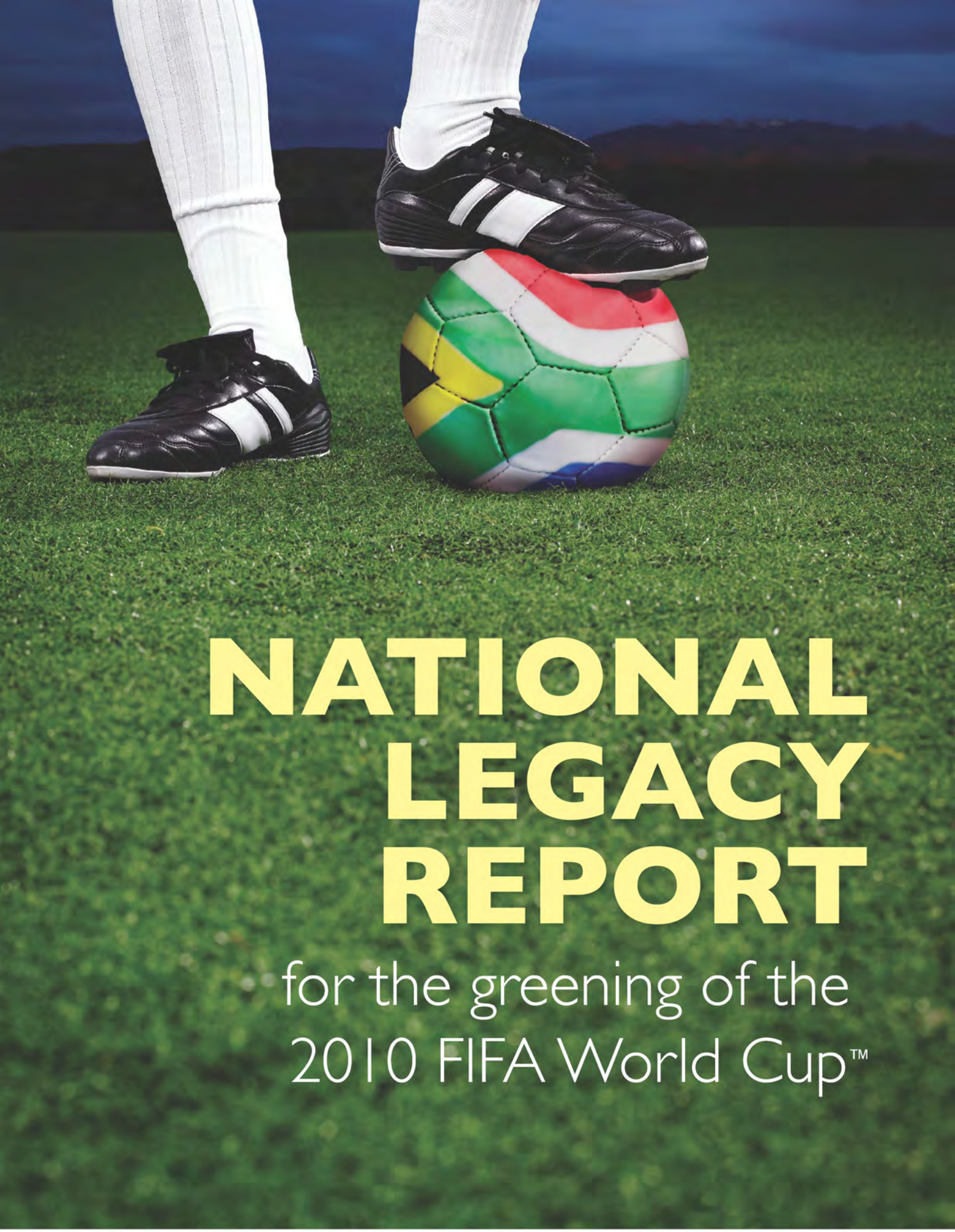


NATIONAL LEGACY REPORT

for the greening of the 2010 FIFA World Cup™

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

NATIONAL GREENING

Indalo Yethu
SOUTH AFRICA'S ENVIRONMENTAL CAMPAIGN

EMBASSY OF DENMARK

national

greening 2010 overview

The FIFA World Cup™ provided an unprecedented opportunity for South Africa to move the sustainability agenda forward across a broad range of sectors – from sustainable transport to energy efficiency, from biodiversity to water efficiency – to ensure a long-term sustainable legacy for Africa's first World Cup.

ISTOCK

1.1 Introduction

THIS HISTORIC EVENT WAS, BY MOST MEASURES, **AN UNDOUBTABLE SUCCESS** AND ... WAS WIDELY DEEMED TO BE ONE OF THE MOST SUCCESSFUL FIFA WORLD CUPS EVER

TWENTY TEN WAS A BIG YEAR FOR SOUTH AFRICA, possibly the biggest since 1994 which saw the country's first democratic election. From the FIFA 2010 World Cup™ kick-off on the 11th June until the final whistle on the 11th July, the country was overtaken by the fever that only a football world cup can produce. Fans, including thousands of South Africans with no previous knowledge or enthusiasm for the game, packed the stadiums. Even when Bafana Bafana, the South African national team, was knocked out of the tournament, South Africans kept up the with the atmosphere, picking new teams to support and making visitors to the country feel welcome. Cars were decked with the South African national flag as well as those of the various (temporarily) adopted nations, while the *vuvuzela* and *makarapa* became common household items, albeit to some people's regret. This historic event was, by most measures, an undoubtable success and when the tournament was finished, the first football World Cup to be held on African soil was widely deemed to be one of the most successful FIFA World Cups ever.

However, moving beyond the enthusiasm and fun generated by the event, it is evident that the FIFA World Cup™ will result in a significant and long-lasting legacy for South Africa – from an infrastructural, economic, environmental and social perspective – and one that will be with the country for decades to come. What is equally clear is that attached to this legacy are both positive and negative outcomes with serious consequences. For example, the environmental impacts experienced as a result of the World Cup are an inevitable consequence of hosting a mega-event of this scale: hundreds of thousands of visiting fans, resulting in increased waste generation, increased carbon emissions (further contributing to global climate change), and additional stress placed on South Africa's limited fresh water resources, not to mention the environmental impacts resulting from the construction activities that took place within the Host Cities (Figure 1).

On the other hand, the event has provided significant positive opportunities for the country to move the sustainability agenda forward across a broad range of sectors – from transport to water efficiency, from energy to biodiversity – and to do so at a national scale, thereby ensuring a long-term sustainable legacy from Africa's first World Cup. This opportunity has resulted in a multitude of projects whose fundamental objectives are to reduce the environmental impacts associated with the event and to maximise the opportunity to educate the public about sustainability issues. These projects have brought together diverse groups from across the stakeholder spectrum, including the Local Organising Committee (LOC), international donor agencies and governments, South African national government departments, provincial and local government, the private sector, the general public, volunteers as well as non-governmental organisations (NGOs). Their efforts focused on all stages of the event, namely: the planning stage in the years preceding the event; the operational stage during the event itself; and post-event, aiming to ensure a lasting positive impact long after the final game was over and the visiting fans returned home.

It is a primary objective of this report to recognise the efforts of these organisations and their dedicated staff who engaged in various projects across the country, and to explore and highlight the sustainable legacy resulting from their efforts.

Traditionally South African: The 'makarapa' hat makes an appearance on the world stage.

FIGURE 1 A MAP OF SOUTH AFRICAN HOST CITIES

1.2 The FIFA World Cup™

1.2.1 Introduction

The FIFA World Cup™ is the biggest sporting event in the world, and with an estimated audience of 700 million people watching the 2010 final, certainly the most widely viewed. It had its inaugural match in Uruguay in 1930 and has continued every four years, with the exception of the Second World War years of 1942 and 1946. Eighty-one years later, and of the nineteen football world cup events held to date, sixteen of them have been held in either Latin-America or Europe. The first World Cup to be held outside of these two regions was the 1994 event hosted by the USA. This was followed by joint hosts Japan/South Korea in 2002 (Asia's first world cup) and now South Africa in 2010, bringing the game to the African continent for the first time.

1.2.2 Institutional framework for hosting the FIFA 2010 World Cup™ and environmental obligations

The multifunctional body responsible for organising the staging and hosting of the event was the Local Organising Committee (LOC). The LOC included representatives from FIFA, the South African Football Association (SAFA), the SA Government, Host Cities, labour and business. As official hosts of the FIFA World Cup™, SAFA and SA Government were signatories to the Hosting Agreement and List of Requirements, containing seventeen explicit and legally binding guarantees. These agreements committed South Africa to ensuring that the event would meet the necessary standards set by FIFA, in all regards, for the successful hosting of the tournament. Despite the extensive scope of these agreements, it should be noted that environmental obligations played only a minor role in terms of the legal requirements imposed by FIFA on the host nation.

NATIONAL GREENING 2010 FOCUS AREAS:

- **Water:** Maximise efficiency in water usage and protection of natural resources
- **Energy:** Maximise efficiency of energy usage and renewable energy
- **Transport:** Maximise the availability, accessibility and efficiency of public transport systems
- **Waste:** Minimise waste to generation
- **Biodiversity:** Maximise protection and enhancement of biodiversity and ecological systems
- **Carbon Footprint:** Minimise the carbon emissions associated with the event
- **Tourism:** Maximise sustainable tourism offerings in South Africa
- **Communications and Awareness:** Maximise the showcasing and awareness raising of greening initiatives to the public.

The Vancouver 2010 Winter Games aimed to set a new benchmark for the greening of mega-events.

JULIAN DICKS

1.3 A brief history of greening large sporting events

THE 1994 WINTER OLYMPIC GAMES IN LILLEHAMMER, NORWAY ... BECAME THE SITE OF **THE WORLD'S FIRST "SUSTAINABLE EVENT" IMPLEMENTED ON A LARGE SCALE**, AND SET THE BENCHMARK FOR FUTURE EVENTS

INITIATIVES TO REDUCE THE ENVIRONMENTAL IMPACTS of large sporting events have their origins off the football field and nearly two decades ago. In June 1994, UNEP and the International Olympic Committee (IOC) formed a partnership to integrate environmental issues into the Olympic movement. This was inspired by the 1994 Lillehammer Winter Olympics in Norway which was a showcase for "green" event management. The Lillehammer games are widely regarded as the being the world's first "sustainable" event to be implemented on a large scale and set the benchmark for future events. That same year, at the IOC's 100 years celebration in Paris, the Environment was added as the 'Third Dimension' to the Olympics in addition to Sports and Culture. This provided much of the impetus leading to the establishment of the World Conference on Sport and Environment, the first being held in Lillehammer in 1996. Since 2007, environmental issues and sustainable development have also been incorporated into the Olympic Charter; and the incorporation of environmental concepts is now obligatory for prospective nations submitting bids and hosting the tournament. The profile of environmental and sustainability issues within the Olympic movement has received a high degree of attention: the Sydney 2000 Olympics championed itself as the 'greenest' Olympics ever, while the Beijing Summer Olympics in 2008 received much media attention (both good and bad) around its efforts to combat the extreme levels of air pollution endemic to the city. Most recently, the Vancouver 2010 Winter Games aimed set a new benchmark for the greening of mega-events.

It was only in 2006 that a host country, Germany, elected to incorporate sustainable practices into the core principles for the hosting of a FIFA World Cup™. The 2006 initiative, dubbed 'Green Goal 2006', aimed to make the World Cup more environmentally sustainable in the areas of water, waste, energy and transport. The onus for integrating environmental issues into the event relied upon the voluntary efforts

undertaken by the host nation. Green Goal 2006 was largely driven by the German Organising Committee, strongly supported by the German Government, the World Wildlife Fund (WWF) and the United Nations Environment Programme (UNEP). It was further supported by the voluntary participation of FIFA, corporate sponsors, local government and other key stakeholders and its success has raised the benchmark for future FIFA World Cup's™ in terms of sustainability.

1.4 Greening the 2010 FIFA World Cup™

THE DEPARTMENT OF ENVIRONMENTAL AFFAIRS (DEA) was involved in World Cup preperations and planning from the beginning. On 14 December 2006, Minister Marthinus van Schalkwyk announced that South Africa was committed to learning from the German 2006 World Cup experience and that the DEA (known at the time as DEAT, or the Department of Environmental Affairs and Tourism) would collaborate with FIFA and the LOC to implement the Green Goal plan for the 2010 FIFA World Cup™. In 2007, the DEA committed itself to implementing a country-wide event greening programme.

The institutional arrangements for Greening 2010 were co-ordinated through sub-structures of the LOC, as shown in Figure 2. The Environmental Forum, a sub-structure of the LOC's Legacy Committee, functioned as a steering committee where National Greening 2010 activities were planned, coordinated and monitored. It was chaired by the LOC's Environmental Manager, with support from the DEA.

The Environmental Forum included representatives from FIFA, the LOC, DEA, Department of Water Affairs and Forestry (DWAF), provincial governments, the

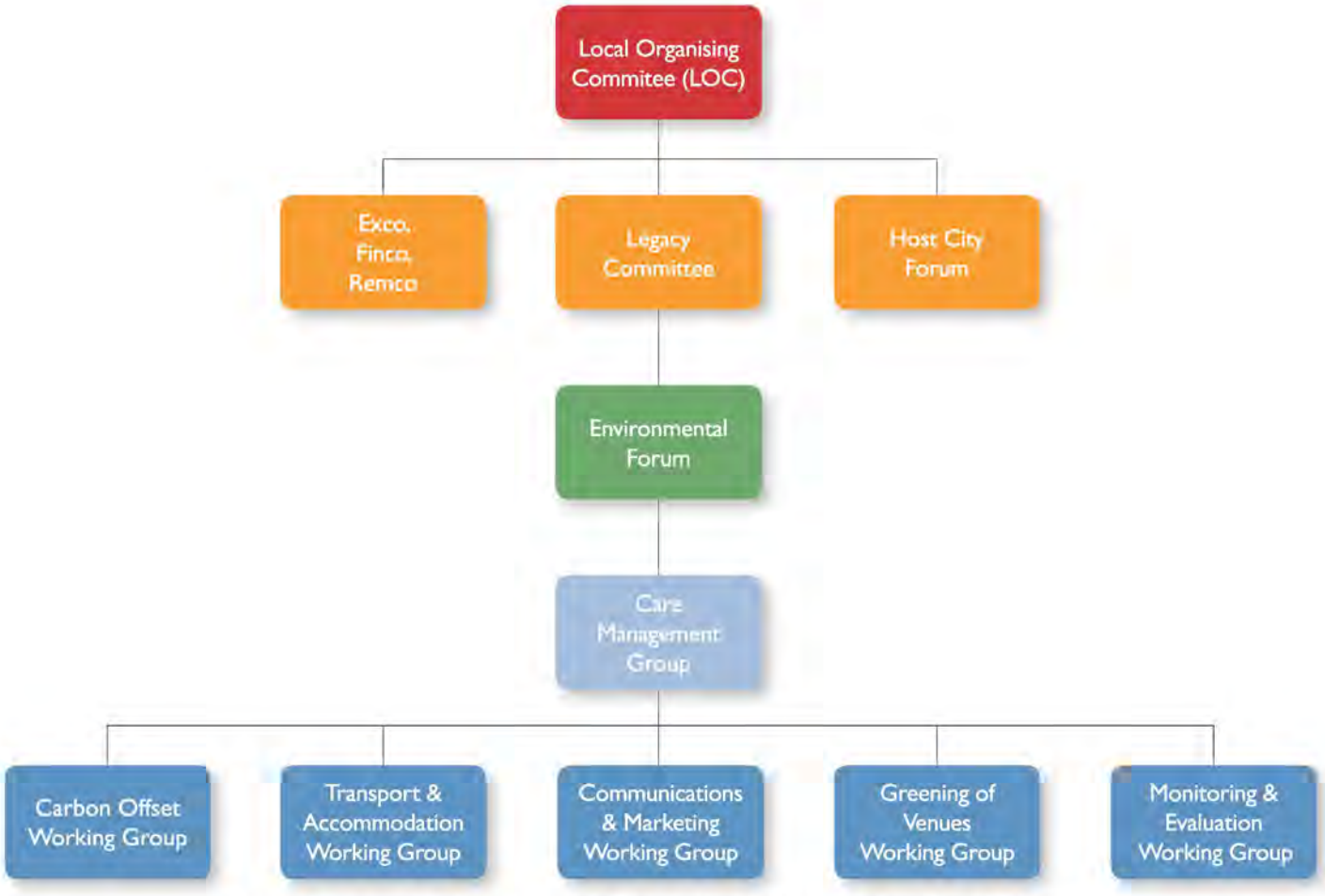


FIGURE 2. RELEVANT STRUCTURES OF THE 2010 FIFA LOCAL ORGANISING COMMITTEE

Tthe Green Goal Action Plan.

nine Host Cities, international resource agencies such as the International Union for the Conservation of Nature (IUCN), UNEP, the United Nations Development Programme and Indalo Yethu (a joint initiative of the DEA and the Wildlife and Environment Society of South Africa (WESSA) to promote environmental awareness and activism amongst South African communities, the business sector and government.

The Environmental Forum contained a core management group which coordinated and oversaw the work streams of five working groups, which covered carbon offsets, transport and accommodation, communications and marketing, greening of venues and monitoring and evaluation, respectively.

The DEA, supported by the LOC Environmental Forum and various other partner organisations, prepared a number of key national guidance documents in support of the greening of the World Cup. These included:

- The National Greening 2010 Framework (DEAT, 2008a)
- Guidelines for the Greening of Large Sports Events, with a focus on the FIFA World Cup™ (DEAT, 2008b)
- Feasibility Study for a Carbon Neutral 2010 FIFA World Cup in South Africa (DEAT, 2009a)
- Stadium Baseline Report for Green Goal 2010 (LOC, 2008b)
- Greening of Large events: A Volunteers Guide
- "Sustainability audits" of four of the main stadiums
- Business plans for three Host Cities (with assistance from DEA).

While some cities, notably Durban and Cape Town, took the initiative to begin developing their own greening programmes ahead of LOC and DEA guidelines, it was clearly understood that cooperation between all levels of government was to be critical to a successful National Greening 2010 programme.

Partnerships and assistance, in some cases financial, were also critical in developing the guidance documents. Partner organisations included NGOs such as UNEP, United Nations Development Programme (UNDP), Global Environmental Facility (GEF), donor nations (notably the United Kingdom, Denmark, Germany and Norway), other national government departments, Eskom (the national electricity generator), the Central Energy Fund (CEF), several corporate sponsors, the LOC, as well as provincial governments and Host City municipalities.

STEPHEN LAMB

The Green Goal stand at the Cape Town city centre fan fest.

1.5 Branding of 2010 FIFA World Cup™ Greening Initiatives

SEVERAL BRANDS WERE ADOPTED for the promotion of greening initiatives undertaken for the 2010 FIFA World Cup™. EThekwini Municipality adopted "Greening Durban 2010" as their brand, while Cape Town adopted FIFA's "Green Goal 2010". Initially the DEA and LOC, along with other municipalities and government organisations, also adopted FIFA's "Green Goal 2010" brand (with a set of "Green Goal 2010" targets being developed nationally). However as preparations for the greening of the World Cup progressed, the DEA identified the need for an independent brand that could work alongside these others, ensuring continuity post-2010 as well as being liberated from the commercial restrictions. Hence the DEA elected to develop the National Greening brand in order to reflect the broader programme for promoting sustainability in South Africa, both for the 2010 FIFA World Cup™ and into the future. The term "national greening" had been used in various policy and guidance documents previously (for example in the National Greening 2010 Framework, however it had not been envisaged as a brand *per se*. While the other brands focused on the 2010 FIFA World Cup™ exclusively, the National Greening brand intends to maintain its momentum for promoting sustainability far beyond 2010.

As the National Greening brand is intended for use on a national basis and beyond 2010, the launch of the brand itself represents a significant legacy project for South Africa. The brand has the advantages of communicating a unifying message around sustainability and being open to all South African authorities (whether national, provincial or municipal) thereby providing these bodies with access to a brand that can benefit from economies of scale in terms of promoting their messages and gaining visibility. The National Greening brand itself was officially unveiled on the 18th of May 2010.

NATIONAL GREENING

THE NATIONAL GREENING BRAND INTENDS TO **MAINTAIN ITS MOMENTUM FOR PROMOTING SUSTAINABILITY FAR BEYOND 2010**

1.6 2010 World Cup Legacy Trust

ON 14th DECEMBER 2010, the South African government and FIFA unveiled a 2010 FIFA World Cup Legacy Trust. The trust's objectives are to promote education, health, humanitarian activities and football development in the South Africa. Following on from FIFA's pledge to ensure that the country continues to benefit from the 2010 World Cup, FIFA has contributed US$100-million to the legacy trust. Projects aimed at benefiting the public will be submitted to the trustees (drawn from FIFA, government, SAFA and the private sector) for review and will be selected in the areas of football, education and development, healthcare and humanitarian activities. As a first project financed by the trust, FIFA purchased 35 of the World Cup team buses and a fleet of 52 vehicles, which were handed over to SAFA for the transport of their regional teams. While sustainability and the environment are not an explicit part of the Legacy Trust's criteria for project selection, the initiative is notable for supporting sustainable development in South Africa in the broader sense.

national

The 2010 FIFA World Cup™ offered South Africa a unique opportunity to demonstrate to the world its commitment to responsible environmental management, while improving the living environment and the livelihoods of South Africa's people.

greening 2010 **programme**

JEREMY JOWELL

A team installing energy efficient floodlighting at one of the official training venues.

2.1 Aims

THE 2010 FIFA SOCCER WORLD CUP™ offered South Africa the unique opportunity to demonstrate to the world its commitment to responsible environmental management, while improving the living environment and livelihoods of South Africa's people. In response to this opportunity, the DEA led the development of the National Greening 2010 Framework, which was published in 2008 following a number of national workshops with key stakeholders. The National Greening 2010 programme had the following objectives (DEAT, 2008a):

- To create a model for hosting international sporting (and other) events and conferences in an environmentally sustainable manner in developing countries
- To minimise the negative environmental impact of events associated with the World Cup by reducing resource consumption and waste production
- To build national capacity to host green events and translate this capacity into new economic opportunities and livelihoods for South Africans
- To improve environmental management performance by upgrading infrastructure used during World Cup events
- To raise awareness about environmental best practice in all sectors involved in planning and hosting the World Cup
- To raise awareness about sustainable development in South Africa.

The Framework targeted six environmental focus areas while a further four cross-cutting themes were identified to strengthen implementation approaches within the focus areas.

The overall outcomes of the National Greening 2010 programme were anticipated to be:

- A reduced environmental footprint from the 2010 FIFA World Cup™
- Legacy projects which take forward the benefits of Greening 2010, including being a catalyst for a National Greening Framework, and informing future FIFA World Cup™ events, detailed in Table 1.

TABLE 1. SOUTH AFRICA'S FRAMEWORK FOR GREENING 2010 *(Source: DEA, 2008a)*

FOCUS AREAS	CROSS CUTTING THEMES	OUTCOMES	IMPACTS
• Waste • Energy • Transport • Water • Biodiversity • Responsible tourism	• Carbon offset and emission reduction programmes • Sustainable procurement • Job creation • Communication and outreach	• Environmental footprint for 2010 World Cup™ is reduced • Legacy projects take forward the benefits of Green Goal 2010 • Citizens see the benefits and understand the value of responsible environmental management • Reduced carbon emissions	• Impact of the event on global warming is reduced • SA's long-term development path becomes more sustainable
Monitoring, Reporting, Evaluation and Impact Assessment			

2.2 Roles and responsibilities

A KEY TO THE SUCCESS of the National Greening programme would be for clear roles and responsibilities to be defined amongst the various roleplayers. The National Greening 2010 Framework identified the following key roleplayers in this regard:

The LOC

The LOC was responsible for setting objectives and overseeing the performance of all LOC sub-structures in preparing for and implementing the 2010 World Cup. The LOC had the following specific responsibilities in relation to Greening 2010:

- Ensure that greening is given a high profile in communication of the objectives and achievements of the 2010 FIFA World Cup™
- Develop guidelines for minimum environmental standards for Greening 2010
- Develop a standardised national approach to waste source separation in the stadium precincts for the Host Cities
- Co-ordinate communication, with support from DEA, around specific environmental components
- Co-ordinate the training of environmental volunteers for FIFA official venues
- In conjunction with the DEA, the Host Cities and other partners, devise monitoring and evaluation formats and outputs to assist the Host Cities in assessing their greening performance before, during and after 2010.

The DEA

The DEA played a critical role in relation to National Greening 2010, including:

- Providing support to the LOC Environmental Forum
- Providing guidance and coherence to the wide range of localised greening initiatives underway
- Mobilising and co-ordinating support from national government departments, donors and other greening partners
- Mobilising resources and funding to support and implement provincial and local plans
- Driving the carbon offset programme at a national level.

In addition to, and in conjunction with the LOC Environmental Forum, the DEA undertook to give informal support to the Host Cities in assessing their environmental management objectives and performance, and to assist the LOC in producing a legacy report, based on Host City and LOC Forum assessments. In effect, DEA has taken on this last task in its entirety, as it did also with respect to devising monitoring and evaluation formats and outputs.

A KEY TO THE SUCCESS OF THE NATIONAL GREENING PROGRAMME WOULD BE FOR **CLEAR ROLES AND RESPONSIBILITIES TO BE DEFINED AMONGST THE VARIOUS ROLE PAYERS**

Provincial governments

Provinces were expected to play an important role in supporting municipalities, in supporting the greening of the designated practice stadia, and in supporting events in locations beyond the nine Host Cities. Provincial environmental management and tourism authorities were seen to have a particularly important role to play in supporting and promoting regional biodiversity and greening initiatives, and in guiding initiatives to strengthen waste processing and recycling.

