ongoing. The roof is vegetated with locally indigenous species to attract biodiversity. The temperature reduction and storm water attenuation benefits of the roof are being monitored and this knowledge is being used to promote the usage of green roof technologies throughout Durban through the development of a green-roof guideline document.

Key Learning:

Key co-benefits of the green roof include a significant increase in biodiversity, roof rainwater run-off attenuation, a reduction in building temperature, the potential for inner-city food production and an improved working environment for staff. The development of the green roof also indicated some of the difficulties involved in changing people's perceptions of the urban environment.

▶ The Green Roof co-benefits include encouraging biodiversity back into the city centre.



Project Title : EThekwini Water & Sanitation (EWS) Customer Service Centre.

Location : 133 K.E. Masinga Road.

Budget : R 24 million.

Sector : Local Government, Water, Energy.

Key Climate Change Challenge:

Minimise energy consumption, conserve water and harvest phosphates (a diminishing resource) from urine.

Short Project Description:

In the new EWS building, ground water from below the parking basement floor; rainwater from the roof and condensate from the air conditioning units is collected in rainwater tanks and used for toilet flushing and to water plants. The plants in time will form a green canopy over the pergola structure, shading the public piazza and reducing heat load at windows, thereby lessening power demand for mechanical cooling, and making it possible to install large areas of glazing to provide natural lighting. Urine is collected from waterless urinals and `no-mix` WCs, stored and processed to extract phosphates.

Key Learning:

High quality integrated "green" energy-saving architectural designs can be realised within municipal building projects without unacceptable pressure on time and budget constraints.



▲ The eThekwini Water & Sanitation Customer Centre has an energy and water efficient design.

Project Title : South Durban Basin (SDB) Biodiversity and Greening Programme and Recycling Pilot Project.

Location : Clairwood and SDB schools.

Budget : R 200,000.

Sector : Education, Community, Waste.

Key Climate Change Challenge:

The South Durban Basin is environmentally degraded, experiencing air pollution, waste disposal problems and the loss of important natural resources. This has undermined the quality of life of local communities and resulted in community mobilisation to address these issues. These challenges are likely to be exacerbated by climate change impacts.

Short Project Description:

A general improvement of the SDB included the upgrading of green areas around the school using indigenous plants, the development of a permaculture garden, use of rainwater harvesting tanks, education and awareness and a reduction in the amount of recyclable waste that goes to landfill sites through recycling initiatives.

Key Learning:

Developing a culture of environmental consciousness among learners helps them understand the value and the uniqueness of biodiversity in general, and the benefit of intact ecosystems, in terms of the services that they provide. The initiative has also demonstrated how small contributions made by different stakeholders help to reduce the challenges faced by the community as a whole.

► Litter collection is a valuable awareness raising tool.



Renewable Energy and Energy Efficiency Projects:

Project Title : COP17/CMP7 Concentrated Photovoltaic (CPV) Solar Project.

Location : Verulam.

Budget : R30 million capital investment.

Sector : Renewable Energy.

Key climate change challenge:

Avoiding greenhouse gas emissions from fossil fuel energy generation by implementing renewable energy generation options.

Short project description:

Installation of a 500 kW concentrated solar photovoltaic dual axis tracking system in eThekweni Municipality. This is the largest Solar CPV installation in South Africa and is being implemented as a showcase for COP17/CMP7. The project also has a focus on skills transfer to municipal staff and public awareness-raising during the COP17/CMP7 event.

Key learning:

This is the first time a solar renewable energy project of this size has been installed in the country. As a result, there was significant learning with regards to planning and preparing for the installation. This includes processes for environmental impact assessments, zoning, land lease agreements and grid connection requirements. Various eThekweni Municipal departments have been involved in different stages of the program and have therefore had first-hand experience in the process of a large scale solar CPV installation.



▲ The CPV new Solar Project is the largest installation in South Africa

Project Title : Wonderbag™ Residential Cooking Efficiency Programme.

Location : Chesterville.

Budget : R 190,000.

Sector : Energy.

Key Climate Change Challenge:

Reducing fossil fuel-based energy supply through energy efficient cooking technology.

Short Project Description:

The Wonderbag™ is a heat-retention/insulation cooker. EThekweni Municipality is currently piloting 3,500 Wonderbags™ in the Chesterville area, prior to implementation throughout the city. The Wonderbag™ saves approximately 0.5 tonnes of carbon per year if used 2 or 3 times per week. This heat-retention cooker is South Africa's first programmatic CDM project and is being registered by the UNFCCC. The resultant revenue will ensure the project's commercial sustainability by subsidising the price at which the bags are sold. It will also be used to support communities of Wonderbag™ users to achieve "green" lifestyles.