THE FRAMEWORK TARGETED SIX ENVIRONMENTAL AREAS WHILE A FURTHER FOUR CROSS CUTTING THEMES WERE IDENTIFIED TO STRENGTHEN IMPLEMENTATION APPROACHES WITHIN THE FOCUS AREAS

Municipalities

The primary task of implementing Greening 2010 lay with the nine cities that hosted the 64 matches of the World Cup and their associated events. Each of the Host Cities was responsible for designing and implementing initiatives related to the core focus areas and cross-cutting themes. To this end they developed business plans for their greening programme, a process which, in cases where the Host City was poorly resourced financially, was supported by the DEA.

On a location by location basis, Host Cities were to assess what resource conservation and efficiency options were desirable, feasible and achievable. Besides implementing environmental management systems (EMS) at the various stadiums and fan parks, each municipality was expected to meter and audit water and energy consumption and waste generation at different points within its stadium precinct and other venues in order to track environmental performance. After the event, each Host City was to submit to the LOC a report on their achievements in greening for the World Cup against the performance objectives detailed in their business plans (as per section 2.5 below).

Other role-players

Particular national sector departments and parastatals also had a significant role to play in the Greening programme. These included the Department of Water Affairs (Working for Water); Department of Transport; Department of Energy; Eskom, National Energy Efficiency Agency and CEF; Department of Agriculture, Forestry and Fisheries and the Department of Human Settlements.

The South African National Biodiversity Institute (SANBI) was appointed by DEA to co-ordinate the implementation of the Expanded Public Works Programme-related (EPWP) national Greening 2010 projects aligned with SANBI's mandate.

SANParks, in conjunction with the National Energy Efficiency Agency and the CEF, was to implement a R575-million infrastructure upgrade of its 23 national parks, to showcase energy efficient installations to local and international visitors during the 2010 World Cup™ and beyond. It was further anticipated that the hospitality industry had an important role to play in promoting and enabling responsible tourism. The development of a national environmental rating system for the hospitality industry was mooted.

Finally, FIFA, as the country's 'client' and tournament owner, was required to play a critical role in supporting environmental initiatives, in promoting the visibility of messages around Green Goal 2010, in addition to their participation in the LOC Environmental Forum.

SANParks, in conjunction with the National Energy Efficiency Agency and the CEF, was to implement a R575-million infrastructure upgrade of its 23 national parks

2.3 Financing

THE PRIMARY RESPONSIBILITY FOR FUNDING Greening 2010 initiatives lay with the Host Cities, with funds being sourced primarily from each city's overall capital and operating budget. The DEA committed R34 million from its

Social Responsibility Policy and Projects programme to support Greening 2010 over a three year period. This funding was to support initiatives aligned to the EPWP in at least four areas:

- Waste minimisation and waste recycling projects
- Energy efficiency (energy saving and demand side management), working in partnership with Eskom and other role-players, and training of energy auditors
- Training and placement of environmental volunteers, who could act as advocates for sustainable environmental management in their communities after the event
- Labour-intensive development of small-scale infrastructure.

The DEA sought support from both national and international bodies to help achieve the objectives of the National Greening Framework. While some of the cities diverted funds from other long term programmes to support their 2010 initiatives, others reported funding constraints as a major reason for limiting the extent of their Greening projects. In this regard, the omission of significant environmental obligations (in terms of FIFA's Host Agreement and List of Requirements) is likely to have presented particular challenges to later efforts to apply sustainable principles to the hosting of the World Cup. Host Cities and other role-players may, understandably, have afforded a lower priority in allocating budget and human resources to environmental legacy initiatives when compared with legally-binding obligations to which Host Cities had signed.

Some attempts were made by various organisations, including the DEA, to secure corporate sponsorship funding and participation. However these efforts were made exceedingly complicated by commercial restrictions protecting the rights of official 2010 FIFA World Cup™ sponsors.

A Green Goal Workshop: planning and preparations started many years in advance of kick-off.

2.4 Monitoring and evaluation tool

A KEY ELEMENT TO IMPROVING ENVIRONMENTAL PERFORMANCE is the ability to monitor and track various sustainability indicators. To this end, a DEA-commissioned monitoring tool was distributed to Host Cities on 1 May 2010, with a request that they implement it and report the results to the Department after the World Cup. Unfortunately, the monitoring tool was not widely utilised by Host Cities mainly because the cities had either put in place their own monitoring and evaluation systems or lacked the budget and/or human resources to undertake detailed monitoring. For some Host Cities, the basic infrastructure needed (on the ground) for providing the data to populate the monitoring tool was simply absent. For instance, to evaluate the energy savings of the stadiums, data from stadiums is required in a disaggregated fashion i.e. energy use for lighting versus energy use for air conditioning of corporate suites. However, several of the stadiums are equipped with only a single water and electricity meter. The costs of commissioning water and energy measurement in particular parts of the stadium complex were not justifiable in relation to the value of the outputs.

2.5 LOC Green Goal 2010 targets

AS MENTIONED PREVIOUSLY, the LOC (with support from the DEA) also developed a series of Green Goal 2010 targets to guide the environmental initiatives of Host Cities. The Green Goal 2010 targets, in contrast to the National Greening 2010 Framework targets, were quantitative. The setting of quantitative targets proved, for the most part, to be overly ambitious. For most municipalities, there were inadequate resources (financial, human resource and time) to allow for monitoring mechanisms to be put into place in order to assess environmental performance against quantitative targets.

2.6 National Greening objectives

THE DEA'S NATIONAL GREENING PROGRAMME was oriented to the support of Host Cities in their efforts at greening the World Cup. The DEA elected not to set quantitative targets in the National Greening 2010 Framework. This was in recognition of the differences in financial and human resources between Germany and South Africa, and in anticipation of the difficulties which municipalities, especially the smaller ones, would be likely to face in monitoring progress towards achieving quantitative targets. The Framework's objectives therefore aimed to provide a set of practical objectives for the various focus areas and cross cutting themes identified in the Framework, as summarised in Table 2.

TABLE 2. NATIONAL GREENING OBJECTIVES *(Source: DEA, 2008a)*

FOCUS AREAS	WASTE	• Minimise waste generation • Maximise waste sorting, re-use and recycling
	ENERGY	• Minimise consumption of energy (improve efficiency of use) • Maximise use of renewable energy
	TRANSPORT	• Minimise use of private vehicles to access 2010 events and games • Maximise availability, accessibility and efficiency of public transport systems • Reduce carbon emissions from public transport systems • Maximise access for pedestrians and cyclists, and provide appropriate surfacing and lighting
	WATER	• Minimise consumption of water (improve conservation of water) • Maximise rainwater capture and grey-water recycling • Protect wetlands • Minimise pollution of water resources
	BIODIVERSITY	• Maximise protection and enhancement of biodiversity and ecological systems • Maximise recreation and tourism experiences associated with biodiversity
	SUSTAINABLE TOURISM	• Maximise energy and water use efficiency in all hotels, guest houses and B&Bs • Minimise waste generation in hotels, guest houses and B&Bs, and maximise waste sorting, re-use and recycling • Establish an environmental rating system based on clear criteria and standards • Maximise opportunities to sensitize visitors to the need to conserve water and energy
CROSS-CUTTING THEMES	CARBON FOOTPRINT	• Minimise carbon emissions • Where carbon emissions cannot be eliminated, maximise the benefits to South Africa by setting up carbon-offset programmes located within South Africa or in African countries
	COMMUNICATIONS & AWARENESS	• Inclusive information sharing about what is being done through Greening 2010 and why it is being done • Outreach to residents and visitors beyond matches, fan parks and events • Sensitisation of vendors and service provides to Greening 2010 objectives • Involvement of schools and the youth • Showcasing and explanation of water-wise technologies, energy-efficient appliances, and waste recycling initiatives • Communication to the FIFA Family, including sponsors
	JOB CREATION	• Maximise job creation and skills development • Link to the Expanded Public Works Programme
	SUSTAINABLE PROCUREMENT	• Procurement from suppliers who practice responsible environmental management • Maximise use of local products and local enterprises

2.7 The sustainable legacy challenge

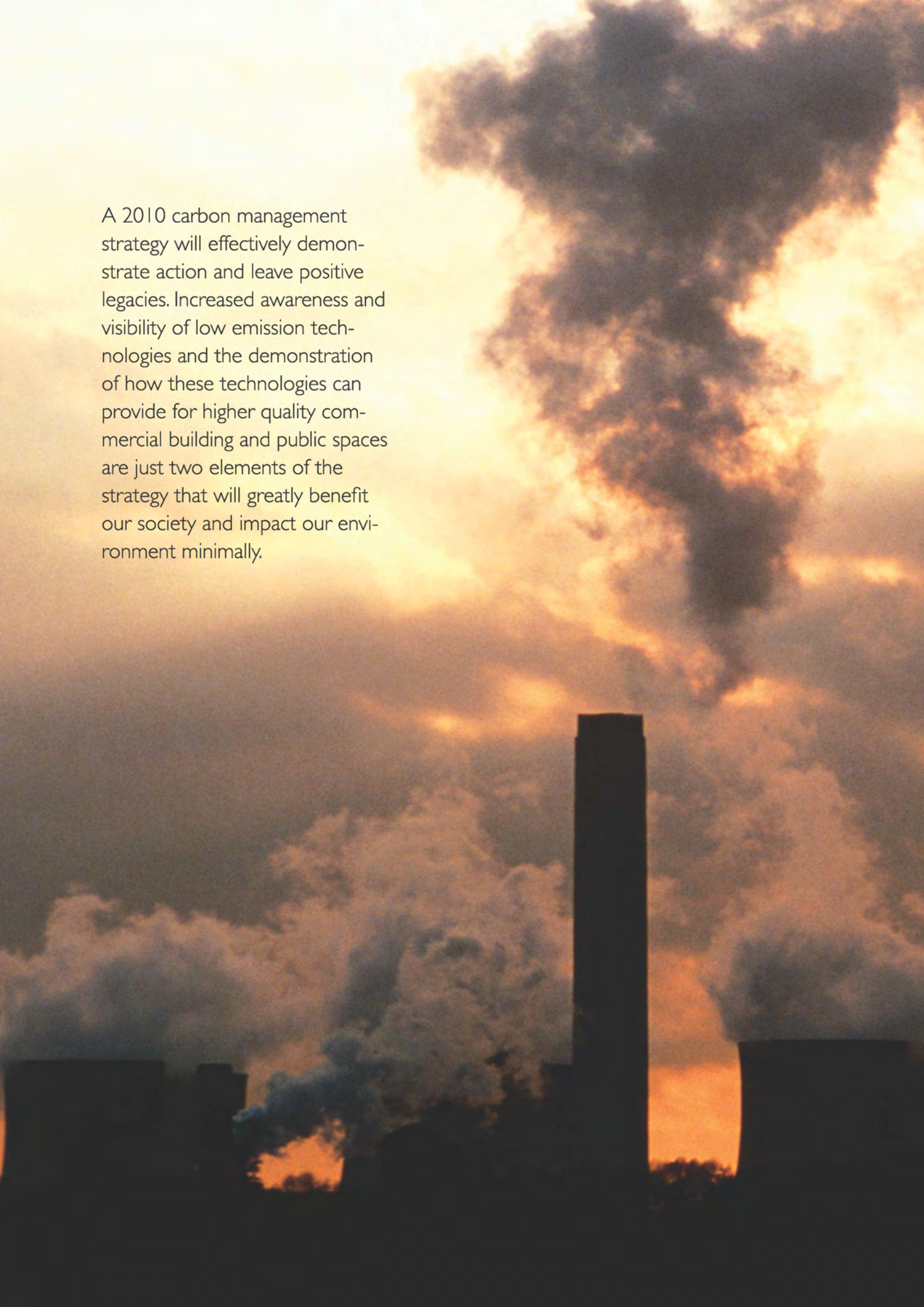
THE GREENING OF THE 2010 FIFA WORLD CUP™ presented major challenges to the Host Cities, as well as to national and provincial government bodies involved in the process. Some of the challenges faced included:

- Limited existing infrastructure, systems and experience, not to mention the change in public mind-set, required to achieve significant sustainability outcomes. While to some extent these present clear legacy opportunities (i.e. more space for improvement), it also imposes certain limitations in terms of what can be achieved in the short term.
- As it became apparent during the auditing phase of this report, most municipalities did not have reliable systems in place for the measurement of sustainability-related metrics at a Host City level, making it extremely difficult to gather quantitative data on progress made in relation to sustainability targets for waste, water and carbon emissions.
- Environmental criteria did not form a significant part of the Host City agreements or any other legal obligations made to FIFA in terms of the hosting of the World Cup. Arguably, this led to environmental issues being seen to some extent as "optional" and afforded lower priority compared to other areas that were related to legally binding obligations, such as logistics and security.

Despite these challenges, it is clear that a significant sustainable legacy, as described in the chapters that follow, has been achieved. The greening of the World Cup and resulting sustainable legacy outcomes should also be seen as part of a greater process – and, in fact, as part of the start of this greater process – to fundamentally embed the concepts of sustainability within South Africa's national economic development framework.

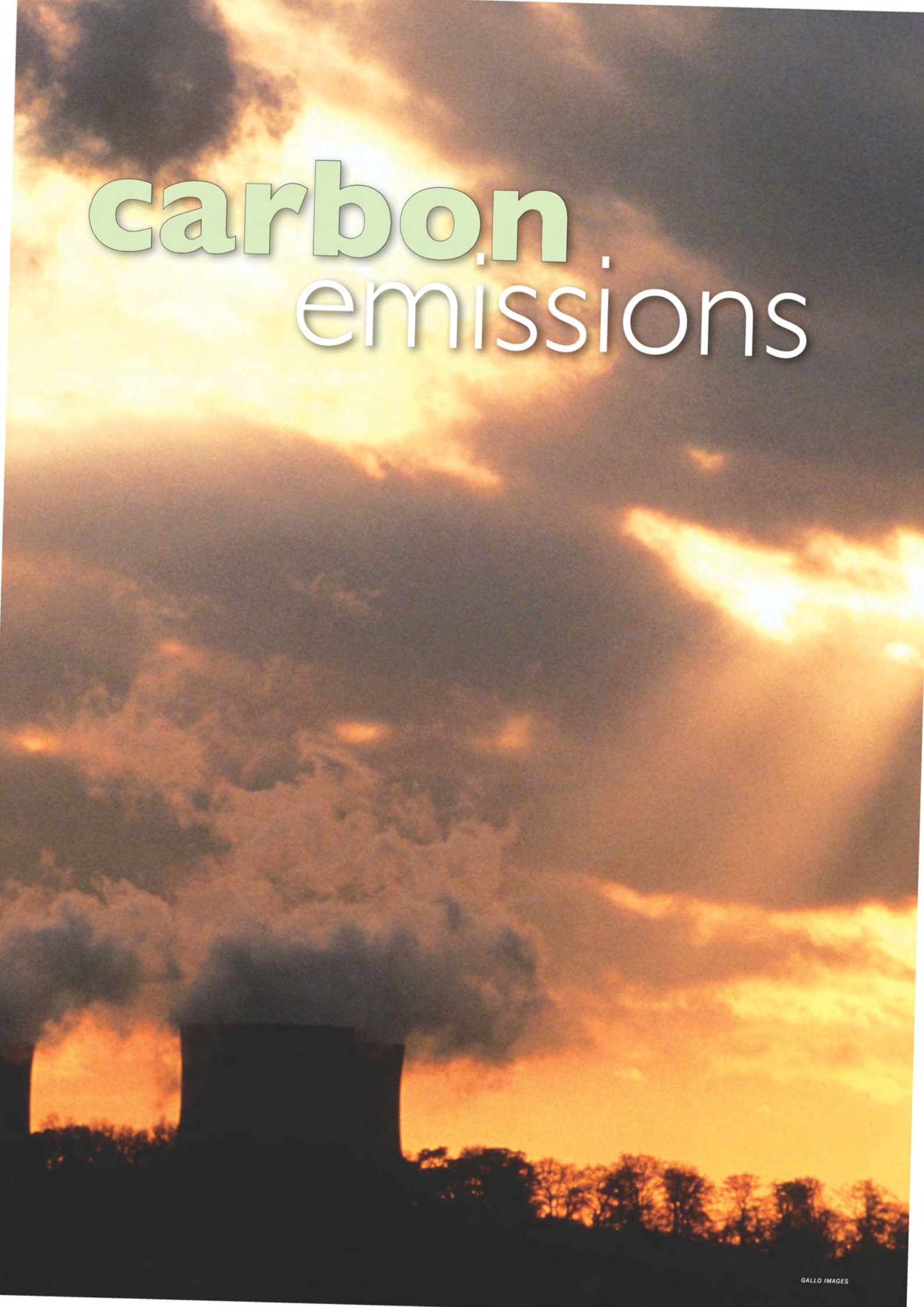
THE GREENING OF THE WORLD CUP ... SHOULD ALSO BE SEEN AS PART OF A GREATER PROCESS **TO FUNDAMENTALLY EMBED THE CONCEPTS OF SUSTAINABILITY** WITHIN SOUTH AFRICA'S NATIONAL ECONOMIC DEVELOPMENT FRAMEWORK

The new Moses Mabhida Stadium.



A 2010 carbon management strategy will effectively demonstrate action and leave positive legacies. Increased awareness and visibility of low emission technologies and the demonstration of how these technologies can provide for higher quality commercial building and public spaces are just two elements of the strategy that will greatly benefit our society and impact our environment minimally.

carbon emissions



GALLO IMAGES

The fan park In Cape Town city centre at nightfall.

3.1 Introduction

THE INTERGOVERNMENTAL PANEL on Climate Change Fourth Assessment Report (IPCC, 2007) concluded that global temperatures are rising, and that this is very likely to be as a result of human activity, specifically, the release of greenhouse gases into the atmosphere. Carbon emissions (as greenhouse gas emissions are often called) of the 2010 FIFA World Cup™ is a cross-cutting theme, with implications for waste management, sustainable energy, transport, water and biodiversity. Many of the initiatives referred to in this chapter will be touched on again in the chapters on energy, waste, transport and biodiversity which follow.

Major sporting events are increasingly adopting programmes to compensate for the carbon emissions that arise from the event. The 2006 FIFA World Cup™ in Germany set a precedent in this respect, earning a title as the first 'climate neutral' World Cup by offsetting their domestic footprint.

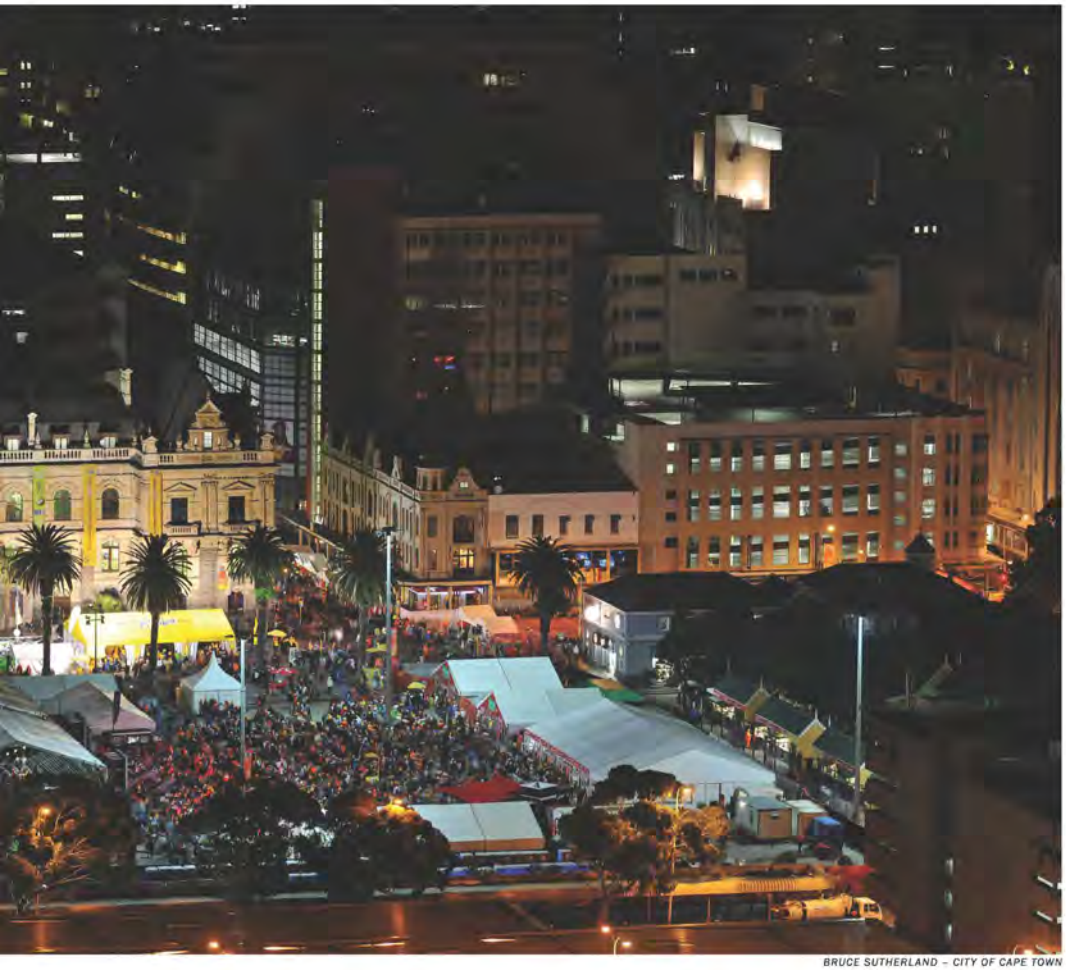
Climate, or carbon, neutrality can be achieved in two main ways:

- By reducing carbon emissions at source through interventions such as energy efficient installations or use of renewable energies, and
- Through 'offsetting' the remaining emissions by investing in carbon reduction projects elsewhere.

'Offsetting' refers to an investment in projects that will ultimately lead to a reduction of carbon emissions that would not have occurred on a business-as-usual basis. The approach adopted for reducing carbon emissions associated with the football world cup in South Africa was a combination of both of the above.

The National Greening 2010 Framework (DEAT, 2008a) as well as the 2010 Green Goal clearly identified the legacy value of addressing the carbon emissions associated with the event:

"A 2010 carbon management strategy will effectively demonstrate action and leave positive legacies. Increased awareness and visibility of low emission technologies and the demonstration of how these technologies can provide for higher quality



BRUCE SUTHERLAND – CITY OF CAPE TOWN

commercial buildings and public spaces are just two elements of the strategy that will greatly benefit our society and impact our environment minimally'' (DEAT, 2009a).

The need for energy conservation, energy efficiency and energy security within South Africa has been highlighted as an area of national priority. As yet, South Africa is not required to commit to binding carbon reduction targets within the UNFCCC Kyoto Protocol. However, at the international climate change talks in Copenhagen in December 2009, South Africa announced that it would undertake non-binding mitigation actions that will result in a deviation below the projected "business as usual" emissions trajectory of 34% by 2020 and 42% by 2025 respectively. South Africa formalised these commitments in the Copenhagen Accord in January 2010.

In line with this, several national strategies are expected to be implemented in the near future to address such issues. For example, South Africa has recently released a Green Paper for discussion regarding the National Climate Change Response Strategy. Individual cities have also set specific targets for energy efficiency and the use of renewable energies.

THE NEED FOR ENERGY CONSERVATION, ENERGY EFFICIENCY AND ENERGY SECURITY WITHIN SOUTH AFRICA **HAS BEEN HIGHLIGHTED AS AN AREA OF NATIONAL PRIORITY**

3.2 Actions taken

3.2.1 Carbon Footprinting

South Africa's commitment to understanding the carbon intensity of the 2010 event was evident in a number of feasibility studies carried out in the years preceding the event. One such study, commissioned by the Norwegian Embassy in partnership with the DEA, estimated that the 2010 FIFA World Cup™ event would generate a footprint of 896,661 tonnes of CO_2 equivalent (tCO_2e) excluding air travel, and a total footprint of 2,171,000 tCO_2e, if air travel was included (DEA, 2009a). A total of 65% of this

World Cup visitors enjoy the sites from a pedi-bike.

footprint would therefore be as a result of international air travel, followed by intercity travel (17%), accommodation (13%), stadium construction[1] (0.6%) and stadium energy usage (0.5%).

TABLE 3. SOUTH AFRICA'S PROJECTED WORLD CUP CARBON FOOTPRINT

COMPONENT	South Africa[2] (tCO^2e)	Cape Town[3] (tCO^2e)	Durban[4] (tCO^2e)
International transport	1,856,589 (67.4%)	-	-
Inter-city transport	484,961 (17.6%)	107,536	55,057
Intra-city transport	39,577 (0.6%)	4,270	3,071
Stadium construction materials	15,359 (0.5%)	3,473	189,836
Stadium energy use	16,637 (0.5%)	3,092	1,058
Other venue construction materials	-	-	2,427
Other venue energy use	-	1,091	770
Energy use in accommodation	340,128 (12.4%)	63,730	54,990
Energy use in Final Draw	-	452	-
TOTAL	**2,753,250**	**183,192**	**307,208**

TABLE 4. INTERNATIONAL TRAVEL FOOTPRINT PREDICTED VS. ACTUAL

Region of Origin	Predicted Visitors	Actual Visitors	Ave. Dist Travelled	Predicted Footprint (tCO^2e)	Actual Footprint[5] (tCO^2e)
Africa – Air	63,486	21,669	3,500	127,670	43,576
EU – Air	165,064	77,389	9,000	747,740	350,570
Asia – Air	63,486	37,146	9,500	302,130	176,780
S America – Air	63,486	40,242	7,000	229,438	145,435
N America – Air	50,789	34,051	13,500	334,750	224,430
Africa – Land	300,000	99,057	1,202	114,861	37,966
TOTALS	**706,311**	**309,554**	**-**	**1,856,589**	**978,756**

In comparison, the total carbon footprint of the 2006 FIFA World Cup™ in Germany was 92,000 tCO_2e (Öko-Institut, 2006), excluding air travel. Therefore, even when excluding the 65% contribution to overall emissions from international air travel, the 2010 event was predicted to have a footprint over eight times that of the preceding event. The Carbon Neutral Feasibility Report (DEAT 2009a) provided some analysis for the high predicted carbon intensity of the 2010 event.

- *International travel:* South Africa is a long haul destination for the majority of visiting spectators.
- *Inter-city transport:* South Africa covers a vast area and public transport options between host cities are relatively limited.
- *Intra-city transport:* Public transport systems within cities are generally poor and as a result passenger car use is high.
- *Accommodation:* Estimated energy consumption per person per night in South Africa is 30kWh. This is compared to 7.6 kWh per person per night in Germany. This reflects building efficiency (or inefficiency) and climatic issues, as well as the fact that energy production in South Africa is heavily reliant on high carbon emission fossil fuels (coal).
- *Longer stays:* People travelling long distances were expected to stay longer due to the expense of travel to the event.

EVEN WHEN EXCLUDING THE 65% CONTRIBUTION TO EMISSIONS FROM INTERNATIONAL AIR TRAVEL, THE 2010 EVENT WAS PREDICTED TO HAVE **A FOOTPRINT OVER EIGHT TIMES** THAT OF THE 2006 EVENT

1 Excluding embedded emissions
2 South Africa's Carbon Footprint (DEAT, 2009a)
3 Cape Town's Carbon Footprint (Econ Poyry, 2010)
4 Durban's Carbon Footprint (Econ Poyry, 2009), includes embedded emissions for stadium construction
5 Calculation by WSP based on DEAT, 2009a for assumed return international flight as well as one short haul connecting flight of 1,000 km.

Baseline estimates for contribution of individual Host Cities to this overall footprint were estimated at 180,000 tCO_2e for the Western Cape and 307,208 tCO_2e for Durban (Table 3). The Durban footprint included the total embodied emissions for the stadium, which accounted for 62% of the total figure.

Calculations of carbon footprints are essentially estimates indicating of the scale of the potential problem and a reference point as to how much mitigating action is required. The DEAT (2009a) study was carried out in a balanced manner, using disaggregated emissions from six event-related activities, with clearly stated assumptions and internationally approved conventions to derive these estimates. The biggest proportion of the baseline estimate was attributed to international travel to and from the event. Using figures from the Initial Transport Operational Plan (Department of Transport, 2007), the calculation assumed that 700,000 visitors in total would be entering South Africa for the World Cup (400,000 via plane, 300,000 overland).

Analyses of tourist numbers entering South Africa during the month (11th June to 11th July 2010) suggest that the actual numbers were somewhat lower than original predictions. The South African Department of Tourism (SAT, 2010) states that the estimated number of World Cup-related foreign visitors that entered South Africa was 309,554 (210,497 via plane, 99,057 overland). Using these figures, it was estimated for the report that the footprint (Table 4) for international travel was overestimated by 877,833 tCO_2e (both via air and overland). The post-event estimate for travel to and from the World Cup is therefore 978,756 tCO_2e. The results are consistent with a significant drop from the predicted international and local visitor number – most significantly, from the EU. Hence the carbon emissions were lower than expected as the average distance flown was less. The baseline figure also significantly overestimated the number of African visitors driving overland from neighbouring countries. The drop in visitor numbers can perhaps be attributed to difficult global economic conditions in the lead-up to the event.

3.2.2 Stadium precincts

Five new stadiums were constructed for the 2010 FIFA World Cup™. The City of Durban (eThekwini Municipality) took the lead, and was the only city to declare that it would attempt to achieve carbon-neutrality. Impressively, the total embodied carbon emissions associated with the building of the Moses Mabhida stadium were completely incorporated into Durban's carbon footprint and offset commitment. Embodied emissions from the stadium construction constituted 62% of the total emission footprint. In part, this was as a result of the sustainable building design of the Moses Mabhida stadium, which is estimated to have reduced the operational energy footprint of the precinct by approximately 30%. These energy savings are expected to result in an annual operational cost saving of R1 million per year (eThekwini Municipality, 2009). A centralised building management system (BMS) allows for optimal management of ambient temperature (air conditioning) and lighting for different zones. Even after the event, the stadium's performance is undergoing constant refinement, and these modifications are central to ensuring sustainable performance in years to come.

Several Host Cities committed to various green energy initiatives in their stadium construction. Because carbon emissions and energy are subjects so inextricably linked, further details of these developments will be discussed in the energy chapter.

The Moses Mabhida Stadium precinct.

3.2.3 Carbon reductions from transport initiatives

Improvements in the provision and accessibility of public and non-motorised transport can be translated into an improvement in air quality, reduction of noise level, reduction of traffic congestion, improved physical environment and, importantly, carbon reduction. Although carbon savings due to transport initiatives were not quantified, they should be recognised as a key component of the legacy of the 2010 FIFA World Cup™.

From an early stage, the large-scale movement of people within South Africa during the World Cup was recognised as a major hurdle in the event's planning. Public transport initiatives were necessary in all Host Cities, and numerous needs assessments were carried out. "Park and ride" and "park and walk" facilities were implemented

in order to reduce carbon emissions and traffic congestion in the stadium precincts. In some cases the 2010 FIFA World Cup™ served to accelerate existing plans for transport infrastructure upgrades. Highlights include the allocation of R 1.69 billion funding by the National Treasury for projects related to the 2010 FIFA World Cup™, as well as towards the development of comprehensive transport plans. In addition to this, the following Host Cities of Johannesburg, Cape Town, Polokwane, Port Elizabeth and Tshwane each created a non-motorised transport framework, with clear objectives to meet their vision of promoting low carbon forms of transport such as cycling and walking. Most Host Cities carried out upgrades to road systems in the stadium surroundings and protocol routes to improve pedestrian safety and accessibility to spectators. Pedestrianisation of urban spaces in South Africa, which has traditionally focused on motor vehicle accessibility, will be a key to the extension of a sustainable urban transport legacy in years to come. In addition, numerous public transport pro-

TABLE 5. CARBON-FRIENDLY TRANSPORT LEGACY INITIATIVES FOR THE 2010 WORLD CUP™

ENTITY	TRANSPORT INITIATIVE
Cape Town	• Development of public transport infrastructure including dedicated bus lanes on freeways and improved transport corridors. Three hundred new buses purchased. • Training of 20 metered city taxi drivers in 'eco-driving' as part of a pilot project. • Stadium precinct infrastructure improvements for non-motorised transport and an improved inner-city distribution system. Construction of FIFA fan walk to allow pedestrian flow from city centre to stadium.
eThekwini (Durban)	• Public transport lane for one highway. • Construction of linkages between the stadium and the CBD precinct, and a new railway station adjacent to the Moses Mabhida Stadium.
Johannesburg	• The Strategic Public Transport Network between Johannesburg and Tshwane: Fast-tracking of the Gautrain development, and linkages to and from the NASREC precinct and to and from OR Tambo airport. • Fast-tracking of sustainable public transport development: Johannesburg BRT (Rea Vaya) public transport system with 325 km of special public transport lanes and intersections, and 40 transport interchange nodes where commuters can switch from one form of transport to another.
Mangaung (Bloemfontein)	• The development of an internodal public-transport facility, including upgrading the taxi rank and street pedestrianisation to encourage non-motorised public transport. • Infrastructural upgrades including the establishment of a high-capacity public transport service between the south-eastern areas and the CBD and improved access to Mangaung Bloemfontein airport.
Mbombela (Nelspruit)	• Upgrades to multimodal and pedestrian facilities in the central business area. Upgrades included walkover bridges to the stadium. • Upgrades including adding a high occupancy vehicle lane to major highway and construction of a new rail station and platform.
Nelson Mandela Bay (Port Elizabeth)	• Introduction of BRT system with 45 high-capacity buses. • Rehabilitation and widening of public-transport routes, and improvement of non-motorised transport routes including cycle tracks and walkways.
Polokwane	• Non-motorised transport improvements. • Upgrading of the Polokwane Centre bus terminus and taxi ranks in the municipality.
Rustenburg	• Design and construction of safe pedestrian and cycle networks. • Upgrades to the taxi rank and bus facilities.
Tshwane	• Improvement in non-motorised transport, including the Shova Kalula Bicycle Project. • Improvement in public transport infrastructure and systems, including the development of the Gautrain and a new municipal bus fleet.

Solar powered traffic light outside Soccer City, Nasrec, Johannesburg

jects, such as Johannesburg's Bus Rapid Transit system or the Rea Vaya (which means "We are going" in Portuguese) were fast-tracked to ensure that fans and spectators could benefit from them. A summary of transport initiatives is provided in Table 5.

3.2.4 Voluntary arbon initiatives for a 'carbon fair' event

Carbon offsets involve transactions in which polluters invest in projects that reduce greenhouse gas emissions in exchange for the right to claim credit against their own footprint. It was clear that the World Cup would have a substantial carbon footprint even if significant efforts were made to directly reduce carbon emissions associated with the event. Carbon offsetting offered an opportunity to address these carbon emissions in a more affordable and practical manner, as had been undertaken for Germany's Green Goal 2006. A desire to respond to this precedent in 2010 was embodied in a new National Carbon Offset Working Group, which was to initiate the offset response. Five official offset projects were selected for the World Cup. With funding from the GEF/UNEP, these projects were linked to a carbon calculator on the Green Passport website as part of the communications and awareness programme. The official offset projects included:

- Solar cookers, by Sunfire Solutions
- Soil composting, by Soil and More Reliance
- LED energy efficient lighting retrofit programme, by Lemnis Lighting
- Wind energy, by Mainstream Wind Power
- Domestic fire lighting – *basa nge magogo* project, by the Nova Institute.

WORLD CUP TEAMS OFFSET THEIR EMISSIONS

The total carbon footprint of the 32 participating football teams in the 2010 FIFA World Cup™ was estimated at 16,010 tCO_2.

Ten of the nations that qualified for the 2010 FIFA World Cup™ in South Africa, including all seven teams sponsored by Puma™, offset their CO_2 emissions from travel and accommodation (estimated at approximately 4,567 tCO_2), by supporting a South African organic compost project set up by Soil & More Reliance. Teams included football powerhouses such as Italy, Cote d'Ivoire, Ghana, Uruguay, Algeria, Cameroon and Switzerland. The Netherlands, Republic of South Korea and Serbia are also reported to be offsetting their emissions.

SOIL & MORE RELIANCE diverts green waste away from landfill sites to produce high quality organic compost using an aerobic process. Greenhouse gas savings are made through the avoided release of the methane that would have been emitted should the green waste have gone to landfill.

Disappointingly, substantial funding could not be secured to offset the 2010 event in full. Nevertheless, the hurdles that may have prevented large-scale investment in offsetting projects should not distract from the many city-wide interventions that were carried out, and which ultimately allow for the 2010 FIFA World Cup™ to be considered as a "carbon fair" event, if not carbon neutral. The following provides a snapshot of the main focus areas in which these activities took place.

3.2.5 South Africa's carbon neutral Host City

With a goal of carbon neutrality, the eThekwini Municipality investigated 80 potential carbon emissions reductions projects, of which five were selected for further development. The five Certified Emissions Reductions (CER) projects detailed in Table 6 will offset a total of around 178,000 tCO_2 per year when running at full capacity. The intention is to run the projects to the maximum allowable registration time of 21 years. If this can be achieved, the maximum CER that could be generated from all of the projects would be 3,738,000 carbon credits/tCO_2 offset (eThekwini Municipality, 2010).

None of the projects have commenced at the time of writing, but business plans have been developed and project identification notes (PINS) have been submitted to and accepted by the Designated National Authority for the Clean Development Mechanism (CDM). Under the Kyoto Protocol this is the first step in registering ventures as carbon offset projects eligible to bank or trade in carbon credits. The three projects closest to implementation are:

- Western Aqueduct Hydropower Scheme
- Durban Solid Waste Marianhill landfill biogas to energy project. This will utilise landfill gas from the municipal waste site for energy generation.
- Roll-out of 100,000 solar water heaters by 2015 to high-end users.

It is estimated that within three years the carbon credits banked through these projects will be sufficient to offset the carbon footprint associated with Durban hosting the 2010 FIFA World Cup™. Thereafter, these credits may be sold to generate further revenue for additional carbon emissions reduction projects.

Buffelsdraai Landfill reforestation project (Source: eThekwini Municipality Greening Durban, 2010)

TABLE 6. SUMMARY OF CARBON OFFSETTING PROJECTS: CITY OF DURBAN

PROJECT NAME	Estimated Carbon Credits/Annum	Est. Average Electricity Units (kWh)/Annum
Western Aqueduct Hydropower Scheme	16 415	15 937 000
Southern Wastewater Treatment Works AD	97 038	18 679 900
Mini Hydropower Turbines at Municipal Reservoirs	12 000	11 650 000
Mariannhill Landfill Site Composting and AD	24 872	3 310 000
Solar Water Heater Rollout (100,000)	27 581	0
TOTAL	**177 906**	**49 576 900**

3.2.6 Tree planting

Tree planting was a common theme across many of the Host Cities because of their potential to sequestrate CO_2 as well as the clear ecological and landscaping benefits, if appropriately selected and managed. To date a total of 361,000 indigenous trees have been planted as a result of the World Cup (Table 7). It is estimated that each tree can sequester 20.3 tonnes of CO_2 during the average lifecycle of 40 years.

In one such example, the City of Durban partnered with the Wildlands Conservation Trust to plant 104,000 indigenous trees on an 82 hectare site within the Buffelsdraai Landfill buffer zone. The achievement marked a 166% increase on their original target of 62,500 trees by the start of the 2010 event. As a conservative estimate, it is calculated that these trees will offset approximately 20,000 tons CO_2 over the next 20 years.

The second phase of the project was recently commenced that will raise the carbon sequestration to 40,000 tCO_2e. A further positive spinoff of the project was the

creation of 15 permanent jobs for local community members (nursery and planting), 220 temporary jobs (digging and planting), and 400 "treepreneurs" to grow trees and trade for basic goods, food and school fees (eThekwini Municipality, 2010).

A second site has been identified for post-event offsetting of carbon emissions at Inanda Mountain on tribal authority land, to contribute to the City's next goal of planting a further 100,000 trees.

TABLE 7. SUMMARY OF TREE PLANTING INITIATIVES IN SOUTH AFRICA FOR THE 2010 WORLD CUP™

CITY	Initiative	No. of trees planted
Johannesburg	Soweto Tree Planting Initiative	200,000
Durban	'One goal – one tree' campaign Buffelsdraai Landfill Buffer Reforestation phase 1 (phase 2 to commence in 2011 with a target of another 104,000 trees)	104,000
Tshwane	'One Goal – One Tree' campaign Corporate tree planting	32,000
Rustenburg	City Beautification	25,000

3.2.7 South Africa goes solar

Solar water heating is an attractive prospect in a country like South Africa. Water heating consumes 18% of the total coal-generated electricity supply to industry, commerce and domestic sectors. Eskom estimates that replacing traditional electric geysers with solar water heating could cut a typical domestic bill by up to 70%. Additionally, each household with solar water heating will reduce carbon emissions by 1.8 tons per year. Among energy-generation technologies, solar is second only to bio-fuels in its potential to create new jobs (NEEC, 2010). The recent launch of the

Among the various initiatives explored was the **"GOGREEN" SMS CAMPAIGN**. This was a fund-raising project geared towards a national carbon offset programme. Sadly the project, supported by Foneworx and KPMG, fell off due to a lack of on-going publicity and sponsorship difficulties. Not all projects will achieve the success of others, but the value of lessons learnt for carbon offset programmes in future should not be discounted. Further initiatives have been pledged in order to advance the offset of World Cup emissions, such as the City of Cape Town's pledge to retrofit 100,000 low cost houses with energy efficient lighting. These and other pledges will ensure that the momentum is maintained in tackling South Africa's carbon footprint in general.

Newly fitted solar water geysers in Darling, Western Cape.

National Solar Water Heater Project (NSWHP) in April 2010 reflects the widespread implementation of such geysers as a national priority. The project aims to install one million solar geysers in South African homes by 2014. In addition:

- The City of Cape Town used part of the World Cup funding supplied by the Department of Environment Affairs and Development Planning (DEA&DP) and the Danish International Development Agency (DANIDA) to contribute to the installation of 300 solar water heating systems within the Darling community in the Western Cape region (DEA&DP, 2010 media release).
- Nelson Mandela Bay, through funding received from the Division of Revenues Act, has committed to retrofitting 100,000 solar water geysers over the next five years.
- The City of Tshwane, through funding received through CEF and Eskom, were able to mark the launch of the NSWHP through the replacement of 270 units in the township of Winterveld, with a further 2,730 units to be installed in Phase 2.

These are just a few of the projects that will ensure increased environmental awareness and a legacy of energy efficiency, sustainability and renewable energy are introduced in communities of South Africa

3.3 Outcomes

TABLE 8. SUMMARY OF WORLD CUP RELATED CARBON REDUCTION INITIATIVES

TYPE OF CARBON REDUCTION	PROJECT	POTENTIAL CARBON SAVINGS (TONNES)	TIMESCALE
Energy Efficiency & Small Scale Renewables	Solar Powered Street Lighting (13 in 5 cities) – National	19,929	7 years (product lifespan)
	Retrofit of traffic lighting – National	672	7 years (product lifespan)
	Solar powered billboards – National	995.4	7 years (product lifespan)
	Solar water heaters – National	1,270,080	7 years
Offset Projects	Solar Water heaters – City of Durban	577,878	21 years
	Western Aqueduct Hydropower Scheme – City of Durban	344,715	21 years
	Southern waste water treatment works	2,037,798	21 years
	Mini hydropower turbines at municipal reservoirs – City of Durban	252,000	21 years
	DSW Marianhall biogas to energy project – City of Durban	522,312	21 years
Carbon Sequestration	Tree planting – National	7,238,300	40 years
Avoided Emissions	Renewable energy supplied by SAPP	2,491,271	Once-off

THE SUMMARY ABOVE DESCRIBES the diverse and varied carbon initiatives that were implemented (or are in the process of being implemented) across South Africa (summarised in Table 8). The cross cutting themes of energy, transport, waste, water and biodiversity will be explored in more detail in the following chapters. No post-event carbon footprint calculations for the Host Cities had been released at the time of writing, so the performance against the initial baseline estimates cannot be fully assessed.

South Africa is currently not a major participant within global carbon markets. The 2010 FIFA World Cup™ presented significant opportunities for large scale investment in carbon offset projects. If more substantial investment had been secured this could have been used to encourage and promote the local carbon offset industry. Effectively, however, the chance to completely offset the 2010 FIFA World Cup™ carbon emissions was lost due to lack of funding taking into account that greening of the World Cup was a voluntary effort. The major lesson learnt for South Africa therefore, and any other nation undertaking an event of this magnitude, is that binding agreements

Plant a tree for every goal: Loftus trees surrounding a sculpture by one of Tshwane's most famous contemporary artist, Angus Taylor.

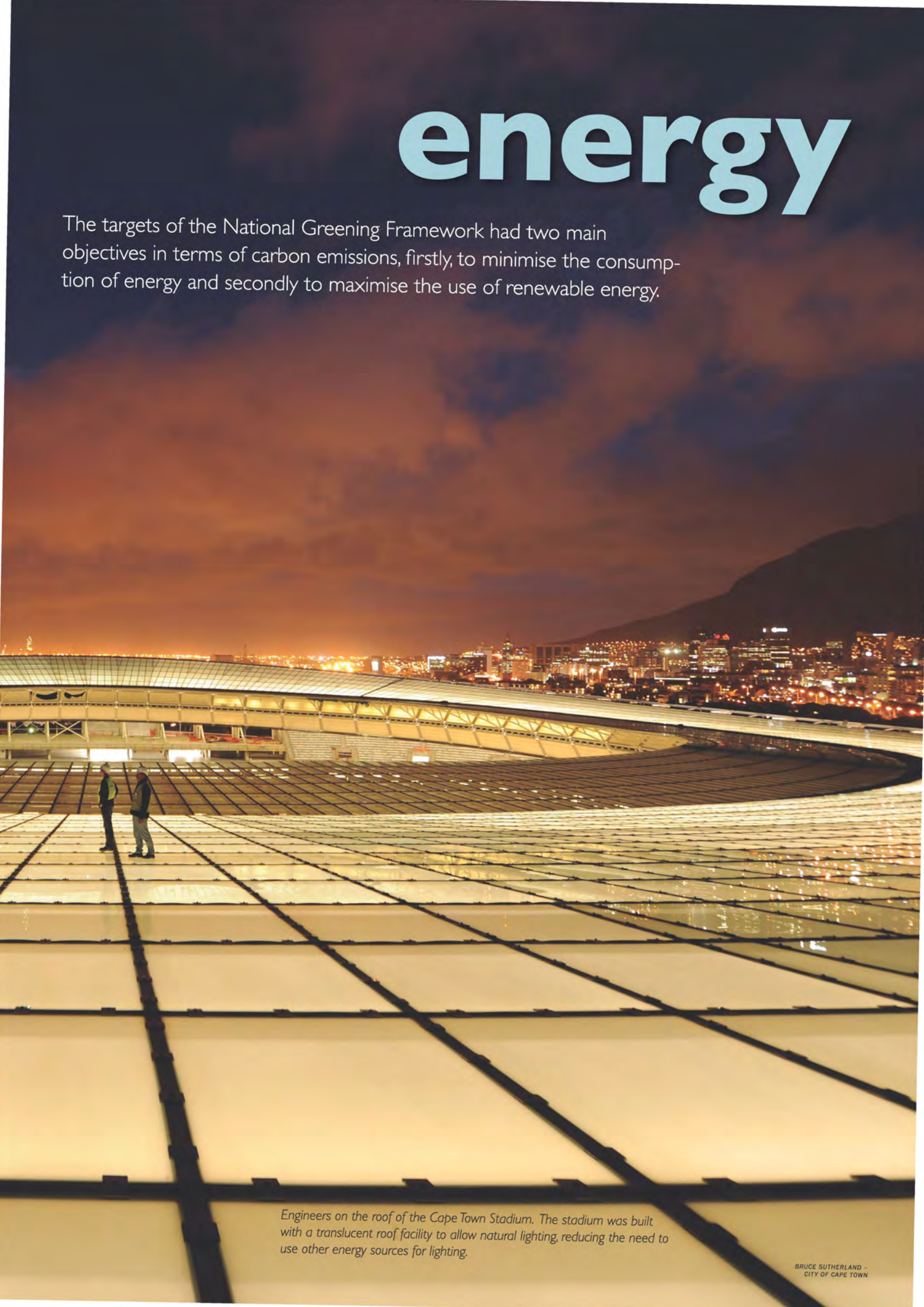
for fiscal support should be sought upfront for a carbon emissions reduction programme. Alternatively, more flexible mechanisms need to be considered for accessing private sponsorship funding. This is not to understate the achievements of those Host Cities that managed to produce their own legacies in the form of municipal projects such as the advances in multimodal transport links, energy efficiency interventions, investment in various small-scale renewable energy projects, and the numerous tree planting/reforestation projects taking place across the country.

The true legacy projects in South Africa are therefore those that, though of a smaller scale, will promote increased awareness of sustainability issues and carbon neutrality amongst South African communities and seed new initiatives in the future.

THE TRUE LEGACY PROJECTS ARE THOSE THAT WILL PROMOTE INCREASED AWARENESS OF SUSTAINABILITY ISSUES AND CARBON NEUTRALITY AMONGST SOUTH AFRICAN COMMUNITIES AND **SEED NEW INITIATIVES IN THE FUTURE**

energy

The targets of the National Greening Framework had two main objectives in terms of carbon emissions, firstly, to minimise the consumption of energy and secondly to maximise the use of renewable energy.



Engineers on the roof of the Cape Town Stadium. The stadium was built with a translucent roof facility to allow natural lighting, reducing the need to use other energy sources for lighting.

BRUCE SUTHERLAND – CITY OF CAPE TOWN

Johannesburg's Soccer City Stadium.

ELECTRICITY SUPPLY PREPARATIONS:

- Securing regional networks and supplies to municipalities and key installations
- Optimising and integrating Eskom planning with the supply chain response capability planning of stadiums and surrounding regions, in the event of outages or operational emergencies
- Aligning consolidated risk profiles and treatment plans to help secure electricity supply chain from generation to distribution
- Forecasting capacity through municipal load control
- Accelerating 2010 demand-side management (DSM) initiatives
- Eskom capacity management
- Securing Southern African Power Pool member contributions
- Negotiating key customer (high-end consumer) capacity management
- Engaging with key business sectors (such as tourism) to improve energy efficiency by developing energy efficiency campaigns and messaging.

(Eskom, 2009)

4.1 Introduction

SOUTH AFRICA HAS BEEN IN THE GRIP of an energy crisis for some years now. A legacy of inadequate maintenance combined with political imperatives and a relentless pressure for development has kept the price of electricity artificially low for several decades. The result has been, amongst others, an influx of energy intensive firms into South Africa. Even more challenging is the fact that industrial, commercial and household users of electricity have had little incentive to use energy efficiently. These factors have led to ongoing pressure on the grid and contributed significantly towards the severe capacity shortfalls experienced in recent years.

With this in mind, the South African Government is taking action across the board, from implementing industrial energy efficiency programmes to directing the country's building regulations towards ensuring energy efficiency in new buildings. In the interim municipalities such as the City of Johannesburg and Tshwane are investigating the development of by-laws and incentive schemes to reduce energy consumption in their region. Another example is the South African Department of Trade and Industry, who have begun to phase out the sale of incandescent light bulbs.