Key Learning:

Green living can result in social and economic benefits. The Wonderbag™ units reduce the amount of time required to be spent on cooking as the people involved do not have to be present during cooking. Also less electricity is used in households in general.



▲ The Wonderbag™

Project Title : Community Renewable Energy Projects.

Locations : Durban Market (Clairwood), Alice Street Bus Depot, Thusong Centre, Claremont Taxi Rank.

Budget : R 400,000; R1 85,000; R685,000 & R689,000 respectively.

Sector : Community, Markets, Transport, Renewable Energy.

Key Climate Change Challenge:

Mitigation of carbon emissions and reduced dependency upon national electricity grid.

Short Project Description:

In the Durban Market a high energy lighting system was replaced with a low energy system resulting in a 38 kWh reduction in energy consumption. A solar PV unit and a wind turbine were installed at the Alice Street Bus Depot and Thusong Centres and provide 31 and 100 kWh, respectively, of renewable energy daily. At the Claremont Taxi Rank a solar PV unit was installed and provides 23 kWh of renewable energy daily for the operation of the taxi rank.

Key Learning Outcomes:

An increase in the knowledge relating to the use of renewable energy interventions in the urban context through studying the availability of wind and the use of low energy light sources. Also highlighted were the need for vandal proofing and the value of management of power usage during operations.

Wind turbines are a useful source of renewable energy in Durban



Project Title : Low Cost Solar Water Heater (SWH) Programme.

Location : Welbedacht, Parkgate, Nazareth Island and Cato Crest.

Budget : The programme was fully funded by an ESKOM subsidy for low pressure SWH units (90 % of cost) and Carbon Credits through the Clean Development Mechanism (10 % of costs).

Sector : Built Environment, Housing, Energy.

Key Climate Change Challenge:

Reducing carbon emissions associated with the heating of water.

Short Project Description:

Eight Thousand three hundred and four 100 L capacity solar water heaters were installed on roofs of low cost houses within eThekweni Municipality from January to June 2011. The solar water heaters were provided to registered owners of low cost houses free of charge.

Key Learning:

Eskom has now suspended the subsidy for low pressure units as it has not seen a sufficient drop in electricity use as a result of this programme. This appears to be because many low cost home-owners, because of financial limitations, were not using large amounts of electricity to heat water.



▲ Low cost solar water heaters are installed on Reconstruction and Development Programme housing.

Project Title : Shisa Solar Programme.

Location : Municipality-wide.

Budget : R 1 million.

Sector : Built Environment, Housing, Energy.

Key Climate Change Challenge:

Mitigating carbon emissions associated with heating of water.

Short Project Description:

The Shisa Solar programme aims to promote energy efficient solar water heaters (SWH) throughout Durban. The Neighbourhood Programme targets the middle to high income market segment. A key barrier to solar water heater uptake in South Africa is the price of individual SWH units. EThekweni Municipality has therefore developed a program that will allow participants to pay less for SWHs, through a "volume purchasing" system. Participants register on the system through the website and when 10 people have registered in a neighbourhood, the Shisa team links the participants to a pre-selected panel of service providers, with economies of scale reducing the cost of installations.

Key Learning:

The role of local government in markets should be limited to a facilitation role rather than direct financial interventions. URL: <http://www.shisasolar.org.za>.



▲ Installing solar water heaters in the Shisa Solar Programme

Project Title : KwaDabeka Hostel Hot Water Pilot.

Location : KwaDabeka.

Budget : R 190,000.

Sector : Housing, Built Environment, Energy.

Key Climate Change Challenge:

Mitigating carbon emissions associated with heating of water.

Short Project Description:

EThekweni Municipality is responsible for managing numerous Community Residential Units (formerly known as Hostels). There are almost 14,000 residential units within the 10 hostel complexes, housing approximately 100,000 people. Approximately 25 % have geysers for hot water, while most residents use kettles and two plate stoves to heat water for bathing and washing, resulting in high monthly electricity usage in many hostels. In this pilot project an industrial sized solar water heater was installed on one floor of the KwaDabeka Hostel to determine the viability of a renewable energy solution to this problem. The viability is being assessed according to cost effectiveness, social acceptance and supply of hot water. Eighteen 2m² solar arrays were installed in June 2011, supplying 100L of hot water per day to 25 flats.