4.1.1 Preparations and planning

The FIFA World Cup™ is the most widely televised sporting event globally. Thus, one of the main concerns on match days is to ensure the continuous and secure provision of energy. The FIFA World Cup™ Terms of Reference stipulated that the national energy provider, Eskom, guarantee an uninterrupted supply of energy for all 2010 games, and that generators capable of operating as primary energy sources be available at all stadiums. Preparations for Eskom's readiness for the event began as early as 2007 with the establishment of its Project 2010MW team, which worked in a broad-based partnership with local Host City Municipalities, the Southern African Power Pool and large industrial customers, to ensure a continuous supply of energy. All match events were supplied with electricity by local municipalities (which received their electricity from Eskom), with the exception of Rustenburg, which was supplied directly by Eskom (Eskom, 2010).

To guarantee an uninterrupted supply of electricity to key 2010 FIFA World Cup™ venues, Government fitted all ten stadiums with diesel-powered generators. This ensured undisturbed power supply during matches. Most of the stadiums were run

ENERGY AT A GLANCE FOR THE 2006 FIFA WORLD CUP™, GERMANY

Visitors: 3.4 Million
Average annual consumption of stadiums: 3.5 GWh
Total electricity consumption of stadiums and hospitality over WC period: 13 GWh
Average consumption per match: 170,000 kWh (0.17 GWh)

- A number of energy efficiency and energy saving technologies were employed to minimise electricity use in the stadium and precincts. 13 Million kWh of green electricity was purchased from a Swiss hydropower plant in Switzerland.
- Electricity accounted for carbon emissions of 2,490 CO_2e during the World Cup period.
- Mobile generators were used extensively – including diesel to ensure an uninterrupted supply to the stadiums. Diesel consumption was in the region of 660,000 litres.

Source: Öko-Institut 2006

directly from the generators during matches, with electricity from the grid only used as a back-up supply. Consequently, all 2010 World Cup stadiums were self-sufficient, placing little additional stress on the national power grid. The exception was the Peter Mokaba Stadium in Polokwane, which did use the national grid as its primary source.

With energy supply concerns aside, the Host Cities' next priority was to try ensure a low-carbon 2010 FIFA World Cup™. Two of the main aims of the National Greening Framework in relation to carbon emissions and energy were:

- To minimise the consumption of energy through energy efficiency measures, and;
- To avoid unnecessary carbon emissions and stress on the national grid, by maximising the use of renewable energy.

In line with its National Targets for Green Goal 2010 (DEA, 2008a), the LOC carried out baseline studies through a quantitative questionnaire for Vodacom Park Stadium, Loftus Versfeld (Tshwane), Royal Bafokeng (Rustenburg), Ellis Park (Johannesburg) and Newlands Stadium (Cape Town). Additional information was gained from three match day audits at Loftus Versfeld and Newlands. The baseline studies were used to develop a status quo for energy use at South African stadiums. The 2008 baseline study concluded that:

- None of the stadiums included in the study had energy management plans in place
- No active monitoring of energy was taking place
- None of the stadiums had any on-site renewable energy sources
- None of the stadiums had specific or detailed records of their energy usage (aside from municipal accounts)
- Most of the stadiums did not have comprehensive sub-metering of different facilities
- Most of the stadiums did not have energy efficiency programmes in place, although they were making use of energy saving lamps (CFLs) for general public lighting. Optimised management of lighting and HVAC (heating, ventilation and air-conditioning) was generally not carried out.

The study showed that what each of the stadiums needed was an operational energy management plan that specifically addressed energy efficiency and mechanisms for the monitoring of energy use. It was hoped that this would reduce the energy used at official venues by 15%.

Modern football stadiums are incredibly energy intensive to construct, operate and maintain. Floodlighting, air conditioning and lighting of the stadiums, and associated peripherals, such as media and catering facilities, are all highly energy intensive components of match day operations. FIFA stipulated an average pitch lighting level of 2,400 lux (a measure of light intensity or brightness) at camera level to meet the demands of modern high definition television viewing. This is significantly higher than the standard illumination level of 1,000 lux currently required for national televised games, represent a significant increase in energy usage.

MODERN FOOTBALL STADIUMS ARE **INCREDIBLY ENERGY INTENSIVE TO CONSTRUCT OPERATE AND MAINTAIN ...** FLOODLIGHTING, AIR CONDITIONING AND LIGHTING ... ARE ALL HIGHLY ENERGY INTENSIVE

As such, the installation of energy efficiency measures at new stadiums – and retrofitting of existing stadiums – was given high priority by Host City planning teams, as well as within the DEA National Greening Framework (DEA, 2008a). These interventions meant that not only would the stadiums be more energy efficient during the World Cup but also address their sustainability in the longer term.

4.2 Actions taken

THE TEN 2010 FIFA WORLD CUP™ STADIUMS vary in terms of size and specification, and therefore have varying levels of energy consumption (Table 9). A number of baseline studies were carried out in the run-up to the 2010 event. In the carbon neutral feasibility study (DEA, 2009a), the projected total electricity consumption of the Soccer City Precinct (expected to be the most energy intensive per match day) was a match-day consumption of 407 MWh and a total consumption of 3,257 MWh over the course of the World Cup. The Cape Town Stadium and Stadium Precinct consumption was estimated to be approximately 2,405 MWh for the duration of the World Cup event. In comparison, data captured during the 2010 event indicates that the Peter Mokaba Stadium in Polokwane consumed only 430 MWh of electricity during the same period.

Data received from the Host City of Rustenburg following the 2010 event indicates that total energy usage within the Royal Bafokeng Stadium and fan park was approximately 175 MWh per match. Of this, 53% was consumed by field lighting, making it by far the most energy intensive application. This was followed by air conditioning and ventilation (13%) and lighting (7.2%) (Figure 3).

TABLE 9. ENERGY DEMAND ESTIMATES FOR WORLD CUP STADIUMS *(DEA, 2009a)*

Stadium/Host City	Seating capacity	Electrical cons. per match (MWh)	Electrical cons. total (MWh)	Emissions (tCO_2e)	Match days
Soccer City/Jhb	95,000	407	3,257	3,245	8
Ellis Park/Jhb	61,006	261	1,830	1,823	7
Moses Mabhida/Durban	70,113	194	1,358	1,353	7
Cape Town/Cape Town	68,000	301	2,405	2,397	8
Mangaung Stadium/Bloemfontein	48,000	212	1,273	1,269	6
Mbombela/Nelspruit	46,000	203	814	811	4
Nelson Mandela Stadium/P.E.	48,000	212	1,698	1,692	8
Loftus Versfeld Stadium/ Tshwane	50,000	22	1,327	1,322	6
Royal Bafokeng /Rustenburg	42,000	186	1,114	1,110	6
Peter Mokaba Stadium/Polokwane	46,000	203	814	811	4
International Broadcast Centre			807	804	
TOTALS			**16,696**	**16,637**	**64**

4.2.1 Energy Efficiency at the World Cup

DEVELOPING A TOOL FOR BEST PRACTICE IN STADIUM DESIGN

In 2007, the DEA commissioned (through the Urban Environmental Management Programme (UEMP) funded by the Royal Danish Embassy), a review of the greening status of five of the stadiums (official match stadiums and training venues) including Royal Bafokeng, Cape Town, Athlone, Moses Mabhida and Peter Mokaba stadiums. An adaptation of the Sustainable Building Assessment Tool (SBAT) (WSP GreenByDesign, 2010a-e) was created to assist with the design and operation of the stadiums. The aim of the assessments was to establish how sustainable the stadium designs were, and provide the design teams with the opportunity to further enhance the 'green' aspects of their designs. Energy efficiency was clearly an important criterion in the assessment of the overall sustainability of the stadiums.

Soccer City, Johannesburg. The hot climate of South Africa offers both significant challenges and opportunities for energy savings in terms of avoiding excessive levels of solar radiation to ensure spectator comfort, while maximising the use of natural lighting and ventilation.

The scale and expense of building such stadiums means that energy efficiency interventions are often now considered standard practice, particularly in consideration of potential cost savings. The hot climate of South Africa offers significant challenges and opportunities for energy savings such as avoiding excessive levels of solar radiation to ensure spectator comfort, while maximising the use of natural lighting and ventilation. A review of some of the interventions used in the stadiums is given below.

ENERGY BEST PRACTICE AT HOST CITY STADIUMS

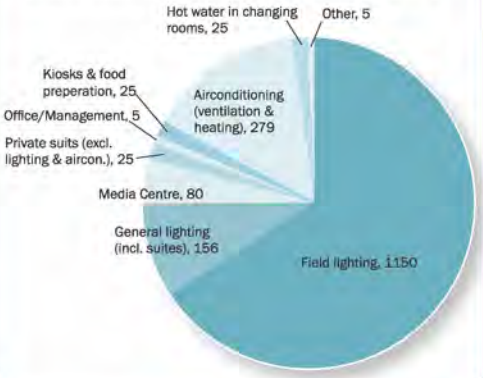
Passive design systems: day lighting and natural ventilation, solar control, and night time cooling in order to reduce reliance on electrical or electro-mechanical systems

- The external envelope of the Mbombela Stadium is cavity brickwork, which significantly reduces heat transfer through the wall. Most windows, particularly on the western façade of the stadium, were fitted with shading to reduce heat build-up.
- The mesh fabric cladding of the Cape Town Stadium allows 30% light through, and the white colour reduces thermal radiation. This means less energy is needed to cool the stadium environment.
- The Cape Town Stadium is built with a translucent roof to allow natural lighting, reducing the need to use other energy sources for lighting.
- Passive ventilation is aided through the design of open concourses at podium level between inner and outer façades to encourage natural air movement and reduce the need for cooling systems.
- In the Moses Mabhida Stadium, natural ventilation is facilitated by punched corrugated metal sheeting behind the façade. Natural lighting and a light-coloured roof reduce energy demand while the shade provided by the roof ensures spectator comfort.

Installation of energy efficient luminaries such as LEDs, fluorescent and compact fluorescent lighting reduces electricity consumption

- Moses Mabhida Stadium was fitted with energy-efficient LED lighting technology and T5 fluorescent lighting. Control gear such as electronic ballasts and timing controls for feature lighting were installed to help streamline energy usage.
- Compact fluorescent lights (CFL's) were installed in Soccer City Stadium. The use of CFL's has a lower energy demand than conventional lighting, reducing the amount of energy used.
- Nelson Mandela bay municipality has committed to installing motion sensors and compact fluorescent lights in the stadium offices and corridors.

FIGURE 3. MATCH DAY ENERGY USAGE AT THE ROYAL BAFOKENG STADIUM (SOURCE RUSTENBURG MUNICIPALITY)



Moses Mabhida Stadium, Durban

- The Royal Bafokeng Stadium employs the use of motion intelligent lighting systems to ensure that lighting is only in use when the zone is occupied.
- Cape Town Stadium's external lighting was designed to use high efficiency light sources, namely metal halide, fluorescent and LED lamp technologies. LED lighting on the façade provided high efficiency, long life, low maintenance illumination of the façade.

Installation of Building Management Systems (BMS) and creation of building zones allowing the control of individual zones and spaces and minimising unnecessary electricity consumption during low-use periods

- Soccer City, Cape Town, Moses Mabhida, Mbombela, Peter Mokaba and Nelson Mandela Stadiums were fitted with centralised BMS to control lighting and heating in the various building zones. This allows for an optimal management of ambient temperature (air conditioning) and lighting for each zone individually. The pumps and plants, heating and air conditioning in the Moses Mabidha Stadium are all controlled by a centralised BMS, minimising energy wastage.
- Results from BMS analytics and wastage assessments are being used in the post-world cup period to aid further rationing of electrical lighting and air conditioning systems. The Cape Town Stadium is currently undergoing sub-zoning to allow for separate zoning of emergency lighting.

Installation of energy saving measures for hot water geysers

- Many of the stadiums dispensed with hot water in the public sanitary facilities, making energy savings on electrical geyser systems.
- Tshwane and Mbombela Stadiums have installed solar water geysers to save on energy from intensive water heating and reduce operational costs.

GOING ABOVE AND BEYOND: SMART SYSTEMS WORK TO KEEP CONSUMPTION LOW

Mbombela Stadium (Nelspruit)

- Hot water is generated by waste heat from the air-conditioning plant and stored in an insulated tank in the plant for use during peak loads. Circulation pumps keep the hot water at the desired temperature as long as the air conditioning plant runs.
- A chilled water system was selected to serve 90% of the stadium due to its high efficiency and minimal use of refrigerant gasses. The plant is housed in an internal room with attenuated louvers to reduce noise pollution. The plant has been

configured to run at optimal efficiency under reduced load (i.e. no game) and peak load (during a game).

Moses Mabhida Stadium (Durban)

- Water was heated by heat pumps – a system that consumes as little as 35% of the energy of a direct heating system.
- The stadium's design stood out from the others in the promotion of energy efficiency in media and broadcasting & hospitality areas.
- The commitment to energy efficiency has produced a stadium projected to use more than 30% less electricity than Cape Town Stadium per match despite having a bigger seating capacity.

Cape Town Stadium

- A water-cooled, variable refrigerant volume cooling system – the first of its kind in South Africa – was used to cool small zones or systems efficiently.
- Ventilation fans in the parking garage of the stadium are activated when a certain level of carbon monoxide is detected. In certain times of low use the air supply system can be switched off altogether, leaving only the exhaust (outlet) system, which means significant savings in energy.

A CONSCIENTIOUS APPROACH: RETROFITTING AT TRAINING VENUES

While energy efficiency was a priority in the design of the Host City stadiums, it was also important that the existing training venues be improved. Funding from the Danish International Development Agency (DANIDA) was used to retrofit the electrical installations at the Princess Magogo, King Zwelethini and Sugar Ray Xulu Stadiums in Durban, and the Athlone and Philippi Stadiums in Cape Town. Beyond the FIFA World Cup™ these smaller venues will be used to host small scale sporting and community events. The changes made to the structures, including the replacement of ageing electrical infrastructure, will prove beneficial to future operating and maintenance costs of the venues as well as reducing their carbon footprint.

A summary of the Durban-based stadium interventions and estimated energy and cost savings is provided in Table 10 (Pennington & Asc. *et al*, undated). Four high-mast floodlights were installed at the Princess Magogo and Sugar Ray Xulu training venues. Three adjustable levels of operation mean that only the necessary illumination strength is used in different instances, for example 200 lux in practice, 600 lux for non-televised games and 1000 lux for televised games. The lighting system is controlled by a newly installed BMS to ensure even usage of lamps and minimal lamp replacement.

TABLE 10. ENERGY SAVINGS ACHIEVED AT TRAINING VENUES IN DURBAN

Interventions	Expected Average Annual Cost Savings (ZAR)	Expected Average Annual Energy Savings (kWh)*
Heat Pump	R 120,000	164,667
Motion Detection lighting	R 85,000	144,000
Timers & daylight switches	R 35,000	23,500
Flood lighting control	R 130,000	128,000
Building Management System	R 670,000	144,000

* Every 1,000 kWh saved off the national grid is equivalent to approximately a 1 tCO_2e reduction in carbon emissions

PITCH LIGHTING AT CAPE TOWN STADIUM: CASE STUDY

Metal halides are approximately five times more efficient than standard tungsten halogen lamp technology, and for that reason these lights were chosen to illuminate the Cape Town Stadium. Efficiency in the maintenance and operation of stadium luminaries was a key factor in the choice of which lights to use. The Cape Town Stadium consists of 360 separate 2 kW floodlights (each producing approximately 215,000 lumens of light output – or about the same light as 430 desktop lamps combined), so the effect of

THE INSTALLATION OF FLOODLIGHTING CONTROLS IS ESTIMATED TO **SAVE AN AVERAGE OF 65% ON ENERGY CONSUMPTION** COMPARED TO THE STANDARD ALTERNATIVE

Lighting at the Princess Magogo Stadium.

installing energy efficient lighting would be significant minimisation of the potential energy usage and thus operating costs of these lights. The total light output at the Cape Town Stadium was as per the FIFA stipulations for high definition television.

Since it will not always be required to illuminate the stadium for HD television, several different settings have been programmed into the floodlighting control system, so that lower levels of field illumination can easily be selected for non-televised events, practice/training sessions or for maintenance works at the stadium.

SAFA HEADQUARTERS, JOHANNESBURG

The South African Football association (SAFA) headquarters, SAFA House, is situated next to Soccer City in Nasrec, south of Johannesburg. The building was also used as the headquarters of the Local Organising Committee (LOC) during the 2010 World Cup period. The building was proposed as a showcase opportunity for modern South African design. However aspects of the design meant that the building turned out to be hugely energy inefficient. Lighting was both inadequate and highly energy intensive, necessitating the installation of extra desk lamps and hence doubling the energy consumption. Ineffective energy controls and poor electricity zoning meant that lighting would often be left on permanently. In order to remedy the situation, funding received from the CEF was used to upgrade the building by replacing all existing halogen lamps with energy-saving compact fluorescent lamps (CFLs), and to install a system of motion sensors, which automatically switch off lighting in areas where no motion is detected for a set period of time. In addition, two solar water heaters have been installed to replace all electric geysers (CEF, 2010).

MANY OF THE MUNICIPALITIES RECOGNISED THE IMPORTANCE OF THE 2010 FIFA WORLD CUP™ **AS A CATALYST TO DRIVE DEVELOPMENTAL BENEFITS FROM INFRASTRUCTURAL UPGRADES**

4.2.2 Improvements to infrastructure

CASE STUDY: POLOKWANE

Many of the municipalities recognised the importance of the 2010 FIFA World Cup™ as a catalyst to drive developmental benefits from infrastructural upgrades. The finance and trade opportunities created through the 2010 event were intended to be optimised to secure sustainable (social, economic and environmental) outcomes.

Extensive preparation and planning were done well in advance of the World Cup to ensure readiness of the electricity supply. At an early stage it was recognised that the existing grid infrastructure in Host City of Polokwane would be insufficient to supply the Peter Mokaba Stadium during the event. A total investment of R 78.6 million from the Department of Minerals and Energy (DME) and local municipality was used to purchase additional infrastructure to accommodate the electrical demands of the event. Upgrades were also made to the previously inadequate distribution system.

The infrastructural upgrades have already benefited the local community in the City of Polokwane, with installed capacity being used to supply a local hospital development. In addition, the electrical installations of the fan fest areas have been earmarked for use in future local cultural and music events (Potgieter, 2010).

TABLE 11. EXAMPLES OF ENERGY-RELATED LEGACY PROJECTS

HOST CITY	ENERGY
Cape Town	• Installation of various energy efficient technologies in stadiums and training venues, at fan-park, public viewing areas, and at the Athlone and Philippi training venues • Smart design and energy installations of the Cape Town Stadium to maximise energy efficiency • Installation of a small hydroelectric turbine at the Green Point Park (planned)
Durban (eThekwini)	• Carried out a post-hoc review of all aspects of energy procurement for stadium and stadium precinct to determine if other sources of green energy can be purchased or supplied • Review of stadium and precinct design and installations to maximise energy efficiency within Moses Mabhida Stadium and the Sugar Ray Xulu, Princes Magogo and King Zwelethini training venues • Developed Energy Efficiency Guidelines for all municipal infrastructure and installations for 2010, and the advocacy thereof
Johannesburg	• Implemented alternative interventions for cooking and/or heating purposes in two targeted areas in the City, and encouraged alternative cooking methods at stadiums on match days • Installation of energy-saving lamps within stadiums • Retrofitting of the LOC (SAFA) headquarters
Mbombela (Nelspruit)	• Maximised energy efficiency at the 2010 venue • Promotion of energy efficiency in private sector • Retrofitting of traffic lights and street lights • The installation of solar powered precinct lights at the Mbombela Stadium
Nelson Mandela Bay (Port Elizabeth)	• Installation of 50,000 energy efficient street lights • Replacement of geysers with solar water heaters, targeting 100,000 installations over five years • Supply of luminary replacements in around 75,000 households of previously disadvantaged communities • Motion sensors and CFLs in stadium offices and corridors
Polokwane	• Energy efficient design and installations at the stadium, and venues • Retrofitting of street lights, traffic lights and billboards
Rustenburg	• Maximised energy Eefficiency at 2010 venues, intelligent sensor lighting • Retrofitting of street lights, traffic lights and billboards
Tshwane	• Retrofitting of municipal buildings with energy efficient lights • Retrofitting of street lights, traffic lights, and billboards

4.2.3 Renewable energy

One of the key National Greening Framework objectives was to seek provision for renewable energy. In the run up to the World Cup, Eskom pledged that they would donate the "green portion" from hydro and wind (existing renewable energy) generated over the FIFA World Cup 2010™ period on behalf of South Africa, as part of its commitment to the National Greening Programme. The total amount of 'green' energy contributed by Eskom and the South African Power Pool between the 11th June to the 11th July 2010 was 2,418 GWh (COWG, 2010).

Although no major new renewable energy projects were brought online for the 2010 FIFA World Cup™, some small scale interventions were achieved. The 25 turbine Coega Windfarm in Nelson Mandela Bay, located a stone's throw from the stadium, is scheduled to be complete in 2012 and once complete, will supply the Nelson Mandela Bay Municipality with 4.5 MW of green electricity. The first 1.8MW turbine was erected prior to the kick-off of the World Cup, and was used to supply the Nelson Mandela Bay Stadium with around 574 MWh (Nelson Mandela Bay Municipality, 2010) of green electricity free of charge. Although the energy could not be supplied

ONE OF THE MAJOR LEGACY PROJECTS OF THE 2010 FIFA WORLD CUP™ IS THE **GREENING OF STREET LIGHTS AND BILLBOARDS AROUND THE STADIUMS** OF THE SIX HOST CITIES

directly to the stadium and was fed into the national grid, it displaced the usage of conventional coal power electricity (25Degrees, 2010).

STREET GREENING

Supported by US$1 million in funding from the GEF, one of the major legacy projects of the 2010 FIFA World Cup™ was the greening of street lights and billboards around the stadiums of the six Host Cities, including the City of Tshwane (Pretoria), Nelson Mandela Bay Municipality (Port Elizabeth), Polokwane Municipality, Rustenburg Municipality and Mangaung Municipality (Bloemfontein). Ten billboards, five of the Host Cities' major traffic intersections and 65 street lights across the cities were retrofitted to run from solar power. These retrofits represent a monthly saving of approximately 306.6 tCO_2e from those powered by conventional electricity (UNEP, 2010). In addition, thirteen (120 W) CFL energy efficient street lights were retrofitted in Mangaung. Other energy efficiency lighting included the replacement of mercury vapour luminaires with solar powered lights, providing a monthly saving of 649,210 kwh or 668 tCO_2e, and the replacement of high pressure sodium luminaries with CFL lights, expected to provide a monthly energy savings of 685,277 kWh.

The Silica Substation in Polokwane was among the many electrical infrastructure upgrades in South Africa necessary to host the 2010 event

MBOMBELA SOLAR INITIATIVE

Mbombela Municipality has recently installed two solar PV panels at the northern side of the Mbombela Stadium precinct. The total energy output will provide 30 kWh each day and will be connected via conversion equipment directly into the stadium low voltage power grid. It is anticipated that the system will provide sufficient power to illuminate the security area lighting on the outside perimeter walkway of the stadium (Mbombela Municipality, 2010).

4.2.4 Community projects

Funding secured through the Greening Programme carbon mitigation projects was also used to extend the influence of existing projects. One such example was the installation of an additional 300 solar water heaters in the Darling housing community in the Western Cape. The installation was funded by DEA&DP and DANIDA, contributing amounts of R1 million and R1.6 million respectively. This funding went towards an existing project aiming to install 1,300 solar water heating systems across the Western Cape region.

Lessons from similar projects show that on average, each household saves at least 900 kWh for water heating per annum. Projects such as these will ensure that increased environmental awareness and a legacy of energy efficiency, sustainability and renewable energy can become established in communities throughout the Western Cape (DEA&DP, 2010).

TRAINING OF 100 YOUTHS ON ENERGY AUDITING

In recognition of a skills shortage and in line with recent legislative changes in South Africa on the phasing out of incandescent light bulbs, the DEA, through its Expanded Public Works Programme and in partnership with Indalo Yethu and GTZ, funded an energy auditor training initiative that has taken advantage of the momentum generated by the 2010 FIFA World Cup™. The programme will train 100 youths in the building sector of South Africa to audit the energy consumption of public buildings. Another aim will be to develop a successful network of training facilitators to replicate the training, and to develop and deploy these energy auditors throughout the country in a fully-fledged energy auditing programme. The government has earmarked around 100,000 public buildings to be audited in order to improve their energy consumption and decrease energy demand.

First Electrawinds Wind Turbine at Coega IDZ.

4.3 Outcomes

THE TARGETS OF THE NATIONAL GREENING FRAMEWORK had two main objectives in terms of energy, firstly, to minimise consumption of energy and, secondly, to maximise use of renewable energy. Table 11 presents a summary of energy saving projects implemented as a result of the 2010 World Cup.

The carbon footprint of the 2010 FIFA World Cup™ was projected to be among the highest of all large scale sporting events. International pressure to commit to carbon reductions and energy demand surplus in South Africa has resulted in the dual effect of creating incentives both to use less energy and to develop renewable energy systems to replace traditional coal powered electricity. The renewable energy market in South Africa is, however, still in its infancy, with solar and wind powered technologies in particular showing significant potential. Similarly there remains a great deal that can be achieved in South Africa through energy efficiency initiatives. The Moses Mabhida Stadium stands out as one example of what can be achieved through energy-efficient design.

The National Green Goal Targets (2008) initially aimed to achieve at least 15% reduction of energy used at official venues. The baseline study indicated that South Africa had a fair distance to travel in terms of conforming to the high standards expected from an event of this nature. Although the 15% reduction target was not rigorously monitored or enforced by the Host Cities, the energy efficiency interventions and cutting edge energy optimisation techniques employed within the stadiums – given the time and budgetary constraints – is notable. The benefits of investing in such technologies are now recognised as the future for South African building standards.

Building a flexible, reliable and sustainable transport system played a large part in the success of the 2010 FIFA World Cup™. Arguably the most challenging of all tasks, it was the area in which significant infrastructural improvements will be felt by South Africans of this generation and those to come.

sustainable transport

GALLO IMAGES


C2
C5
Shuttle
CA 235-498

A brightly painted bus shelter as part of the 'Soccer and Environment Campaign' serves as a visual reminder of the environmental legacy of the 2010 World Cup in Cape Town.

5.1 Introduction

A NUMBER OF INESCAPABLE REALITIES specific to South Africa meant that the predicted carbon emissions of the 2010 FIFA World Cup™ would be higher than any other major sporting event before it. In the feasibility report for a carbon neutral world cup transport accounted for 86.4% of the total predicted footprint of 2.75 million tonnes of carbon dioxide for the event (DEA, 2009a). Whilst international air travel was the main contributor to this footprint, inter- and intra-city travel would also make a substantial impact compared to similar large scale events overseas. This also reflects a South African legacy of inadequate spatial planning and historic under-investment in the public transport systems which have led to a dependency on private vehicle use. This, in turn, has led to severe road congestion in urban centres, declining levels of air quality and deteriorating road surface conditions as well as higher carbon emissions.

Transport was consequently recognised as one of the major considerations for planning prior the World Cup. It was recognised that the sheer volume of spectators entering South Africa, and the mass transit of fans to and from match events, would require careful planning and preparation, and was therefore considered to be one of the chief hurdles to running a successful event. In a survey carried out by the South African Social Attitudes Survey (SASAS) on the "Attitudes to Transport and 2010 World Cup in South Africa" (HSRC, 2009), an overwhelming majority (80%) of South Africans surveyed agreed that road congestion would present the main disadvantage to hosting the World Cup. The results of the survey provided a number of other useful and positive insights into public perception, with a general agreement that, as a result of the World Cup:

- Infrastructure would improve
- Public transport improvements would benefit the poor
- There would be better policing and security of transport facilities
- Train coaches should be refurbished or upgraded
- Mini-bus taxis should be regulated
- At least 60% of the respondents wanted public transport improvements to be lasting or sustainable.

Although the focus of World Cup related transport initiatives was to move spectators and tourists in a logistically sensible and safe manner, the long term sustainability

of transport options were taken into consideration at all stages of planning, design and implementation. In particular, the development of public transport systems and promotion of non-motorised transport were prioritised.

5.2 Actions taken

5.2.1 National Government Support

The South African Government acknowledged that upgrading public transport infrastructure was an essential component to the smooth running of the event, and the South African Department of Transport (DoT) duly made substantial funding available to municipalities to assist with transport infrastructure projects. Further funding was put forward by the National Treasury as well as from the Public Transport Infrastructure and System (PTIS) grant. The programme to upgrade transport systems, included:

- Construction and upgrades of public and rail transport and road infrastructure
- Bus rapid Transit (BRT) systems
- Inner-city mobility systems
- Intelligent transport systems and call centre systems
- Airport-city links
- Passenger safety.

(SA Online, 2010)

5.2.2 Moving the Masses

All transport planning activities focused, wherever possible, on the avoidance of unnecessary travel, as well as the provision of safe public or non-motorised transport options. Each Host City produced operational plans that included strategies to minimise travel needs related to the event. The primary objectives were to ease existing problems of traffic congestion and insufficient parking amenities. Successfully establishing a varied and integrated transport offering, including bus shuttle services, "park and ride" and "park and walk" facilities, was one of the key initiatives. While these concepts are well established elsewhere globally, this was the first time they had been implemented at a significant scale in South Africa.

The "park and ride" facilities were supported by match-day shuttle services between the stadiums, main transport hubs and other strategic locations. Distances for both "park and ride" and "park and walk" facilities needed to be kept within international standards (i.e. a maximum of two kilomentre walking distance and at least a five kilometre radius where other modes of transport were provided to complete the trip and ensure popular use).

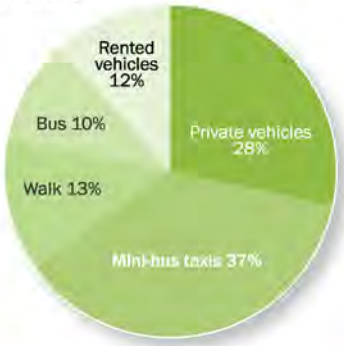
THE RECAP PROJECT

One of the most widely publicised – and certainly the most ambitious – government interventions that took place in the lead-up to the 2010 World Cup was the Taxi Recapitalisation Programme. Minibus taxis are the most popular form of transport in urban South Africa and the industry employs around 200,000 people with an annual turnover of R16.5 billion (Arrive Alive, 2010). The taxi industry plays an important role in South Africa by providing cheap, accessible transport to a large proportion of the population. Historically, the industry has had a reputation for being unsafe and unreliable.

The Recapitalisation Programme (also known as "Recap Project") sought to proactively address the problem of an ageing and unregulated minibus taxi fleet. The project represented a comprehensive re-engineering of the taxi industry which aimed to incentivise the replacement of ageing taxis with new high-spec models by means of a 'scrappage' allowance. The project is on-going and has achieved considerable success in terms of improving regulation of the taxi industry, by ensuring compliance with legitimate documentation and safety specifications. In 2009, more than 27,800 old taxis had been scrapped with more than R1.4bn paid out to operators. A total of R7.7bn has been allocated to the Taxi Recapitalisation Programme.

During the lead-up to the World Cup, the minibus scheme became a visible indication of the government's commitment to cater for the transport needs of the World Cup and dedication to the ongoing safety of both the local and international commuters.

FIGURE 4. PUBLIC TRANSPORT USED DURING MATCH DAYS IN RUSTENBURG (DEA, 2010A)



INTEGRATED PLANNING AND OPERATIONS

With the numerous different transport facilities, it was essential that Host Cities undertook a system of integrated planning. Durban incorporated a 'hub-and-spoke' concept: from the City's central shuttle drop off node, fans were able to walk to the Moses Mabhida Stadium or to beachfront fan fests along pre-designated fan routes. This system was further supported by rail routes, "park and walk" systems, "park and ride" routes, metred taxi areas, hotel shuttles and the 'People Mover Project'. A range of on-street and dedicated "park and walk" facilities were available within a 3 kilometre radius of the stadium.

The transport system implemented in the Host City of Mbombela was comprised of a public transport hub, six "park and ride" points and one "park and walk" venue with shuttle services linking the Mbombela Stadium, fan fest and airport. A number of primary and alternative routes were developed to ensure that the system ran efficiently and congestion was kept to a minimum. This was further bolstered through infrastructural upgrades, such as the new Northern Ring Road which provided an alternative route to the main highway through Mbombela, and an alternative route to the stadium.

Infrastructural upgrades in the Host City of Cape Town included the construction of integrated rapid transport stations at Cape Town International Airport, Cape Town Stadium and the city centre. Fifteen 'railway style' bus stations along the transport route were developed and were used for the World Cup "park-and-ride" facility.

FOOT-POWER

"Park and walk" facilities were designed in such a way as to link up with fan parks, feeding people along Fan Walks to the stadiums. Host City Rustenburg established a two kilometre route along which environmental volunteers were dispersed to educate people about the Green Goal campaign and National Greening Programme. Host City Polokwane established a Fan Mile (3.4 km) to the stadium on which all forms of motorised transportation were prohibited. Surveys conducted on the modes of transport used during games held in Rustenburg, show that a majority (37%) of spectators arrived at the stadium and various "park and walk" facilities by mini-bus taxis (DEA, 2010a).

MyCiti Busses were introduced into Cape Town's Transport system as part of the integrated transport plan.

SHUTTLE BUSES

Nelson Mandela Bay was among the many Host Cities to initiate a "park and ride" and a "park and walk" system. A 2010 branded and accredited shuttle service was used to collect and transport fans to the stadium from the parking areas every five minutes. Similarly, six hundred specially branded buses and mini-bus taxis provided the shuttle services in Mbombela. Polokwane also invested in 100 new shuttle buses for the 2010 event, and public mini-bus taxis were branded with environmental awareness mes-

sages. These were utilised to transport visitors into Polokwane from outlying areas. The initiative was considered to be a success as most fans made use of public transport, leaving their vehicles at home.

Although a number of dedicated shuttle services will not continue operating regularly into the future, the demonstration by government and the wider transport sector on delivering safe and convenient public transport has set a precedent towards which future transport initiatives can strive.

5.2.3 Non-motorised transport

The greening objective to reduce carbon emissions was met through the promotion of two key non-motorised networks: pedestrianised routes and cycling lanes. A secondary spin off was the creation of festive 'fan walks', a model that provided a platform for both spectators and non-spectators to experience 'World Cup fever' and enjoy the melting pot of cultures that SA and its visitors had to offer.

THE MOSES MABHIDA STADIUM ... IS NOW CONNECTED TO THE BROADER KINGS PARK SPORTS PRECINCT **THROUGH THE CREATION OF NEW PUBLIC URBAN SPACES**

Pedestrianisation of Isaiah Ntshangase Road, Durban

PEDESTRIAN AND CYCLING NETWORKS

On a larger scale, the Greening Durban 2010 programme lobbied the transport sector about the development of an improved pedestrian and cycling network within the city. The initiative provided support to the already planned upgrade of Durban's beachfront promenade by establishing a major pedestrian and cycling link between the beachfront hotel belt and the Moses Mabhida Stadium.

Thanks to the planning and vision behind the design of the Moses Mabhida Stadium, it is now connected to the broader Kings Park Sports Precinct through the creation of new public urban spaces. Many locals have deemed this a great success. The space has continued to flourish post-World Cup and today one can see families, sports enthusiasts – and those looking simply to socialise – gathered for a range of activities. With its large, unrestricted dimensions the area serves as a popular meeting place and venue for shopping, eating out and sporting events. An example of this is the Engen Dynamic Cycle Challenge which took place in August 2010 and put the new pedestrian and cycling routes to use. The significant investment in the City's infrastructure is another indication of its commitment to creating a sustainable urban environment for the people of Durban.

Cape Town focused on creating new pedestrian and bicycle lanes: A cycle route linked the central business district (CBD) and the stadium, and a bicycle rental service was set up during the event. A sidewalk upgrade project was undertaken along Main Road leading to the stadium from the city centre, to accommodate a bicycle lane and an additional footway, with two pedestrian bridges to provide a safe environment for pedestrians linking the CDB with both the stadium precinct as well as with the V&A Waterfront, South Africa's most visited tourist destination (City of Cape Town, 2010).

Environmental volunteer on a Pedi-bike as a form of non-motorised transport in Rustenburg and Cape Town during the World Cup

The **SHOVA KALULA BICYCLE PROJECT** (meaning 'pedal-easy') is a national government initiative aimed at addressing transport challenges in under-served communities. Channelled through the Department of Transport (DoT), the project provides lower-cost bicycles to those with generally poor access to transport, such as students, rural women and farm workers. The pilot project was initiated in 2001 but was further promoted in Tshwane during the World Cup to facilitate accessibility from peri-urban areas. The programme has in turn promoted the establishment of micro businesses concerned with bicycle maintenance and repair. Aside from the obvious advantages of helping to empower vulnerable people, the efforts have the additional benefit of promoting non-motorised transport and enhanced rural accessibility. As part of the programme, the City of Tshwane built 3 kilometres of cycle paths and walkways and 16 pedestrian ramps (DoT, 2007).

Polokwane was another Host City that effectively created safe pedestrian networks linking the stadium precinct, Fan Park, football training venues and public transport nodes/stops. In Bloemfontein, Mangaung Municipality's key transport initiatives comprised the pedestrianisation of two major roads in the immediate proximity of the stadium precinct, and the construction of a pedestrian bridge for the event.

A number of cities embraced pedal-power for the World Cup. Pedi-bikes were introduced from the "park and walk" facility in Rustenburg. Locals and tourists could either walk or hop on to a pedi-bike to get to the fan park and Royal Bafokeng Stadium.

5.2.4 Gearing up for the future: Public Transport Beyond 2010

According to the National Household Travel Survey (NDT, 2005), only 26% of households in South Africa have access to motor vehicles (108 cars per 1000 people). A large portion of the population therefore relies on public transport to meet their needs. Minibus taxis are responsible for 65% of the 2.5 billion annual passenger trips in rural, urban and inter-city transport, with buses and trains comprising 21% and 14% respectively. Looking at these statistics it is understandable why South Africa invested considerably in the improvement of public transport through the upgrading of the existing system, and construction of new facilities and services. The World Cup called for the identification of budgets for new construction projects and facilitated the significant acceleration of projects already in progress (i.e. these projects were brought forward).

Strategies to improve public transport were introduced in all Host Cities and in some instances included the establishment of integrated rapid public transport networks. These networks comprise an integrated route of rapid rail, established transport corridors, BRT systems, taxi and metered taxi priority networks. Full special needs and wheelchair access formed a key aspect of these strategies. The establishment of the networks in the Host Cities has minimised carbon-intensive transport by providing the commuter with an alternative to private vehicle travel. Many of the cities offered additional services to cope with match day events, for example, the City of Tshwane, where Metrorail provided additional trains and serviced Loftus Stadium directly, an action that was significant in clearing the stadium surrounds of crowds after each match.

eTHEKWINI'S PEOPLE MOVER

eThekwini's transport plan aimed to achieve an improved system and quality of public transport during the World Cup and beyond. The "People Mover" project incorporated 13 buses capable of transporting 33 passengers each along two routes: the North-South beachfront route and an East-West route that connects with other transport route systems within the inner city and at Warwick Junction (the city's primary transport node).

BRT SYSTEMS IN JOHANNESBURG

The City of Johannesburg developed the Rea Vaya (meaning "We are going" in Portu-

guese) Bus Rapid Transit (BRT) system with an objective to reduce traffic congestion and to promote the use and reliability of public transport by 25%.

The Rea Vaya bus service was developed as a safe and reliable public bus rapid transport system that transported fans along specific routes to and from the stadiums. The system was one of the many transport and infrastructure projects significantly accelerated as a result of the World Cup to ensure transport needs were met. During the event it was one of the largest carriers of fans to and from matches in Johannesburg. The system, based on the Brazilian Curitiba model, utilises:

- Specialised vehicles
- Dedicated bus lanes
- Easy-access stations
- Reliable scheduling.

The ongoing benefits of the system are numerous, not least of which being lower carbon emissions due to fewer cars on the road. The Rea Vaya system consists of three specific types of buses and bus routes. Largest are the Trunk buses, with a capacity of up to 112 passengers, and the smallest are Feeder buses, linking outlying areas.

THE GAUTRAIN: BRINGING THE HIGH SPEED RAIL REVOLUTION TO AFRICA

In development for many years, but given impetus by the world cup, Joburg's Gautrain has revolutionised travel for commuters in the area. Although only one section of the line has been completed, between the OR Tambo International Airport and the Sandton business district, it is a route that was notorious for its gruelling congestion. It has reduced travel time between Joburg and the airport from approximately one to two hours (depending on traffic) to 15 to 20 minutes, creating relief for commuters.

The train reaches speeds of 160 km/h (100 mph): though a far cry from the world's fastest train it is far superior to the locomotives typical of the rest of the continent's tracks, which date by-and-large from the colonial era. With a hefty price tag of R24 billion, the hope is that this rapid transit system will bring reliability and efficiency to the regional Gauteng transport system. A link between Joburg and Tshwane is projected to be completed by mid-2011.

SUSTAINABLE TRANSPORT TAKING THE HIGH ROAD

The high-occupancy-vehicle (HOV) project within Mbombela entailed the construction of dedicated lanes along the major entry route into Nelspruit and the widening of five bridge structures along this section of the road (between the Nelspruit City Centre and the Kruger Mpumalanga International Airport). The HOV lane is limited to vehicles with two or more passengers. The private transport model in South Africa comprises largely of single occupancy car use, thus the HOV lane provides a good incentive to lift-share, particularly during peak traffic hours.

The eThekwini Municipality secured a budget of R145 million for a major upgrade of the Western Freeway – one of South Africa's busiest roads – which was built in the 1970s and had outlived its service life. Urgent rehabilitation was required to prevent a rapid deterioration of the road. Widened from three lanes to four, this will continue to serve the city in the improvement of traffic flow, especially during peak periods. The provision of a dedicated public transport lane in both directions has been incorporated in its upgrade, and the fast lane in both directions between Jan Smuts Highway and Botanic Gardens Road has been reserved for the exclusive use of public transport.

The Western Freeway public transport lane is the first of its kind in Durban and will be monitored for improvement opportunities. It serves as the gateway to the City for all traffic entering from the two major highways and was a vital route during the 2010 World Cup (Engineering News, 2008).

SUSTAINABLE RAZL INFRASTRUCTURE

The Passenger Rail Association of South Africa (PRASA) developed a railway station specifically to serve the Moses Mabhida Stadium in Durban. The facility was developed to serve as support infrastructure to the broader sports precinct and the 2010 events as well as for long term use, and to service a fairly large number of potential commuters that do not currently have access to rail services in the Umgeni Road Corridor. In addition to this, the station was designed to include sustainability con-

THE WORLD CUP CALLED FOR THE IDENTIFICATION OF BUDGETS FOR NEW CONSTRUCTION PROJECTS AND **FACILITATED THE SIGNIFICANT ACCELERATION OF PROJECTS ALREADY IN PROGRESS**

The Gautrain, a project accelerated by the World Cup, has revolutionised travel in South Africa.

FIGURE 5. PUBLIC TRANSPORT IN SOUTH AFRICA (NDT, 2005)

siderations such as energy efficient lighting, heating, ventilation and water services. Ultimately, the desire was for the station building to provide a positive contribution to the socio-economic development and to act as a catalyst for a sustained urban regeneration of the area.

TABLE 12. SUMMARY OF 2010 FIFA WORLD CUP™ TRANSPORT INITIATIVES

TRANSPORT INITIATIVE	HOST CITIES
Shuttle services	• **Cape Town** – Shuttle between stadium and main transport hub on match days, two pick up services on the peninsula route and airport shuttle service. • **eThekwini** – "Hub and spoke" system shuttle for match days. • **Mbombela** – Shuttle with branded buses and minibus taxis. • **Mangaung** – Inner-city shuttle service including a route with 16 stops and specific transport nodes. • **Port Elizabeth** – Shuttle with branded accredited buses. • **Polokwane** – Branded public taxis carried spectators from outlying areas.
Bicycle facilities and cycle network	• **Cape Town** – New bicycle lane along Fan Walk, upgrades to cycle routes in stadium surrounds and bike hire service. • **eThekwini** – Upgrades to cycling link to beachfront. • **Tshwane** – Installation of three kilometres of cycle paths and walkways, and engagement in the Shova Kulula Bicycle Project. • **Polokwane** – Designated cycle networks. • **Rustenburg** – Non-motorised 'pedi-bikes'.
Pedestrianisation	• **Cape Town** – Fan Walk and pedestrianisation of Somerset Road (main road to stadium). Construction of two pedestrian bridges. • **eThekwini** – Pedestrianisation of Isaiah Ntshangase Road. Linkages to beachfront including pedestrian bridge over. • **Mangaung** – Pedestrianisation of the stadium precinct and construction of pedestrian bridge. • **Polokwane** – Designated pedestrian network extended beyond stadium surrounds.
"Park and Ride" & "Park and Walk"	• **Cape Town** – Ten rail stations offering park and ride facilities and two bus park and ride stations set-up. • **eThekwini** – "Hub and Spoke System" within three kilometre radius of stadium. • **Johannesburg** – "Park and ride" and "park and walk" facilities in place. Complemented by the 'Rea Vaya' BRT System. • **Tshwane** – "Park and ride" and "park and walk" facilities available. • **Mbombela** – Six "park and ride" points and one "park and walk" venue. • **Mangaung** – "Park and ride" and "park and walk" facilities available. • **Port Elizabeth** – Shuttle service every five minutes on match days. • **Rustenburg** – Two kilometre Fan Walk.
Eco-driving	• **Cape Town** – Eco-taxi project. • **Johannesburg** – Eco-driving training.
Improved transport routing and system	• **eThekwini** – People Mover Buses and public transport information system (touch screens). • **Johannesburg** – Rea Vaya, BRT network. • **Tshwane** – BRT System.
New infrastructure	• **Cape Town** – Three Integrated Rapid Bus Transport systems and numerous railway-style bus stations. • **eThekwini** – Moses Mabhida Railway Station; Warwick Junction Modal Interchange; King Shaka International Airport. • **Mbombela** – Northern Ring Road bypass constructed as alternative route. Dedicated HOV lane along the R40. • **Mangaung** – Upgrade of three main inner city roads and major train station feeding stadium.
Upgraded infrastructure	• **eThekwini** – Upgrades to the beachfront promenade and Western freeway (public transport lane). • **Polokwane** – Upgrades to existing rail system and Polokwane airport.

CARBON REDUCTION INITIATIVES

Did you know that planning your route more efficiently and avoiding excessive braking and acceleration are simple ways of reducing your carbon footprint? These pointers, among others, were part of the re-training received by a number of Cape Town taxi drivers as part of the City's Eco-Taxi project. The City of Cape Town introduced the project, which promoted driving in an "eco-friendly" manner, in collaboration with local private enterprises and associations such as the South African Petroleum Industry Association. Private initiatives included modifying fleets of taxis to run on liquefied petroleum gas. The combustion of the gas emits roughly 10% less carbon dioxide than normal petroleum vehicles, and costs the same to run as unmodified vehicles. This gave residents and travellers the opportunity to reduce their carbon footprint while travelling in Cape Town (CNN, 2010).

Johannesburg drivers were also trained in fuel-efficient, "eco-driving" as part of the City's Greening initiatives. The initiatives included objectives to reduce carbon emissions for all FIFA vehicles and public transport vehicles to meet Euro II standards for fuel efficiency and emissions; and to encourage spectators to use public transport.

5.3 Outcomes

BUILDING A FLEXIBLE, RELIABLE AND SUSTAINABLE transport system played a large part in the success of the 2010 FIFA World Cup™ event. Arguably the most challenging of all tasks, it was also the area in which significant infrastructural improvements will be felt by South Africans of this generation and those to come. All nine Host Cities implemented transportation plans, supported by shuttle, "park and ride" and "park and walk" facilities. Plans for integrated rapid public transport networks, such as Johannesburg's Rea Vaya BRT were brought forward and have proved to be a popular public transport option in the post event period. Perhaps most importantly, the upgrades have created innovative ways of encouraging people to use public transport in a country in which private vehicle use is the default option for those who own vehicles. Infrastructural upgrades of major transport routes and the installation of dedicated public transport and high occupancy lanes were changes much needed in a country whose transport sector has historically been afforded inadequate support and investment. Table 12 presents a summary of 2010 FIFA World Cup™ Transport initiatives, however the major legacy benefits provided by the World Cup can be summarised as follows:

- Substantial new investment in public transport systems, where the majority of the population do not own a motor vehicle
- Significant acceleration of already planned public transport projects
- Expansion and promotion of non-motorised transport infrastructure, and
- Promoting the adoption of public, private shared occupancy and non-motorised transport modes to a large percentage of South Africa's population accustomed to a culture of single-occupancy car use.

The advances listed above will be crucial to South Africa's reducing its carbon emissions in the future. Initiatives introduced during the World Cup itself, including vehicle restrictions in stadium surrounds and urban centres, meant that fans were obliged to utilise public transport and non-motorised transport options, thus creating a shift in traditional behaviour. In Joburg, "park and ride" systems ferried 25% of fans travelling to the stadium. An estimated 14% of commuters utilised the "park and walk" facilities, and an estimated 10% of fans opted for rail transport systems on match days, and another 10% made use of the Rea Vaya system.

The 2010 FIFA World Cup™ allowed South Africa to show its potential in providing safe public transport in line with international best practice. The challenge will be to continue this drive for improvement in public transport as well as to instil a behavioural change within commuters to move away from singular private vehicular use to the use of these new public transport networks and facilities in future.

Preparations and planning – and lots of signage – were crucial in order to move the fans around effectively.

South Africa: a water scarce country

water

South Africa can be proud of the strides achieved in the design and development sector, which enabled the country to successfully host the World Cup whilst minimising the associated demand for freshwater resource.

6.1 Introduction

SOUTH AFRICA IS CONSIDERED TO BE A WATER SCARCE COUNTRY and, if the current rate of water usage continues, demand is likely to exceed supply at some point in the not-too-distant future. The improvement of water conservation, water quality and water-use efficiency is a key national priority, when compared against a global rainfall average of 870 mm per year, the country only receives 450mm. This makes South Africa the world's 30th driest country. Some projections estimate that South Africa already exploits about 98% of its available water supply resources.

Johannesburg is likely to run short of water should a severe drought occur in the next 10 years, as water wastage has not been stemmed and new sources of supply are still 10 years away. The second phase of the Lesotho Highlands Water Project is expected to come online by 2020 – and will supply Gauteng with water. According to experts, however, South Africa's two major river systems – the Vaal and the Umgeni – are already in deficit. These two river systems supply water to regions that generate two-thirds of the country's gross national product.

Should South Africa experience another extended drought period, water shortages will become acute and could result in extreme measures, including water rationing. With all eyes firmly on South Africa, the 2010 FIFA World Cup™ was the perfect time to give water conservation the attention it required and go the necessary distance to protecting this "liquid gold".

Taking note of this, all Host Cities identified the protection of this crucial resource during the 2010 FIFA World Cup™ as an important aspect of the National Greening Strategy. The Green Goal national targets for 2010 also stipulated a 10% saving in use of potable water (LOC, 2008a) via the directives listed below (DEAT, 2008a):

- Minimise consumption of water (improve conservation of water)
- Maximise rainwater capture and grey-water recycling
- Protect wetlands
- Minimise pollution of water resources.