Key Learning:

The installation has only just been completed. To determine future key learning outcomes visit the website URL: <http://www.kznenergy.org.za/projects.aspx?cat=106>.



▲ The solar water heaters on top of the KwaDabeka Hostel

Project Title : Energy Efficiency Demand Side Management.

Location : Infrastructure Municipality-wide.

Budget : Total grant allocation over 3 years is R 68 million: 2009/10: R 8 million, 2010/11: R 25 million and 2011/12: R 35 million.

Sector : Built Environment, Energy Efficiency.

Key Climate Change Challenge:

Reducing carbon emissions associated with electricity use through implementing energy efficiency measures.

Short Project Description:

The Division of Revenue Act (DoRA) Energy Efficiency Demand Side Management (EEDSM) fund from the National Treasury has been made available to municipalities over a three year period. In Durban during 2009-2010 the project focused almost exclusively on traffic light replacements. In 2010-2011 the project is focussing on both traffic lights and office building lights. In the 2011-2012 the bulk of the funding will be used for building retrofits, specifically in community residential units (hostels).

Key Learning:

EThekweni Municipality currently is not able to measure electricity use in key areas, consequently the effectiveness of interventions is difficult to evaluate. The municipality is therefore prioritising installing electricity monitoring equipment in order to prioritise energy efficiency interventions.

► Energy efficient light bulbs in traffic lights help reduce electricity consumption.



Project Title : 2010 eThekweni Municipal Green House Gas (GHG) Inventory.

Location : Municipality-wide.

Budget : R 280,000.

Sector : All sectors.

Key Climate Change Challenge:

Understanding the municipal and community level GHG emissions within Durban.

Short Project Description:

The purpose of this project is to build on the two prior GHG inventories and to catalogue the GHG emissions of both eThekweni Municipality and the entire community within Durban for 2010. The organisational emissions of eThekweni Municipality have been collected from a range of internal departments responsible for various emissions categories. The community emissions were collected from a variety of external sources. In some cases accurate information is not available on certain emission categories; in these cases emissions will be estimated on best available current knowledge. Durban emitted approximately 27,000 tCO₂ e for Scope 1 and 2 emissions during 2010. The two highest emissions categories were transport (37 %) and industry (24 %) respectively.

Key Learning:

The emissions inventory should be reflected in a transparent manner so that the source of information, calculations and assumptions are all available for interrogation by stakeholders.

Project Title : KwaZulu-Natal Sustainable Energy Forum (KSEF).

Location : Municipality-wide and throughout KwaZulu-Natal.

Budget : Approximately R 15,000 per month.

Sector : Energy.

Key Climate Change Challenge:

Encouraging conversion to renewable energy alternatives and energy efficiency and bringing together role players around these goals while building stakeholder capacity.

Short Project Description:

The KSEF meets the need for information dissemination, networking, oversight and accountability for the governance of this sector. The KSEF was established as an independent body, with seed funding from both eThekweni Municipality's Energy Office and the United Nations Industrial Development Organisation (UNIDO). The funds allow for the appointment of a KSEF Manager; and cover the costs of quarterly forum meetings. The primary role of the forum meetings is to introduce and discuss current and future sustainable energy projects and research taking place in KZN, and thereafter guide and coordinate the effective implementation of these sustainable energy projects. In this way, KSEF will continue to be at the forefront of sustainable energy opportunities and solutions in KZN.

Key Learning:

There has been considerable benefit in providing networking and information dissemination opportunities in the sustainable energy sector as stakeholders in the city and province are now more aware of commercial and funding opportunities and have much stronger links with other stakeholders in the sector.



▲ The KZN Sustainable Energy Forum in action.

Waste Water Treatment Projects:

Project Title : Towards a Sustainable Pit Latrine Management Strategy Through LaDePa.

Location : Tongaat Central Waste Treatment Works.

Sector : Wastewater.

Budget : R70 million over 3 years (including pit emptying).

Key Climate Change Challenge:

Pit latrine sludge is difficult to handle and contains pathogens and detritus, making disposal to landfill the only existing option. Sludge, however, also contains nutrients and phosphates, a critical but scarce terrestrial resource, which is lost through landfill disposal. The challenge is to remove (economically) the detritus and pathogens from the sludge and produce a workable material that could be recycled for agricultural use.

Short Project Description:

LaDePa is a self-contained, containerised machine that separates the detritus from the sludge and then pasteurises and partially dries it to a workable state. The product is a valuable, low concentration fertiliser. It was a win-win-win situation for the clients, municipality and the Public Private Partnership partner. The income generated partially offsets the cost of the pit latrine servicing and allows the process to be franchised to small and micro enterprises.