SOUTH AFRICA'S TAP WATER IS OF EXCELLENT QUALITY, REMOVING THE NEED TO BUY BOTTLED WATER IN ALMOST ALL PARTS OF THE COUNTRY

Hosting this global mega-event provided several key opportunities for South Africa. Firstly, it challenged all planners and builders of the stadiums and other key infrastructure to showcase their ability to improve designs. Innovation was key in order for stadiums to meet the consumption required by the event, whilst not placing additional stress on existing systems. Taking advantage of opportunities to conserve natural water resources such as wetlands, rivers, streams and estuaries was encouraged. In many of the cases this took the form of rehabilitation programmes to offset the impacts of development associated with the event. Lastly, proactive actions would allow for the continued provision of potable water to both residents and visitors. Luckily, South Africa's tap water is of excellent quality, removing the need to buy bottled water in almost all parts of the country.

6.2 Actions taken

THE INFLUX OF PEOPLE TO CITIES HOSTING LARGE SPORTING EVENTS naturally places extra demands on water supply. In the absence of significant sources of rainwater or recycled water, drinking water ends up being used for non-potable purposes, such as the irrigation of pitches and stadium surrounds. The Green Goal and National Greening strategies therefore sought to put systems in place that would ensure the minimal use of potable water and increase the use of grey (recycled) water wherever possible.

In general, the objectives for water conservation were achieved through the promotion of:

- Water recycling (rain water harvesting and grey water use)
- Controlled/alternative irrigation methods and pitch management
- Installation of water efficient fixtures (e.g. low flow taps and dual flush systems)
- Construction of surfaces with permeable materials (stormwater control)

Natural resources create new opportunities for people. A job can bring a positive change into the lives of the unemployed and the poor. (Source: Working for Wetlands)

WORKING FOR WETLANDS

Wetlands play a vital role in human health and wellbeing, yet out of the 114,000 that have been mapped all over the country, many are either damaged or destroyed due to human impact. In 2000, the pressing need to intervene and rehabilitate these spaces nationwide led to the launch of the Working for Wetlands Programme. In 2009 alone, Working for Wetlands rehabilitated 95 wetlands in all nine provinces and in the process created employment for more than 1,500 people and made use of 250 small businesses. The programme is implemented by the South African National Biodiversity Institute (SANBI) on behalf of the departments of Environmental Affairs (DEA); Agriculture, Forestry and Fisheries (DAFF) and Water Affairs (DWA). It forms part of the government's Expanded Public Works Programme, which seeks to draw unemployed people into the productive sector of the economy.

- General and site-specific conservation programmes (to minimise water pollution and protect wetlands)
- Public awareness campaigns (discouraging wasteful use of water and promoting of the safety of drinking tap water).

6.2.1 General and site-specific stormwater management and wetland restoration programmes

Wetlands are key natural assets that provide critical ecological service functions, and therefore require protection. These fascinating and dynamic ecosystems provide us with a range of benefits, including flood attenuation and groundwater re-charge and cleansing. By acting as a natural filtration system for pollutants, wetlands are nature's way of providing us with safe water. Wetlands also support a wide range of biodiversity, enhance tourism, provide grazing for livestock and are a source of building and craft materials – if managed sustainably.

Legacy efforts of the 2010 FIFA World Cup™ regarding wetland restoration are discussed in greater detail in the biodiversity chapter. Key wetland maintenance and rehabilitation programmes include the rehabilitation of the Bergvlam Stream in the Mbombela Local Municipality (i.e. Nelspruit) in Mpumalanga Province, the Princess Magogo Stormwater Management Plan and Wetland Rehabilitation project in Durban, and the use of wetland for stormwater management at Royal Bafokeng Stadium in Rustenburg.

USE OF WETLAND FOR STORMWATER CONTROL AT THE ROYAL BAFOKENG STADIUM, RUSTENBURG

The Host City of Rustenburg recognised the important role that wetlands can play in flood attenuation and filtering pollutants. Stormwater from the Royal Bafokeng Stadium infiltrates the soil through many permeable surfaces in the landscape and is also directed to an adjacent wetland where it is filtered before reaching a nearby

stream. The wetland thereby acts as a natural sponge to prevent flooding and erosion by absorbing floodwater and sending it slowly to the streams with wetland plants functioning to filter out pollutants, such as nitrogen and phosphorous.

6.2.2 Alternative irrigation methods

CAPE TOWN: RECLAIMING THE SWEET WATERS

Cape Town's 2010 Project Team was confronted with a massive challenge. Their mission was to create a multi-purpose stadium in an urban park context that would ensure post-event benefits for the public. This included setting aside 105 hectares of the Green Point Common, incorporating the Stadium, Green Point Park, golf course, beach front promenade, playing fields and athletics track.

One complication with such a proposal was to find a sustainable irrigation technique to water the 64 hectares of landscaped grassland, not to mention the irrigation of the football pitch itself. Historically, potable water has been used for irrigation of the Common– which from a water consumption perspective, is unacceptable in the long term. In the end, an alternative and sustainable solution to this problem turned out to be closer than many had originally thought.

From an historical aspect, the use of these springs was formalised in 1682 and a chamber to protect the Main Spring, the Stadtsfontein, was built in 1813. The repair of these chambers will assist in the promotion of civic hydrology - international examples of this resurfacing of original watercourses within the urban fabric of cities include Rome, Chengdu in China and Bellevue in USA.

The lush slopes of Table Mountain are home to the artesian Oranjezicht Springs – a water source used to sustain the Cape colonial community some centuries ago, but completely unutilised in the present day. In fact, it was these springs that facilitated the establishment of Cape Town as a refreshment station on the shipping route in 1652, and their nourishment of the Table Bay basin earned them the moniker Camissa, meaning 'the place of the sweet waters' in the indigenous Khoisan tongue. In the early 1990s the compromised potability of the spring water led to a decision by the City of Cape Town to divert the water away from domestic consumption and into the sea. The water from these springs has thus been flowing, unused, into the sea via a series of underground pipes. The Cape Town Municipality decided to investigate the viability of the springs as the answer to the Green Point Common irrigation problem.

Other alternatives such as desalination plants, borehole water, grey water treatment and even the continued use of potable water were scrutinised. The comparison of yields, costs and secondary benefits related to the different options showed that making use of water from the Oranjezicht Springs is financially attractive (costing a third of the continued use of potable water), sustainable and will meet the objectives of providing irrigation water to the Green Point Common. The Springs were found to be able to supply a year round flow in excess of 40 l/s, thus far exceeding the combined annual 600 kl irrigation needs of the Common, the Stadium, the Metropolitan Golf Course and the Mouille Point Beachfront. This initiative was fully supported by the Oranjezicht Heritage Society as contributing to the heritage fabric and tourism potential of Cape Town.

The Green Point Park project presents an opportunity to re-introduce the public to the Common – previously it was not openly accessible to the broader public and focused exclusively on sports-related use. The 12,5 hectare area within the Common, will serve as a public space for recreation and social interaction in a peaceful, green context. Water from the historic artesian springs will be introduced into the park in ways that create gathering spaces where people can see, hear, touch and be educated about the water. Channels and spillways will feed into low-lying ponds, which in turn will feed into a biodiversity garden and a wetlands garden demonstrating a strong focus on ecological awareness, sustainable practices and environmental interdependence.

The project was not ready in time for the World Cup itself. However, at the time of writing this report, the project was making good progress, most recently with a 5.1 km stretch of pipeline being completed. The project is being developed in two phases at a total cost of R24.1 million and has been funded by the City's Water and Sanitation Department (contributing R17.7 million), with the remainder coming out of the City's 2010 World Cup budget.

NELSON MANDELA STADIUM

The Nelson Mandela Bay Municipality explored a number of unusual avenues in the hunt for viable irrigation options for the Nelson Mandela Stadium. This turned out to be a somewhat circular journey.

Unfortunately, the collection of rainwater from the roof of the stadium was no feasible, as incorporation of this concept into stadium design was considered too late in the day. The next proposal was to make use of water from the North End Lake, which is located adjacent the Nelson Mandela Stadium. Given its proximity to the stadium it could potentially provide a convenient and reliable source of water for irrigation purposes in and around the arena.

However, problems were encountered when it was discovered that due to the historic management of the lake, the water contained significant levels of salt, rendering it unsuitable for irrigation. One proposed way around this problem was to use the water treatment method known as reverse osmosis, for salt extraction. However this technology is expensive, and was initially dismissed as a viable option. Later on, however, following water shortages and subsequent escalation of the price of water, the cost of treating the lake water became justifiable. The project has now been divided into 2 phases. Phase I, which involved the construction of a filtration and disinfection plant, has been completed. Phase 2 is set to continue once necessary funds have been secured.

A second project involving alternative irrigation methods was initiated in Nelson Mandela Bay at the Gelvandale training venue. The project channels the return of stormwater runoff from the pitch and athletics track into holding tanks for re-use to irrigate the pitch. This is projected to achieve a pitch water demand saving of 35%.

6.2.3 Public awareness campaigns

Raising awareness on water efficiency to promote behavioral change was another National Greening objective.

CITY OF DURBAN

The Greening Durban 2010 Programme, led by the eThekwini Municipality's Environmental Planning and Climate Protection Department, prepared a series of guidelines aimed at ensuring the 2010 FIFA Soccer World Cup™ was hosted in an environmentally sustainable manner, and that a positive, long term environmental legacy is achieved. The series includes a Water Conservation Guideline providing information to consumers on how to save water by implementing a water use efficiency programme on residential, commercial and institutional properties (Greening Durban 2010, 2009).

NELSON MANDELA BAY

The Water Wise Campaign initiated by the Nelson Mandela Bay Municipality was targeted at a public use level. The roll out aimed to use the Municipality's existing media sources to inform public on the conservation and management of potable water. Road shows also featured as part of the campaign.

'BLUE DROP' STATUS

In an attempt to increase the use of tap water for drinking purposes, the South African Department of Water Affairs introduced a new water standard termed the 'Blue Drop' status. The 'Blue Drop' indicates to users that the tap water conforms to international tap water standards, and can be safely consumed. Municipalities can request for their water quality to be tested in order to apply for 'Blue Drop' status.

In Cape Town, free tap water stations were installed in the FIFA Fan Fest and along the Fan Walk, as well as in many public parks and gardens.

FIGURE 7. WATER CONSUMPTION AT ELLIS PARK. SOURCE: STADIUM BASELINE REPORT FOR GREEN GOAL 2010 (GREEN GOAL OFFICIAL INITIATIVE, 2008)

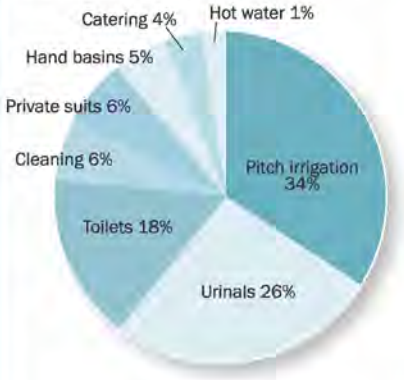
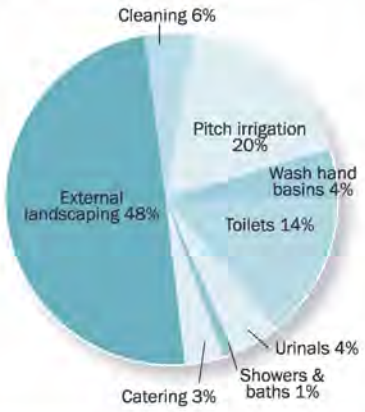


FIGURE 8. WATER CONSUMPTION AT CAPE TOWN STADIUM (WSP GREENBYDESIGN ET AL, 2010



CITY OF CAPE TOWN

The City of Cape Town launched the Drink Tap Water Campaign in order to promote the use of tap water and cut the amount of plastic waste generated during the 2010 FIFA World Cup™ from the unnecessary use of bottled water.

FIGURE 6. WATER LEGACY PROJECTS IN SUMMARY

GENERAL AND SITE-SPECIFIC CONSERVATION PROGRAMMES
Mbombela: Bergvlam Stream Rehabilitation
Durban: Wetland Rehabilitation at Princess Magogo Training Venue

USE OF NATURAL SYSTEMS IN STORMWATER CONTROL
Durban: Princess Magogo Stadium Wetland
Rustenburg: Royal Bafokeng Wetland

ALTERNATIVE IRRIGATION METHODS
Cape Town – Oranjezicht Springs: Cape Town Stadium
Nelson Mandela Bay – North Lake: Nelson Mandela Bay Stadium
Stormwater Return System: Gelvandale Training Venue

WATER AWARENESS CAMPAIGNS
Nelson Mandela Bay: "Water Wise"
Durban: "Water Conservation Guideline"
Cape Town: "Drink Tap Water Campaign"

6.2.4 Stadium designs for water efficiency

The new and existing world cup stadiums were the perfect arenas for the implementation of new and innovative technologies for all environmental aspects, not least, for water conservation. To this end, a baseline study was carried out between May and July 2008 on selected stadiums to enable the compilation of Green Goal national targets for the 2010 FIFA World Cup™.

Prior to the 2010 FIFA World Cup™ none of the stadiums included in the baseline study had water conservation plans and almost none had water management systems in place. The only evidence of a water management system was the rainwater harvesting system found at Ellis Park Stadium.

The findings showed that the majority of water usage in stadiums was attributed to irrigating the playing fields (34%), with the next largest contribution coming from toilets (18%) and urinals (26%) (Figure 7).

Water usage at stadiums is dependent mainly on the type of water fixtures and operational procedures employed at the stadium, which therefore became the focus for water efficiency interventions. For example, cleaning methods varied between the stadiums, but often used high pressure water, contributing significantly to water consumption.

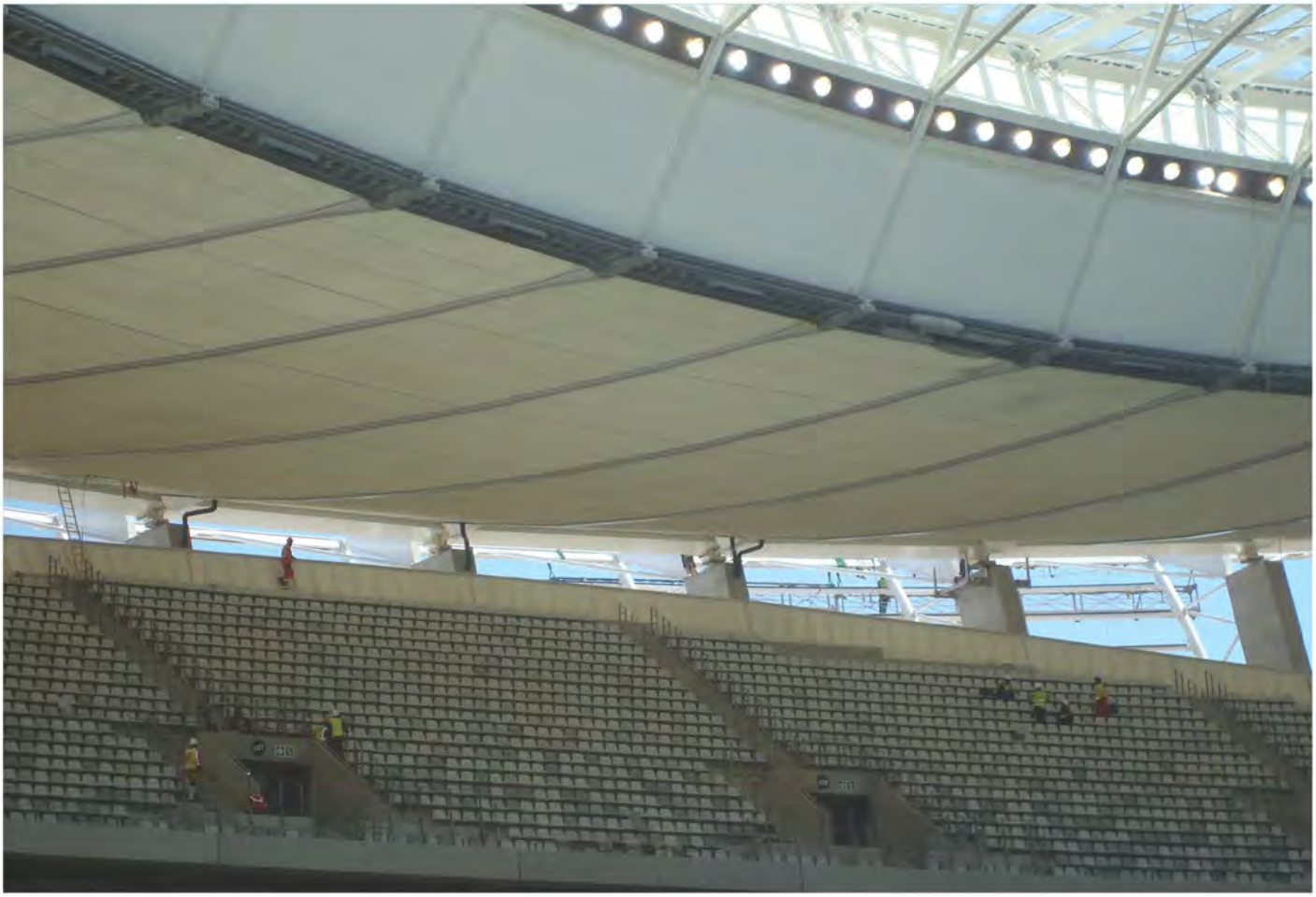
In order for South African host cities to meet the Green Goal target of a 25% reduction of water usage within the stadiums (LOC, 2008b), focus areas for improvement included:

- The construction or retrofitting of venues with water efficient fittings
- Systems for the use of harvested rainwater
- Sustainable landscaping and irrigation practices.

Sports facilities often have large surface areas where rainwater can be harvested (parking areas, stadium roofs and playing fields) for use on site for irrigation, venue cleaning, and toilet flushing. Many new technologies have been developed recently for the storage of water below ground and even under paving or sports fields.

CAPE TOWN STADIUM

According to the Greening Stadia Sustainability Evaluation report conducted for the Cape Town Stadium (WSP GreenByDesign *et al*, 2010) the most significant water



Water collection piping on ceiling of Cape Town Stadium. (Source: CoCT)

consumers of this 68,000[2] spectator stadium were identified as: the landscaped park (58%), the pitch (16%) and sanitary fittings (14%) (Figure 8). Taking into account the water saving measures specified by the designers of the stadium, a 61% saving on annual water consumption would be achieved. Annual consumption would be 25,067m^3 compared to 64,299 m^3 per annum of the baseline scenario – saving enough water to fill almost 26 olympic size swimming pools each year. Due to scheduling and cost constraints, many of these measures were not implemented for the World Cup. The measures that have been implemented, or are in the process of being implemented, are listed in Table 13.

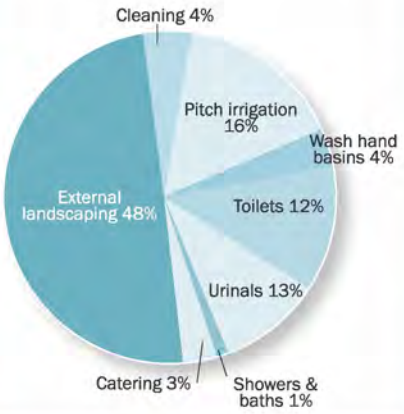
If a hybrid pitch had been specified and added, significant additional water savings could have been achieved – annual savings would increase from 61% to 69%. To

TABLE 13. SUSTAINABILITY ANALYSIS FINDINGS AT CAPE TOWN STADIUM (WSP GREEN BY DESIGN ***ET AL***, 2010)

Category	Intervention	Potential Savings	Achieved
Cutting edge	Alternative source of water for irrigation	Full 600 kl irrigation needs	✔
	Hybrid Pitch	8% reduction in water consumption	✘
Best practice	Dual flush toilets for VIP facilities	5.5% reduction in potable water consumption (R 53,160/annum saving)	✔
	Low Flow shower heads	1% reduction of potable water consumption (R 6,000/annum saving)	✔
Good practice	Metering valves and tap aerators	3% reduction in potable water consumption (R 20,500/annum saving)	✔
	Water wise indigenous landscaping	20% less water required (R 187,725/annum saving)	✔
	Dust control by "recycled" water	No figure – compliant with City of Cape Town by-law	✔

2 Although the Stadium seated 68,000 for World Cup purposes, the capacity has since been reduced to 55,000 seats.

FIGURE 9. MOSES MABHIDA WATER CONSUMPTION (WSP GREENBYDESIGN *ET AL*, 2010)



ensure compliance with FIFA pitch standards. This measure may be implemented in the future.

In line with the Green Goal objective to reduce the use of potable water by 10%, water from the Oranjezicht Springs will be captured and used for ablutions and irrigation thereby replacing the use of potable water. In cost terms, the initiative is expected to lead to significant savings to the stadium management – but also result in huge environmental benefit over time. Tanks for rain collection (i.e. rooftop) have been built into the design of the Cape Town Stadium and are to be installed at a later stage when funds are available.

MOSES MABHIDA STADIUM

According to the Greening Stadia Sustainability Evaluation report conducted for the Moses Mabhida Stadium (WSP GreenByDesign et al, 2010), the most significant water consumers of this 70,000 spectator stadium were identified as: the landscaped park (53%), the pitch (18%) and sanitary fittings (17%) (Figure 9). This baseline scenario would equate to 59,112m^3 /year. However taking into account the water saving measures specified by designers, a 70% saving on annual consumption would be achieved. Annual consumption would be 17 717m^3/year – this water saving equates to 7 olympic-size swimming pools per year.

The management of the Moses Mabhida Stadium faced a number of region-specific challenges. Firstly, the event was held during Durban's dry season. Therefore, the municipal line was used as a secondary water source during match days. All retail and restaurant basins are metered separately, predominantly for cost/charging purposes. It was reported by the stadium manager that a 74% reduction in its water footprint was achieved. This saving can be attributed mainly to the use of an intelligent pitch-irrigation system, tap aerators and low flow showers, water-efficient toilets

The Moses Mabhida Stadium, Durban.

TABLE 14. SUSTAINABILITY ANALYSIS FINDINGS AT MOSES MABHIDA STADIUM (WSP GREEN BY DESIGN *ET AL*, 2010)

Category	Intervention	Potential Savings	Achieved
Cutting edge	Intelligent irrigation system	30% reduction in demand for irrigation water	✔
	Rainwater harvesting	Rainfall tank of 700 m3 results in the potential annual saving on potable water consumption costs of R 2.5 million	✔
	Hybrid soccer pitch	Not calculated but perceived as significant	✘
Best practice	Metering valves and aerators for wash-hand basins	Saving of R 22 350 per annum in potable water costs	✔
	Dual flush toilets for VIP facilities	Not calculated but perceived as minimal	✔
	Low flush toilets for public facilities	2.6% reduction on potable water consumptions	✔
	Low Flow shower heads	0.1% reduction in potable water consumption	✔
	Water wise indigenous landscaping	20% less water required	✔
Good practice	Individual bath tubs	0.2% less potable water consumed	✔

and urinals (including low flush and dual flush toilets), and rain- and pitch-water harvesting to enable use of non-potable water for irrigation of the water wise external landscape. Dual-flush toilets were installed only in VIP facilities as the capital cost compared to future savings still needs to be to be explored. Finally, a hybrid pitch was not installed as this would depend on the future frequency of the use of the pitch and in which season matches would predominantly take place. Should the pitch become multipurpose the intention is to move to hybrid. Table 14 presents a summary of interventions that were implemented.

SOCCER CITY

A target of utilising 25% recycled water for irrigation was adopted by this stadium. Harvesting of rain water involved a moat being covered and converted into a water reservoir to collect rain water for irrigation use and for ablution purposes. The pitch uses 100,000 litres per day, of which approximately 80% is recycled water. The toilet flushing system is controlled by a BMS and can be adjusted to flush at different frequencies at different times. This can be totally switched off on non-match days, adjusted to low frequency during the match and high frequency at half time.

NELSON MANDELA BAY STADIUM

Unfortunately, many opportunities were lost in terms of water efficiency at this stadium, as environmental aspects were not considered sufficiently during the planning and design stages. However, a less water-intensive stadium has been achieved through the following interventions: the toilets throughout the stadium have been fitted with dual-flush systems, while all the urinals have been fitted with motion detectors in order to prevent wastage of water. These measures are in line with the Green Goal objectives for conservation of potable water. In addition, impressive water savings will be realised on completion of the North End Lake Augmentation System (described earlier) which will supply an alternative source of water for irrigation purposes.

MBOMBELA STADIUM

The Mbombela Stadium (Nelspruit) achieved commendable results in water conservation and management through water harvesting and treatment. Rainwater from the roof area is piped through a separate system to a retention pond that can hold 30,000m^3 of rainwater from the roof and will attenuate a further 24,000m^3 of storm-water flow from hard surfaces in the stadium. Water runs through a separate open channel system to an artificial reedbed to filter the retention pond water for irrigation of the 17 hectares of landscaped area on the stadium site – much of which will be indigenous landscaping. The pond will also improve water quality and provide a community lifestyle improvement asset.

THE MBOMBELA STADIUM (NELSPRUIT) ACHIEVED COMMENDABLE RESULTS IN WATER CONSERVATION AND MANAGEMENT THROUGH **WATER HARVESTING AND TREATMENT**

At Soccer City, the pitch uses 100,000 litres per day, of which approximately 80% is recycled water.

IF A HYBRID PITCH WERE TO BE INSTALLED IN FUTURE, **THE REQUIREMENT FOR IRRIGATION WOULD BE AT LEAST 40% LOWER** THAN IN THE CASE OF A COMPLETELY NATURAL PITCH

ROYAL BAFOKENG STADIUM

Extensive efforts were made in Rustenburg to minimise environmental impacts resulting from the expansion of the Royal Bafokeng stadium to host key FIFA Confederation and World Cup games. Assisting the creation of a balanced performance in terms of sustainability criteria was the fact that initial designs of the stadium did take into consideration water and energy-efficiency. The following are listed by WSP GreenByDesign *et al* (2010) as the key water interventions implemented:

- Stormwater is directed to an adjacent wetland where it is filtered before reaching a nearby stream
- Dual-flush cisterns, waterless urinals, low-flow shower heads and metered taps are fitted throughout
- Stormwater infiltrates the soil through the many permeable surfaces in the landscape
- Indigenous planting (100%) with low water requirements.

PETER MOKABA STADIUM

Polokwane has suffered water restrictions over the past six years and was forced to reduce water consumption by 30% prior to the 2010 FIFA World Cup™. The municipality worked hard to bring its vision of a multifunctional, environmentally friendly stadium to fruition through the efficient use of energy and water. Efficient use of the earth's resources also played an important part of the stadium design. The concrete mix for example, contains 30% recycled water in the form of fly-ash. During construction, and with operation of the stadium in mind, the following water efficiency initiatives were included in the design (WSP GreenByDesign *et al*, 2010):

- Rainwater harvested off the pitch, stored in a 50m^3 underground tank and reused for irrigation purposes
- Stormwater harvested, stored in a retention pond and reused for irrigation purposes
- Water-efficient fittings (low-flush cisterns, low flush toilets)
- Automatic pitch and landscape irrigation linked to a rain sensor
- Permeable surfaces in landscaped areas
- Indigenous planting (96%) with low water requirements
- Shredded coconut husks mixed into the pitch's growing medium to reduce the need for irrigation.

ATHLONE STADIUM

The refurbishment of the Athlone Stadium in Cape Town commenced in 2008, earmarked to function as a training venue or fan park. As the stadium was existing and construction of the new stands was progressing rapidly at the time of the sustainabil-

ity review, it was too late to implement major interventions such as rainwater harvesting, re-use of greywater, permeable paving or more efficient sanitary fixtures. Positive water-saving features initially incorporated in the design included (WSP GreenBy-Design *et al*, 2010):

- Dual-flush toilets in VIP facilities
- Most hand-wash basins in public facilities supplied with cold water only
- Only the pitch is irrigated and no additional landscaping introduced, and stadium design allows for the future installation of water meters without having to redo the plumbing.

In the case of Athlone Stadium, pitch irrigation accounts for 45% of total water. If a hybrid pitch were to be installed in future, the requirement for irrigation would be at least 40% lower than in the case of a completely natural pitch (WSP GreenByDesign *et al*, 2010). Although the capital costs to install this type of pitch would be high, the potential savings in water consumption and maintenance would be significant. Over and above the high initial costs, another reason for the artificial turf not being installed prior to the 2010 FIFA World Cup™ is the need for compliance with the standardised natural pitch specified by FIFA for the tournament.

GREENING OF DURBAN TRAINING VENUES

In July 2008 the eThekwini Environmental Planning and Climate Protection Departments (EPCPD) commissioned a study to identify generic designs, strategies and technological interventions and retrofits in the upgrading of the three existing stadiums to be used as training venues. These were Sugar Ray Xulu in Cleremont; King Zwelithini in Umlazi; and Princess Magogo in KwaMashu. One of the purposes of the study was to minimise the impact on already scarce water resources and for recommendations to be made on possible greening interventions that could be achieved within a reasonable budgetary framework; and for funding to be sourced externally. Whilst it was understood that other potential interventions were not to be overlooked, (e.g. climate neutrality, embodied energy of construction materials, waste and biodiversity), energy and water efficiency strategies were most closely scrutinised. Analysis revealed that many greening interventions were already incorporated into the upgrades – particularly those where difference in cost between "green" products and technologies and "business-as-usual" is marginal. Spreadsheets for each stadium were provided recommending interventions. Based on their cost-to-'green' benefit ratio, interventions were rated on a scale, in order for the EPCPD to readily assess their efficacy and where appropriate recommend that funding be made available. These initiatives are summarised in Table 15.

TABLE 15. WATER EFFICIENCY-INTERVENTIONS THAT WERE IMPLEMENTED AT THE THREE TRAINING VENUES (ETHEKWINI EPCPD, 2010)

Intervention	King Zwelithini	Princess Magogo	Sugar Ray
Rainwater harvesting		✔	
Flow-resistant valves in hand basins	✔	✔	✔
Intelligent pitch irrigation	✔	✔	✔
Hi tech pitch		✔	✔
Dual-flush toilets			✔
Tap aerators	✔	✔	✔

The Princess Magogo Stadium received 43% of the total funding from eThekwini Municipality and DANIDA. A total of R 470,000 was spent on the hi-tech pitch and intelligent pitch irrigation (eThekwini EPCPD, 2010). While the pitch will serve as a large collector of rainwater, embedded sensors control the level of irrigation and, with the drainage system linked back to a pump, the stadium is able to reclaim between 50-60% of the water used (Choromanski Architects, 2010). In this way the dissolved nutrients are also recycled.

The DEA-commissioned "Guidelines for the Greening of Large Sports Events with a Focus on the FIFA World Cup" in 2008 (DEA, 2008b) outlined interventions that could be implemented and facilitated as strategies to minimise water usage, protect water resources, and more broadly, to raise awareness to promote behavioral change. Table 16 summarises which stadiums initiated interventions to reduce water usage and protect adjacent water resources.

TABLE 16. SUMMARY OF STADIUM WATER GREENING INITIATIVES

Strategy	Action	Purpose/Description	Realisation at match venues	Realisation at training venues
Minimisation of water usage	Water management plan	Building management systems	Cape Town, Moses Mabhida, Soccer City, Mbombela	
	Water Audits	To identify water uses, consumption levels and areas for improvement	Cape Town, Moses Mabhida, Peter Mokaba, Royal Bafokeng	Loftus, Newlands, Vodacom and Ellis Park, Athlone
	Design or retrofit venues to maximise water efficiency	Installation of water efficiency equipment (eg. low- and dual-flush toilets, low flow shower head, tap aerators and spray taps)	Moses Mabhida, Soccer City, Cape Town, Nelson Mandela Bay, Royal Bafokeng, Peter Mokaba	Athlone, Philippi (Cape Town), King Zwelithini, Princess Magogo, Sugar Ray Xulu
		Harvesting of rainwater (stadia roofs provide large areas and store water in above/below tanks) and use for irrigation or toilet flushing	Soccer City, Moses Mabhida, Peter Mokaba, Mbombela	Ellis Park, Princess Magogo, Olympia Park (Rustenburg)
		Ecological sanitation systems on site e.g. biological/reed bed filtration of sewerage, with water produced for irrigation	Mbombela	
		Installation of drip irrigation for landscaping and/or moisture sensor irrigation system	Cape Town, Moses Mabhida	
		Selection of indigenous/drought tolerant plants for gardens and landscaping	Cape Town, Moses Mabhida, Royal Bafokeng, Peter Mokaba, Mbombela	Princess Magogo
		Use of non-potable water for irrigation (non-potable wells, municipal treated water and recycled grey water)	Cape Town, Nelson Mandela Bay	Gelvandale
		Intelligent pitch irrigation system to minimise water consumption	Moses Mabhida, Peter Mokaba	Princess Magogo, Sugar Ray Xulu, King Zwelithini
		Monitor and maintain water systems to avoid losses through leakage, and install sub-meters to enhance identification	Cape Town, Soccer City, Mbombela, Moses Mabhida	
Protection of water resources	Promote conservation of wetlands or estuaries near event	Work with local conservation organisations	Princess Magogo, Mbombela	
	Use porous or permeable paving	To allow stormwater infiltration, groundwater recharge and on-site storage of water	Royal Bafokeng, Peter Mokaba	
	Divert Rainwater	Into ponds or rivers or build retention dams/"ponds" on site	Royal Bafokeng, Peter Mokaba	Princess Magogo

Deborah Robertson, First princess Miss Earth South Africa helps with the rehabilitaion of Bergvlam Stream.

6.3 Outcomes

6.3.1 Broad targets, challenges and benefits

The National Greening objectives for water, including the minimisation of water consumption and pollution of water resources, maximisation of rainwater capture, and the protection of wetlands, were achieved to varying degrees of success across the country. A target of a 10% potable water saving was set by Green Goal programme, although not all Host Cities agreed to this target – each confronted its own set of challenges. In some cases not enough time was provided to fully address the issues. In order for sustainability and water efficiency to inform a cohesive overarching strategy, these concepts need to be borne in mind from an early stage in the planning process.

Sustainability efforts are often crucially dependent on large upfront investments required to cover costs of water efficiency installations and to ensure the commencement and completion of programmes and projects. The augmentation of the North End Lake to provide the Nelson Mandela Bay Stadium with an alternative source of irrigation is an example of a projected halted halfway through as it awaits further funds in order to proceed. Similarly, in the Mbombela Municipality, a lack of funding was viewed as the key challenge to project implementation.

Nonetheless, it is evident from a number of successful projects that many Host Cities did take action – in many instances with assistance from national and donor funding. DANIDA funding, for example, was received for the greening of Durban's training venues, and collaboration occurred between DEA and the Royal Danish Embassy for the facilitation of baseline studies and sustainability evaluations of a number of key stadiums.

In Mbombela, the stadium footprint led to a regrettable direct loss of about 27 hectares of former wetland. The Matsafeni Wetland in close proximity to the Mbombela Stadium was therefore identified as highly suitable as an offset mitigation area. The aim of this was to rehabilitate a degraded wetland of comparable or larger size than the wetland that has been lost, within the same quaternary catchment. A rehabilitation plan was prepared in 2008, however, to date no progress has been made due to

THE REHABILITATION OF THE BERGVLAM STREAM IS A COMMENDABLE EXAMPLE OF HOW **A PROJECT'S SUCCESS CAN BE GREATLY IMPROVED THROUGH COLLABORATION**

Caring for South Africa's freshwater resources: a rehabilitation wetland in Zeekoeivlei. (Source: Working for Wetlands)

TOP TWO SAVERS IN THE CUTTING EDGE INITIATIVES CATEGORY: ALTERNATIVE SOURCES OF IRRIGATION AND INTELLIGENT PITCH SYSTEM

a lack of funding. It is reported that the City's Environmental Management Unit will become responsible for its future rehabilitation.

The rehabilitation of the Bergvlam Stream is a commendable example of how a project's success can be greatly improved through collaboration. Local project-related future benefits include:

- The upgrade of the stream will improve tourist facilities thereby providing increased income generation for the Mbombela Local Municipality
- The community and the local educational organisations will have a recreational area to enjoy the natural beauty of Nelspruit, which will comprise making use of the planned maintenance program of the stream for educational purposes
- NGOs assisting with scientific knowledge and funding will be able to advertise their contribution to the project.

The City of Cape Town has achieved more than expected through the consideration and reintroduction of the Oranjezicht Spring as a source of non-potable water for stadium use. The project presents a remarkable opportunity for the City of Cape Town to benefit from this unique environmental feature – a natural 6.5 km dual-water system that flows through four distinct landscapes (natural, suburban, urban and industrial) each with their own layered remnants of history and linking two key heritage sites – Table Mountain and Robben Island. It is also reported that the water sourced from the Oranjezicht Spring will be harnessed to drive a hydro-electric water wheel situated in the Green Point Park to generate electricity for use in the Green Point Park and showcase renewable energy technologies.

The implementation of various stormwater management measures that took place throughout South Africa as part of the stadium developments and upgrades all have, or will, result in the following benefits:

- Minimisation of soil erosion
- Natural water filtration and cleansing
- Enhancement of nutrient transformation and flood attenuation and biodiversity
- Replacement of ecosystem services that were potentially lost through World Cup related development.

6.3.2 Stadium targets and achievements

Stadium design represents some of the smartest moves towards water conservation and sustainability. With sophisticated water-saving and recycling interventions, they have left a tangible legacy. Water recycling was implemented in the following instances:

- Soccer City's pitch uses 80% recycled water
- The concrete mix used for the Peter Mokaba Stadium contained 30% recycled water
- The intelligent pitch irrigation system at the Princess Magogo Stadium allows reclaiming and reuse of 50-60% of the water used.

The above interventions as well as the implementation of a number of best practice and cutting edge initiatives have resulted in major water savings and the reduction of water footprints in two of South Africa's newest and most iconic stadiums:

- Moses Mabhida – 70%, reduction in water usage from the initial baseline of 59,112m^3/year water, which includes the elimination of potable water usage for irrigation.
- Cape Town – 61% reduction in water usage from the initial baseline of 25,067m^3/year water, which includes the elimination of potable water usage for irrigation. This could be reduced to 71% if additional features are installed, such as a hybrid pitch.

South Africa can therefore be proud of the strides achieved in the design and development sector, which enabled the country to successfully host the World Cup whilst minimising the associated demand for freshwater resource.

waste

When considering the implications of the quantities of waste that can be generated at an event the size of the FIFA World Cup™, the urgency of the need for effective waste management becomes obvious.

Signage promoting recycling at Cape Town Stadium.

7.1 Introduction

EXCESSIVE WASTE PRODUCTION places enormous pressure on the environment. When considering the implications of the quantities of waste that can be generated at an event the size of the FIFA World Cup™ the urgency of the need for effective waste management becomes obvious. Waste management in South Africa is becoming increasingly important as the population increases and landfill space diminishes. In cities such as Cape Town, demand is expected to outstrip supply in terms of landfill space by 2012 if no new landfills are brought online. There is therefore increasing impetus to look at how to reduce waste production at source. In a study conducted prior to World Cup, it was expected that the daily average per capita waste production waste at the 2010 World Cup would be about 1.8 kg per person (Coetzee & Jenkin, 2010).

In recognition of this, the Department of Environmental Affairs developed objectives to keep waste generation to a minimum and to encourage waste sorting, re-use and recycling wherever possible (DEA, 2008a). The objectives included minimising the negative environmental impact of events associated with the 2010 FIFA Soccer World Cup™ by reducing resource consumption and waste production. The National Greening Framework also declared objectives for showcasing and awareness raising of waste recycling initiatives and declared a Green Goal target for 20% reduction of waste at source.

In addition to the Green Goal and National Greening Framework objectives the Local Organising Committee (LOC) were also responsible for setting objectives and overseeing the performance of all LOC sub-structures in preparing for and implementing the 2010 FIFA Soccer World Cup™. The LOC were therefore responsible for developing a standardised national approach to waste source separation in the stadium precincts for the host cities. The sources of waste during the World Cup were identified as a result of:

- Food and drink catering services
- Transport
- Packaging materials, as well as bottles and leftover food accumulated in fan walks, cafeterias and restaurants.

Host Cities thus implemented integrated waste management systems in advance of the event to ensure systems during the World Cup could cope with the increase in waste. These integrated waste management systems were aimed at creating awareness and promoting the principles of waste prevention and minimisation, and recycling. In order to measure a change in waste management activities, criteria against which waste

Durban Solid waste (DSW) in action at the Moses Mabhida stadium.

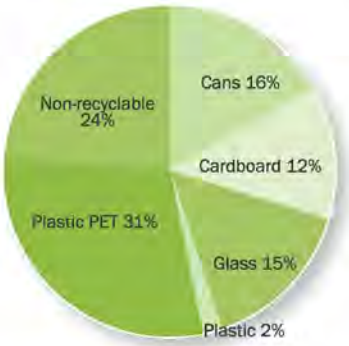
The baseline study included qualitative observations concerning waste management at the stadiums (Green Goal, 2008):

- None of the stadiums had active waste management plans in place
- Recyclables were generally not recovered – neither on site nor off-site and most stadiums did not have compactors or space for collecting recyclables
- The main viewing areas generally did not have bins, except for corridors
- Catering was recognised as the major source of waste generation. A large amount of the waste was located around the food kiosks and in the corridors and viewing area (where there are no bins)
- None of the stadiums used a deposit system for returnable mugs, although Ellis Park had tried in the past
- Based on the outcomes of the baseline study the following Green Goal objectives and targets (for stadiums and official venues) were set for the 2010 FIFA World Cup™:
  - Take-away food in the stadiums and fan-parks should be served in minimum packaging of recyclable material
  - Multi-use containers/cups for drinks should be used for all beverages served in the stadiums and fan parks. A deposit-refund system will be introduced as an incentive for returning used cups
  - The use of reusable material in the construction of temporary facilities should be promoted
  - The offices and Broadcast Centre should reduce paper waste and only print when necessary
  - The use of newspaper and single-use advertising boards and promotional material should be minimised
  - Waste should be separated at source by introducing a two-bin (recyclable and general waste) system to be used in the stadiums' public areas and a multi-bin system (glass bottles, paper, plastics, organic waste and general waste) used in the catering centres and other facilities (volunteer, media and VIP/hospitality centres) in the stadiums and fan parks to separate recyclable from non-recyclable items
  - The quantities of waste generated at the stadiums and fan parks should be determined after each event or at the end of all events in the particular venue
  - Recycling should be promoted by encouraging transfer of recyclables to recycling centre's.

production can be compared must be developed. Such baseline information can be used to measure the point from which improvement can be defined. To this end, a baseline study was carried out through a combination of questionnaires, interviews and match day audits at Vodacom Park, Loftus Versfeld, Royal Bafokeng and Newlands Stadium to understand waste production under match conditions, and the results were used as the basis for reduction targets for the World Cup (Green Goal, 2008).

Figure 10 details the findings for waste production by type in existing South African stadiums during pre-World Cup events (Green Goal, 2008). However, the baseline study did not capture per capita consumption, making comparison against subsequent consumption estimates difficult. The waste was produced primarily from private suites (45%), followed by the stadium area itself (33%) and shops (22%).

FIGURE 10. BASELINE AVERAGE WASTE GENERATION AND DISTRIBUTION FOR STADIUMS (GREEN GOAL, 2008)



7.2 Actions taken

BEHAVIOUR CHANGE IS THE ULTIMATE GOAL of efforts to raise awareness on sustainability. Promoting good behaviour in the area of waste management can be achieved at the (a) pre-consumption stage, either by through direct avoidance of consumption and/or by encouraging suppliers to reduce packaging, and (b) through minimising waste at the post-consumption stage, through effective waste recycling schemes.

FAST FACTS:
CONSTRUCTION WASTE AT THE 2010 FIFA WORLD CUP™

SOCCER CITY: More than 70% of building rubble from old stadium structures was crushed and reused in the construction of the new stadium. Those bricks that were not reused were cleaned on site and made available for local people to take away. Additionally, the seats from the original stadium were re-used elsewhere, thereby eliminating a massive volume of waste. This is in line with the Green Goal waste material recovery and reuse objective.

CAPE TOWN STADIUM: 95% of demolition waste from the old stadium was recovered and reused: Diverting building rubble from landfill sites significantly increases their lifespan. Recovery of demolition waste is the key step towards reuse and recycling of this waste stream and is in line with Green Goal objectives. While this exercise benefits the environment in that less virgin material will be required (and lower emissions related to manufacturing and transporting new products) during construction, it is also hugely beneficial from a financial point of view.

MOSES MABHIDA STADIUM: Much of the waste that resulted from the demolition of the Kings Park Stadium – which made way for Moses Mabhida Stadium – was reused and recycled and thus diverted from landfill. Topsoil was also rescued during the reconstruction phase for reuse in landscaping the new stadium precinct.

All Host Cities developed waste initiatives that included the establishment, upgrading and expansion of facilities and resources for waste separation and recycling that could service the 2010 FIFA World Cup™ and beyond. The section below explores projects developed by host cities for the 2010 FIFA World Cup™ in more detail. A summery of legacy projects is shown in Figure 11.

FIGURE 11. LEGACY SUMMARY OF ACTIONS FOR WASTE

OPERATIONAL RECYCLING PROGRAMS
- Durban – a total of 731 tonnes of waste and average 41% recycle rate across all venues.
- Cape Town – Two-bin system, 58% average waste diversion from all World Cup venues.
- Johannesburg – 'Pikitup' Waste Management, 183 tonnes of waste recycled. (awaiting better data)
- DEA – Mangaung, Polokwane and Rustenburg waste collection, 2,655 tonnes recycled

CLEAN–UP CAMPAIGNS
- Tshwane/Pretoria – Hennops River clean-up and clearing of 14 city spaces.
- DEA/ Indalo yethu – Cleaning of 10 public spaces across South Africa

IMPROVEMENT IN WASTE INFRASTRUCTURE
Cape Town – Inner city recycling stations and installation of permanent 'Zibi' split bins in city centre and other locations

WASTE AWARENESS CAMPAIGNS
- DEA National Greening – Comic Strip
- Cape Town – "Zibi" and Smart Events Handbook
- DEA/Indalo Yethu – "Green and Clean" Campaign
- Tshwane – Recycle bikes

7.2.1 Expanded Public Works Programme

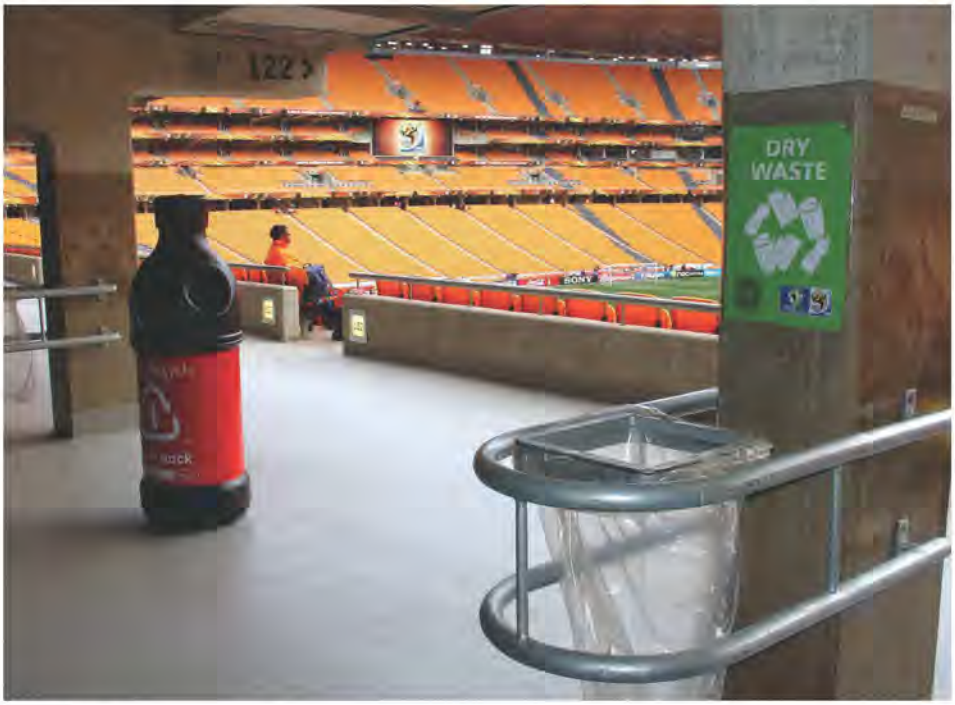
The DEA used funding from the Expanded Public Works Programme Greening 2010 initiative to promote awareness of greening nationally while at the same time taking full advantage of potential employment opportunities. Consequently a portion of the funding was devoted to developing the existing systems for collection and recycling of waste (DEAT, 2009b).

In an effort to identify those most in need of help, the DEA conducted a needs analysis for waste management support within each of the Host Cities in 2008. The analysis showed that three Host Cities namely, Mangaung, Polokwane and Rustenburg required assistance with waste collection. The project commenced during the first week of June 2010 and was completed by the end of September 2010. During this time a total of 730 jobs were created collectively in the three cities. The total amount of waste collected from 1st June until 15th July 2010 was 2,656 tonnes, with all recyclable waste being redirected from landfill.

7.2.2 Waste seperation and recycling

Multi-bin recycling systems were used as part of the Green Goal programme to promote the separation of waste at source and encourage recycling of waste in all the World Cup stadia. The 2009 FIFA Confederations Cup acted as a trial run for the development of these waste separation systems. Key to the objective of a successful waste management program is the distribution of waste bins within the stadium precinct and informing the spectators of the waste separation initiative. Green Goal proposed that a two-bin system be introduced in the spectator areas. Dry waste bin for recyclables (such as paper & plastic) and wet waste bin (for soiled waste products, napkins, food leftovers etc.).

All bins in the stadium precinct were suggested to have pictograms of the waste fraction to be disposed in the bins, and bear the Green Goal logo. Waste management at official FIFA stadiums nationally was managed by the LOC, but the areas adjacent to the stadiums required additional, augmented waste collection services. A five-bin system was to be introduced in the catering areas such as the kiosks, volunteer centres, media centres and hospitality areas. These were designed to cater for glass, paper, cans, plastic and wet waste.



Waste Management at Soccer City Stadium.

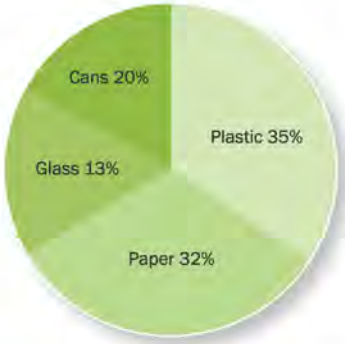
CITY OF JOHANNESBURG

With all the new construction and refurbishments at match stadiums and training venues, the City of Johannesburg was confronted with a large increase in construction-related waste. Additionally, as with all Host Cities, the influx of visitors into the city's hotels, stadiums, training venues and public viewing areas (PVA's) led to a considerable increase in domestic waste production. In response to this, great efforts were made to promote public awareness and behavioural change. The City's waste agency – Pikitup – proactively planned for the event through improvements in infrastructure and facilities necessary to ensure waste was minimised.

Johannesburg adopted a system based on the waste management hierarchy of avoidance, reduction, re-use, and recycling (City of Johannesburg, 2007). Waste recycling stations for dry and wet waste were positioned at all entrances to the stadiums and were also placed, on a full time basis, in the fan parks, public viewing areas and Football for Hope in Alexandra Township. A total of 214 trained waste minimisation personnel were employed to manage the stations, sort waste, and collect litter. These workers managed to divert 183 tons of recyclable waste from landfill during the event (refer to Figure 12).