Key Learning:

The existing prescriptive legal and administrative environments operate within a retrospective framework, by definition while development and planning operate within a future scenarios framework. If South Africa is to utilise research and development output to overcome development challenges, its institutions will need these two frameworks to align, so that development is not hindered.



▲ Valuable output from the Ladepa system.

Project Title : Decentralised Wastewater Treatment System (DWATS) at Newlands-Mashu Agricultural Hub.

Location : Newlands East.

Sector : Water and Sanitation, Urban Horticulture.

Budget : Construction of the plant cost R 2.3 million, while testing and research cost R 1,15 million for the infrastructure to facilitate field trials and testing of water.

Key Climate Change Challenge:

Water availability will be a key adaptation challenge in a climate changed future. Similarly there is a mitigation need to avoid the use of petrochemical inputs in agriculture (reducing nitrous oxide emissions).

Short Project Description:

DWATS consists of decentralised off-sewer wastewater treatment coupled to the promotion of urban horticulture via the recovered wastewater. The system was designed, constructed and operated in order to enable data collection, gain experience and to promote the ability to replicate this for future applications.

Key learning:

DWATS can be provided using anaerobic treatment processes; however, the treated waste water must be used in horticulture so as to beneficially remove nutrients (Nitrogen and Phosphorous). The anaerobic treatment process must be carefully designed and adhered to in order to safely use treated wastewater in urban agriculture.



▲ The benefit of DWATS

Project Title : Durban Water Recycling.

Location : Southern Wastewater Treatment Works.

Budget : Privately sourced funding.

Sector : Water and Sanitation.

Key Climate Change Challenge:

A potable water shortage that is potentially exacerbated by climate change impacts.

Short Project Description:

Treating domestic wastewater back to near potable standard for recycling back to industry, thereby reducing demand for potable water. The available water can then be used to better service city residents and support further development in the city. This was the first Public Private Partnership in the water sector in South Africa and is a unique recycling intervention.

Key Learning:

It was a win-win-win situation for the clients, Municipality and the PPP partner. Innovative use of recycling in the industrial sector can reduce pressure on natural resources that can then be used to increase human well being. This is a good example of industrial ecology in action.



▲ Southern Wastewater Treatment Works

Solid Waste Projects:

Project Title : Durban Landfill Gas-to-Electricity Project.

Location : Bisasar Road and Mariannahill Landfills.

Budget : Capital: R 110 million; Operating costs: R 10 million per annum.

Sector : Solid Waste, Energy.

Key Climate Change Challenge:

Landfills are substantial producers of Green House Gases (GHG), including methane and carbon dioxide.

Short Project Description:

This project is currently producing 7.5 mWh of electricity (6.5 at Bisasar and 1.0 at Mariannahill). Both vertical and horizontal wells are drilled into the existing waste. Landfill gas is extracted and piped to the generation compound, where the raw gas is fed as a fuel into spark ignition engines. This drives generators that produce electricity that is fed into the local grid, thus reducing GHG emissions by some 20,000 tons per month.

Key Learning:

Adhering to the requirements of the Clean Development Mechanism process is challenging and time consuming. Cash flow in CDM projects is a major issue and there is a substantial amount of administration after registration.



▲ Methane gas from the landfill site is flared off to produce electricity and reduce the carbon footprint of the site

Project Title : Mariannahill Landfill Conservancy.

Location : Landfill lane, Mariannahill.

Budget : Approximately R 550,000 per annum.

Sector : Local communities, Education, Tourism.

Key Climate Change Challenge:

To mitigate the potential negative impacts of an urban landfill, provide educational opportunities for schools and encouraging tourists to visit a natural area within an urban environment.

Short Project Description:

This project involves the rehabilitation of the footprint and buffer zone of the landfill on a continual basis using local environmental assets such as endemic and indigenous flora and fauna. Both the original soil profile and flora was rescued and restored by the Plant Rescue Unit (Prunit) during the rehabilitation process. These were used in other rehabilitation projects in the region, thereby minimising the loss of key biodiversity.

Key Learning:

Management of a landfill buffer as a conservancy is an innovative way of reducing the ecological footprint of the landfill operation. These projects can be used to provide local communities with employment (planting and maintenance) as part of the green economy. The conservancy approach has greatly improved the public's perception of the operation.

URL: <http://www.durban.gov.za/durban/services/cleansing/gastoelec/fill>.



▲ The Marianhill Landfill and surrounding conservancy

Project Title : Domestic Orange Bag Recycling Programme.

Location : Municipality-wide.

Budget : R 9 million to date.

Sector : Residential waste.

Key Climate Change Challenge:

Recycling at source to reduce waste at landfills and to meet the obligations of the Polokwane Declaration.

Short Project Description:

The National Environmental Management Waste Act (2008) and the Polokwane Declaration in 2000 prescribed a 50 % reduction in waste to landfill by 2012, and zero waste to landfill by 2022. Hence, this innovative recycling project, where recycling at source eliminates contamination in the recycling process. Each household is provided with 15 orange bags every three months for recycling paper, cardboard, tetrapak and plastic. Bags are collected on the same day as the domestic collection. Initiating a pilot project in 2007, 49 tons were collected in the first month. Currently over 1,200 tons are collected per month from 800,000 homes. Collection is by local level contractors. The substantial benefits of this project include saved landfill airspace, job creation, local community upliftment, entrepreneurship development and increased awareness of the need for reducing, reusing and recycling.

Key Learning:

The cost of the recovery of the orange bags is substantially higher than for regular refuse collection. The key learning from this is that choosing the environmentally correct option is not always the cheapest option, but it is nonetheless necessary. Greater uptake of this project is required to reduce the cost per collection through economies of scale.

►
Collection of recycled material occurs alongside regular refuse collection



Partnership Projects:

Project Title : Durban Climate Change Partnership (DCCP).

Budget : R 800,000 to date.

Location : Municipality-wide.

Sector : Various sectors across the municipality.

Key Climate Change Challenge:

Climate change is likely to affect all sectors of society and will require a collective effort to manage mitigation and adaptation interventions. This should include both city, national and international partnerships to build institutional capacity to plan and implement projects.

Short Project Description:

The DCCP unites diverse sectors, including business, industry, government, civil society, academia, people with disabilities and the youth in addressing the climate change challenge. Seed funding was provided by eThekweni Municipality to facilitate the formation of this body, which will become independently funded and administered in the longer term.

Key Learning:

The formation of the DCCP was through a democratic, open and transparent process, which although taking longer to reach its end goal resulted in a partnership with greater credibility.

Project Title : Durban Industry Climate Change Partnership Project (DICCPP).

Budget : R 700,000.

Location : Municipality-wide.

Sector : Various sectors across the municipality.

Key Climate Change Challenge:

Climate change is likely to affect all sectors of society and will require a collective effort to manage mitigation and adaptation interventions. This should include both city, national and international partnerships to build institutional capacity to plan and implement projects.

Short Project Description:

The core focus of the DICCPP has been to provide support to eThekweni Municipality's Energy Office to promote implementation of the formally adopted Municipal Energy Strategy. The DICCPP has also conducted a number of climate change response workshops with various economic clusters during 2010 and has participated in a local climate change partnership forged between the National Business Initiative, Durban Chamber of Commerce and Industry, UNIDO and eThekweni Municipality.

Key Learning:

The process of forging a partnership between local government and multinational organisations such as UNIDO has been facilitated by the similar mandates shared by these organisations, and the provision of resources in terms of finance and technical expertise.



▲ Climate change partnerships benefit all residents and visitors to Durban

Project Title : Sister City Programme.

Location : Municipality-wide.

Sector : Various sectors across the municipality.

Key Climate Change Challenge:

Climate change is likely to affect all sectors of society and will require a collective effort to manage mitigation and adaptation interventions. This should include both city, national and international partnerships to build institutional capacity to plan and implement projects.

Short Project Description:

All sister city partnerships are based on formal cooperation agreements that focus on a number of areas of cooperation, and have resulted in the following projects: The DWATS system at Frasers Informal Settlement is a Public Private Partnership between the Bremen Overseas Research and Development Association (BORDA), eThekweni Municipality and Hering (see Waste Water Projects).

The isiThumba Sportgarten in KwaXimba is an economic development hub, which is part of the Durban Green Corridor, and is funded by Bremen and the French Foreign Ministry through Durban's partnership with Le Port on Reunion Island.

Key Learning:

Partnerships are a critical element in achieving locally transformative outcomes.

► One of the projects in the Sister City Programme involves the introduction of ecotourism notes in the Green Corridor





NOTES



This booklet was compiled using the contributions from eThekweni Municipality staff. While there is good representation across the Municipality, it is by no means an exhaustive listing of all “climate smart” municipal activities. For further information about this booklet or to provide feedback, please contact:

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(<http://www.durban.gov.za/durban/services/development-planning-and-management/epcpd/documents>)