It soon became clear that the goals of the waste management strategy would have a good chance of success only if waste management practices were communicated effectively to the public. As a result of this, initiatives such as the 'Clean City Campaign' launched on 5 June 2010, were devised to inform the public about the importance of litter-free environments. (Pikitup, 2010).

FIGURE 12. BREAKDOWN OF RECOVERED WASTE COLLECTED IN WORLD CUP VENUES IN THE CITY OF JOBURG OUT OF A TOTAL WASTE COMPLIMENT OF 183 TONS (PIKITUP 2010).



CITY OF TSHWANE

The City of Tshwane was another leader for managing its waste. Its proactive, diversified approach to waste management represented the benchmark for other World Cup Host cities. A two-bin system (dry and wet waste) and five-bin system (glass, paper, plastic, tins, non- recyclables) were implemented at Loftus Stadium, the Centurion Cricket Stadium, City of Tshwane public viewing areas, park and rides and the City Central Transportation Hubs in an effort to minimise waste to landfill.

Over 27 tonnes of waste was recycled as a result of this initiative during the World Cup, of which 31% was Plastic, 25% was Glass, 17,3% was cans and 26.4% was paper.

The City's three-pronged approach to waste management also included the following awareness raising campaigns:

Green wheels recycling programme: A small number of "recycling bicycles" were purchased in ward 67 of Tshwane. The bicycles were used to collect recyclables as well as to promote awareness of the recycling initiatives within the city.

City-wide clean up campaigns: The Tshwane Waste Management Division undertook a total of fourteen clean up campaigns throughout the city from May – June 2010, in order

Five bin system implemented at Loftus Stadium, Tshwane.

to present Tshwane as a clean city before and during the event. These campaigns were conducted in conjunction with various stakeholders from the five city regions.

Hennops River clean-up campaign: The Environmental Management Division undertook a clean-up campaign along the banks of the Hennops River in Centurion. The purpose was to not only showcase the City's efforts in recognition of International Biodiversity Day (which is celebrated worldwide on 22nd May), but also to clean up the area adjacent to the 2010 FIFA Soccer World Cup™ fan park site.

Based on the success of the initiatives listed above, and in order to maintain the momentum of the waste management initiatives, the City of Tshwane has proposed an additional project following the 2010 FIFA Soccer World Cup™ whereby waste recycling will be implemented during the 2010/11 financial year at all city garden refuse sites and nature conservation resorts.

TABLE 17. WASTE STATISTICS FOR ALL VENUES COURTESY OF DURBAN SOLID WASTE (DSW)

Venue	Total non-recyclable waste generated (tons)	Total Recyclable waste generated (tons)	Total Waste Produced	Recycled %
Moses Mabhida Stadium	117	102	219	47%
FIFA Fan Fest™	15.6	24.3	39.8	61%
Public Viewing Areas	8.5	9	17.5	51%
Beach Festival (promenade)	418	37	455	8%
Beach Fan Centre	4.1	1.4	5.5	25%
TOTAL WASTE TONNAGES	**563**	**173.7**	**736.8**	**24%**

THE CITY OF DURBAN

Durban began recycling initiatives from the beginning with the construction of the Moses Mabhida Stadium, with the recycling and reuse of construction materials such as masts, control gear, topsoil, steel and bricks from the former Kings' Park Stadium.

The City used the 2010 FIFA World Cup™ to demonstrate that waste recycling and re-use on a major scale can be effective. A strategic sustainable waste management plan, addressing the Greening Durban 2010 principles and targets, was developed and included into the Municipality's overarching waste management operational plan and incorporated into their environmental management system. For the event, Durban implemented a two-bin system for general and recyclable waste at all 2010 FIFA World Cup™ venues, resulting in 24% of all waste collected being sent for recycling.

CITY OF CAPE TOWN

To ensure that the City of Cape Town achieved the target of 20% waste reduction they rolled out a split-bin system for wet and dry waste in certain areas of the City's central business district (CBD) before the 2010 FIFA Soccer World Cup™. The City invested in two multi-use mini-recycling facilities (drop-off centres), one in the CBD

TABLE 18. BREAKDOWN OF WASTE PRODUCTION AT ALL OFFICIAL WORLD CUP VENUES IN CAPE TOWN

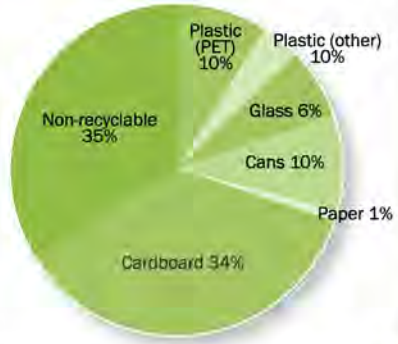
Venue	Total non-recyclable waste generated (tons)	Total Recyclable waste generated (tons)	Total Waste Produced	Recycled %
Cape Town Stadium	53.89	102	155.89	65%
FIFA Fan Fest™	15	11	26	42%
Public Viewing Areas	54.4	55.1	109.5	50%
Fan Walk and surrounds	142	198	340	58%
TOTAL WASTE TONNAGES	**258.9**	**358**	**616.89**	**58%**

and one on the Atlantic seaboard as Green Goal legacy projects, where local residents could take their recyclable waste for sorting and dispatch. The mini-facilities augment the transfer stations, where bulk sorting is facilitated (City of Cape Town, 2009). The investment in waste management infrastructure represents a significant improvement to the existing city recycling facilities, and will hopefully serve to improve inner city recycling rates, as at present there are no curb-side collections in these areas. Such facilities now provide the public with sites where recyclable items, such as glass, plastic, paper, cardboard and metal cans, can be dropped off at no charge. All recyclables from the waste stream will be recovered and sold or donated to manufacturers for re-use.

A two-bin system was implemented at the Cape Town Stadium, fan fest, public viewing areas and fan walk and other key pedestrian routes in the CBD. Appropriate signage was developed to promote waste separation at these venues. Table 18 shows total waste production at the Cape Town venues from all eight match days and Figure 13 presents a breakdown of wastes by type at the Cape Town Stadium. The two bin system will remain as a permanent fixture in the CBD. As a result of the City's initiatives the following waste recycling targets were achieved during the World Cup period:

- 58% waste diversion from Zibi split bins on street level
- 65% waste diversion from Cape Town Stadium
- 58% average waste diversion from all official 'Green Goal' target areas.

FIGURE 13. WASTE PRODUCTION AT THE CAPE TOWN STADIUM



MBOMBELA

The Municipality's strategy was geared towards developing an integrated waste management system that included the establishment, upgrading and expansion of facilities and resources for waste separation and recycling to service the 2010 FIFA Soccer World Cup™ and beyond. It also aimed to minimise waste generated by construction/refurbishment activities and the hosting of the 2010 events in the Municipality.

MANGAUNG

The City of Bloemfontein played host to six games in the Free State Stadium. Mangaung's (i.e. Bloemfontein's) municipal solid waste management department was tasked with overseeing the storage, collection, transportation and, proper disposal of waste generated at the Stadium for the duration of the tournament.

Mangaung adopted a two-bin system for both wet and dry waste aimed at collecting various recyclables including plastic bottles (PET), white paper, cans, boxes and a small amount of glass (Table 19). Just over 25.5 tonnes of waste were produced during the six matches, of which 66% was recycled (Table 19).

TABLE 19. WASTE PRODUCTION AT THE FREE STATE STADIUM (MANGAUNG MUNICIPALITY, 2010)

Waste	Japan V Cameroon	Greece V Nigeria	Slovakia V Paraguay	France V South Africa	Switzerland V Honduras	Germany V England	Totals
Recyclables	2,385 kg	3,277 kg	1,401 kg	3,792 kg	2,099 kg	3,938 kg	16,892 kg
Non-recyclables	1,162 kg	14,53 kg	529 kg	2,310 kg	1,245 kg	1,982 kg	8,681 kg
Total waste	3,547 kg	4,730 kg	1,930 kg	6,102 kg	3,344 kg	5,920 kg	25,573 kg
% Recycled	33%	31%	27%	38%	37%	33%	34%

The DEA's National Greening awareness raising comic strip for recycling

7.2.3 Communications and awareness raising

Although urban waste management and access to recycling facilities in South Africa has vastly improved over recent years, waste facilities in the rural and township areas remains hugely undeveloped. Communications campaigns, particularly those that ran outside the confines of the stadium precinct, have been an important awareness raising activity in this respect. The DEA's National Greening produced a series of six cartoon strips carrying environmental messages in four languages, namely Sotho, Zulu, English and Afrikaans. The cartoons were run in a national newspaper, and were also screened on SABC, the national television broadcaster.

Numerous other communications and awareness initiatives were undertaken across the municipalities, such as Tshwane's recycling bicycles mentioned previously. In Cape Town, the character "Zibi", the rubbish eating ostrich, was re-launched for the public waste awareness campaign. Older South Africans are familiar with the catchphrase 'Zibi says "Zappit in zibi bin". Zibi was created in 1979 by the political cartoonist, Dov Fedler, as part of the Keep SA Beautiful campaign in action at the time. Apart from reducing littering and dumping, Zibi will also promote the reduction of waste that is sent to our landfill sites through split bag initiatives and other campaigns that the City is currently running, and will continue to do so in the foreseeable future. These and other waste-related communications initiatives are expanded on further in the Communications & Awareness chapter.

GIVE IT BACK CAMPAIGN

Coca-Cola provided 10 Host City stadiums with collection bins for tin cans and plastic polyethylene terephthalate (PET) bottles. In addition to this, Coca-Cola sponsored a number of projects in the run up to the 2010 FIFA World Cup as part™ of the Coca-Cola National Schools Recycling Programme. Perhaps the most inspired initiative was one that got South African kids excited about waste management. This initiative involved a month long collection competition for PET bottles and tin cans in 200 schools across the country. The total number of total units of PET and cans collected was 4,874,480, with the an average of units per school of which about 70% was PET. On top of a sense of victory for top collectors, there was a prize of 20 000 World Cup tickets through the FIFA Ticket Fund. The FIFA Ticket Fund was created to enable South Africans who could not afford to buy tickets the opportunity to attend matches. In parallel with the collector competition, a series of interactive educational workshops with fully trained and educated recycling experts were also conducted in the schools.

COMMUNITY PROJECTS: GREEN AND CLEAN VOLUNTEER CAMPAIGN

'Green and Clean' saw the clearing and greening in ten public spaces around the country. This was accomplished by Indalo Yethu, a legacy project that originated through the World Summit on Sustainable Development held in South Africa in 2002. The organisation functions as an independent trust of the DEA promoting greening and eco-friendly practices as a way of life. The 10 municipalities benefiting from this project include Nkandla Local Municipality, KwaZulu Natal; Emfuleni Local Municipality, Gauteng; Tshwane Metro, Gauteng; Mantsopa Local Municipality, Free State; King Sabata Dalindyebo Local Municipality, Eastern Cape; Greater Giyani Local Municipality, Limpopo; Thulamele Municipality, Limpopo; Bushbuck Ridge Local Municipality, Mpumalanga; Ga Segonyana Local Municipality Northern Cape; and Mnquma Local Municipality, Eastern Cape.

Indalo Yethu, in partnership with the DEA and the National Lottery, also trained 100 environmental volunteers from across the country in raising awareness on sustainable environmental management practices.

TABLE 20. SUMMARY OF PERFORMANCE AGAINST WASTE

City	Total Recyclable (tons)	Recycle Rate %
Cape Town	358,000	58%
Durban	174,000	23.6%
Jo'burg	183,026	-
Polokwane	65,105	35.5%
Rustenburg	18,134	-
Tshwane	27,000	-
Mangaung	16,892	-

7.3 Outcomes

SOUTH AFRICA HAS NEVER BEFORE BEEN EXPOSED to such a level of awareness regarding waste management. The 2010 FIFA World Cup™ saw the country's first nationwide waste separation and recycling initiative, for which the results and lessons learnt can be used to set a precedent for future events. The Host Cities' municipalities, which generate the large amounts of waste, have substantially improved the skills and infrastructure required to effectively manage their waste, while significantly increasing awareness of recycling and proper waste disposal practices among the general public. Considering that for many municipalities, and for most South African citizens, waste recycling is not widely practiced. The achievements with regards to waste management can be considered as a significant step in the right direction in terms of sustainable development.

Although data was not received from all host cities, those cities that could provide complete data indicate that their waste management programs achieved the desired target of 20% waste diversion from landfill. The City of Cape Town very much lead the way in this respect, with an impressive 58% diversion overall and a 65% diversion in the stadium itself.

Waste projects initiated by the Host Cities contributed to the outcomes of the National Greening Framework in several ways:

- The implementation of integrated waste management programmes in the Host City municipalities enabled the overall environmental footprint for the 2010 FIFA Soccer World Cup™ to be substantially reduced
- A legacy of awareness was created by educating people regarding waste, minimising waste, and appropriate disposal of waste (whether sorted, re-used, recycled or dumped)
- The integrated waste management systems allowed South African citizens to see that waste management can be implemented at all levels, with each individual having the power to make a difference
- By the implementation of re-use and recycling initiatives, waste volumes sent to landfills were reduced
- Significant additional investment in recycling infrastructure and management systems and expertise was made.

The National Greening Framework enabled Host Cities to put systems in place for the future. To meet the waste management objectives in the Framework, various projects were implemented that educated both ticket-holders and non-ticket-holders during the event regarding waste sorting, re-use and recycling of waste. Such education, it was realised, would most effectively take place at stadiums, fan parks and public viewing areas. The creation of as many sustainable jobs as possible, the proper disposal of waste, and recycling where possible were expected results of these projects. Clean-up campaigns addressed littering and waste avoidance directly.

A NEW TAKE ON WASTE

This sports fan towered over Cape Town's V&A Waterfront, at 15 meters tall, for the duration of the World Cup. Coca-Cola, in collaboration with artist Porky Hefer, created the quirky 'crate-fan' statue as part of the World Cup 2010 Celebrations. Using steel scaffolding, 2,600 1.25-litre Coca-Cola crates, the artist created a monument to recycling waste for art. The structure is made of fully of recyclable material, which the company said highlighted their commitment to sustainable packaging. All the material is to be re-used once the structure is disassembled.

urban environ
biodiversity

South Africa is blessed with a tremendous diversity of landscapes and ecosystems, from the fynbos plant kingdom of the Cape to the 'Big 5' game of the Kruger National Park… It was therefore particularly fitting that the 2010 FIFA World Cup™ would be taking place in the year named by UNEP as the International Year of Biodiversity.

ment &

*A Drakensburg Dwarf Protea (*Protea dracomontana*). The protea is the national flower of South Africa, and the flagship species of the Cape Floral Kingdom with 92% of all protea species only occurring in this region.*

ISTOCK

The Ekurhuleni Regional Park, was revamped and upgraded as a 'Welcome Centre' for World Cup visitors. The mosaic tiling map directed visitors to the facilities in the park.

8.1 Introduction

IF ANY TOURIST IN SOUTH AFRICA – whether foreign or local – were asked what is the country's primary attraction, they would almost invariably refer to wildlife and natural landscapes. South Africa is blessed with a tremendous diversity of landscape and ecosystems, from the fynbos plant kingdom of the Cape to the "Big 5" game of the Kruger National Park. In fact, South Africa is regarded as one of only five "mega-diverse" countries in the world. It was therefore particularly fitting that the 2010 FIFA World Cup™ would be taking place in South Africa in the year 2010, named by UNEP as the International Year of Biodiversity.

The World Cup itself took place in the country's urban centres (i.e. in the stadiums). Consequently biodiversity was a consideration that came second to others such as energy and water – issues that could be directly addressed through processes like stadium design. In short, opportunities afforded to Host Cities around biodiversity were generally limited. While efforts to increase the profile of biodiversity were given priority in the National Greening programme, the response of Host Cities was, generally, to:

- Focus more broadly on creating, expanding and enhancing green spaces for the public (i.e. urban landscaping and public parks)
- Help the public to connect better with nature (through education projects, and by providing the green public spaces with a focus on indigenous flora for landscaping)
- Enhance cultural heritage (by encouraging the use of these public spaces for arts and cultural activities).

That said, there were some 2010 legacy biodiversity initiatives that deserve to be highlighted. The objectives for biodiversity in the National Greening Framework and Green Goal were broadly focused, recognising the fact that there are close linkages between biodiversity, landscape, culture and sustainable tourism. The South African National Biodiversity Institute (SANBI) was commissioned to manage DEA's public works programme for the National Greening programme (DEA, 2008a), while numerous biodiversity initiatives took place under the scope of other Green Goal initiatives, for example indigenous tree-planting and reforestation for carbon offsetting, and

THE OBJECTIVE FOR BIODIVERSITY IN THE NATIONAL GREENING FRAMEWORK AND GREEN GOAL WERE BROADLY FOCUSED, RECOGNISING THE FACT THAT **THERE ARE CLOSE LINKAGES BETWEEN BIODIVERSITY, LANDSCAPE, CULTURE AND SUSTAINABLE TOURISM**

restoration of wetlands to enhance natural water resources. The actions taken within the various cities around biodiversity and the greening of the urban environment are discussed in the following sections.

8.2 Actions taken

ACTIONS TAKEN AROUND BIODIVERSITY for the 2010 FIFA World Cup™ generally focused on four sub-themes:

- Restoration of wetlands
- Reforestation, with a focus on indigenous tree species
- Greening of the urban landscape and expanded/enhanced public spaces
- Education of the public on biodiversity and promotion of nature-related tourism.

Wetlands are nature's way of providing clean water to downstream aquatic and marine ecosystems, by filtering out particulates and biologically degrading various pollutants. They are also home to tremendous biodiversity and are often compared to rainforests in terms of their ecological biodiversity and value. Despite this, wetlands are frequently degraded and damaged through inappropriate urban development. Their maintenance and enhancement is a critical element in maintaining biodiversity nationally.

Reforestation through the appropriate planting of indigenous trees enhances water catchment management, supports and enhances natural ecosystems (providing habitats for insects, birds and other small animals), removes carbon dioxide from the atmosphere and stores it in the soil (if managed correctly), helping to reduce the impacts of climate change and minimising soil erosion. By restoring natural habitats to their original state, ecosystems are strengthened and enhanced by providing for a larger and less fragmented habitat.

The greening of urban landscapes and public spaces generally provide only marginal benefits to biodiversity. However there are several 2010 legacy projects that break this mould and achieve more significant biodiversity outcomes.

8.2.1 Urban landscaping and city greening

Even where urban landscaping and tree planting are not performed specifically with the objective of maximising biodiversity, the greening of cities generally helps improve the quality of life of their inhabitants and provides numerous health and economic benefits. It could also be argued that it helps city-dwellers feel more connected to nature and fosters an appreciation for biodiversity. Due to the sharp contrasts in urban landscape quality – a legacy of Apartheid-era spatial urban planning – certain areas have been conspicuously neglected in terms of green spaces. Countrywide, municipal and metropolitan governments recognised that the 2010 FIFA World Cup™ offered an opportunity to focus on upgrading the quality of public spaces and improve urban design aspects of city-scapes.

Host Cities undertook significant city greening and beautification initiatives aimed at improving the urban environment of their city centres. In many cases these initiatives were rolled out in townships characterised by a degraded environment. There can be little doubt that the greening of these areas will support education efforts aimed at increasing awareness of and appreciation for South Africa's biodiversity. The use of indigenous plant and tree species was often prioritised within these urban greening programmes.

A prime example is Ekurhuleni Metropolitan Municipality where, despite operating under extreme time pressure, the Parks department managed to roll out a massive city greening programme that included specifications to maximise the use of indigenous plant species, resulting in thousands of indigenous trees being planted.

The City of Johannesburg is another municipality that made commendable strides, particularly through urban greening projects across several of the old Apartheid townships, including Diepsloot Park, Rose Park, Ivory Park, Thokoza Park, Orlando West Regional Park, Diepkloof X-treme Park, Orange Farm Regional Park, Krematart Park,

BLOWING THE 'VUVUZELA' FOR BIODIVERSITY

The South African National Botanical Institute (SANBI) has recently named a new plant species commemorating South Africa's hosting the 2010 FIFA World Cup™. The *Moraea vuvuzela* is a species of iris found near Worcester, in the heart of the Cape Floral Kingdom. The pretty little bulb is severely threatened by agricultural development – it is believed that the species has already been wiped out from certain areas through the flooding of the Theewaterskloof Dam, and is currently known to exist in just two localities between Rawsonville and Villiersdorp. The naming of the flower is linked to a conservation programme initiated by the non-profit association Patrons for Biodiversity (BIOPAT), sponsored by the Deutsche Gesellschaft für Technische Zusammenarnbeit (GTZ, the German Technical Development Cooperation Agency), which supported the South African Government in the preparations for the 2010 FIFA World Cup™ on behalf of the German Government.

The epithet "vuvuzela" derives from the raucous air horn, approximately one metre in length, commonly blown by fans at soccer matches in South Africa. The horn became a World Cup icon, and bears a resemblance to the flower with its flared petals.
Source: SANBI website

GREENING SOWETO: THE 200,000 TREES PROJECT

In April 2010 Johannesburg Mayor Amos Masondo planted the 200,000th tree in a celebration of the successful achievement of the 200,000 trees project. The massive greening programme kicked off in 2006 with the aim of correcting environmental imbalances and creating green spaces in southern Johannesburg. The 2010 FIFA World Cup™ provided a critical target for the completion of this programme, another example of how the event motivated agencies and administrations to complete their various legacy projects before the first kick-off.

and Soweto – which saw significant tree-planting and garden creation in previously 'dead' open spaces.

Some municipalities went beyond urban greening to actively enhancing the biodiversity value of their urban greening programmes. eThekwini made significant efforts to incorporate principles of biodiversity into several of their keystone urban greening projects, including landscaping around the Moses Mabhida Stadium, which combined indigenous dune, grassland and coastal forest sections within the surrounding park. eThekwini also developed an excellent series of environmental management guides that are available on its website, including a Guide to Green Landscaping (see Communications and Awareness chapter) and an open forum on the greening of buildings and landscapes was held to build local capacity in related disciplines.

8.2.2 Protecting, restoring and creating marine and aquatic ecosystems

Several biodiversity legacy projects were undertaken which focused on rivers, wetlands and estuaries. In some cases, these projects were required as part of the environmental impact assessment authorisation process related to a specific 2010 development; in other cases the initiatives were voluntary and associated with an aquatic or marine environment located close to a public viewing area or stadium precinct. Some examples include:

ETHEKWINI

Restoration of the Umgeni River Estuary. The City of eThekwini undertook significant work in this area, including the restoration of the coastal section connecting the main beachfront to the estuary. The foredune zone of the estuary was cleared of alien or inappropriate vegetation and rehabilitated using indigenous species, while ecologically sensitive areas were demarcated to minimise damage from pedestrians. Fifteen hectares of land was cleared.

The Princess Magogo Stadium, KwaMashu. The stadium site is located adjacent to a riparian zone (considered to provide wetland functions and services). The environmental authorisation process recognised the importance of these wetland functions and therefore included provisions to minimise damage to the zone. The resulting wetland rehabilitation plan includes "hard" engineering (gabion structures) and other features to minimise erosion and sediment loading into the wetland, as well as "soft" engineering measures such as the clearing of invasive plant species and revegetation with wetland plants endemic to KwaZulu-Natal.

TSHWANE

Alien vegetation eradication and river rehabilitation. The City's biodiversity action plan placed focus on the removal of alien vegetation and river rehabilitation. Electing to continue its ongoing urban environmental upgrade by selecting river courses for attention, these projects benefited terrestrial and aquatic ecosystems while simultaneously improving freshwater production and quality. A total area of 284 hectares of alien vegetation was cleared throughout Tshwane, mostly along riverbanks. In commemoration of International Biodiversity Day, Tshwane also organised a waste clean-up campaign along the banks of the Hennops River in Centurion adjacent to the 2010 FIFA Soccer World Cup™ fan park site.

MBOMBELA

Rehabilitation of Bergvlam Stream. One of the first projects selected within Host City Nelspruit to respond to the environmental protection clause in FIFA's Standard Host City Agreement was the rehabilitation of the Bergvlam Stream. The school grounds were selected for use as a fan park due to its accessibility for tourists. Several clean-up campaigns were held along the stream and work is ongoing to restore and preserve this locally important ecosystem. The project included participation by South Africa's Spar and Miss Earth first princess.

Restoration of the large Matsafeni wetland upstream of Mbombela Stadium. Restoration of the Matsefeni wetland was a condition of the water use license issued

REHABILITATION OF MBOMBELA'S BERGVLAM STREAM

The Bergvlam Stream is a tributary of the Crocodile River, one of SA's biggest rivers, that flows into the world-renowned Kruger National Park. The importance of maintaining healthy river systems, in terms of South African biodiversity, cannot be overstated particularly considering the water-scarce conditions typical of much of the country and the already degraded state of many of its urban river systems.

The drive to rehabilitate the Bergvlam Stream started in 1996 when the Bergvlam Nature Society applied to have the area declared a bird sanctuary. The location of a 2010 public viewing area on the banks of the stream, combined with a renewed focus on water conservation and biodiversity in the National Greening Framework, provided a clear opportunity to identify additional resources for this initiative.

The stream was found to be in poor condition with erosion gullies, alien invasive plants and illegal waste dumping sites. To date, the restoration and rehabilitation of a 5 km (35 ha) portion of the stream has been planned at an estimated cost of over R6 million. The plan commenced in October 2009 with a focus on the removal of alien vegetation (led by Working on Fire) and waste and a re-vegetation programme using trees and wetland plant species. The waste clearing programme involved numerous local schools. An environmental authorisation process has been initiated for two further planned activities, namely the rehabilitation of the stream with gabions and the stabilising of the river banks. The building of the raised walkways, hiking trails and bird hides are also due to commence following receipt of approval. Local bird guides are presently bringing tourists to this area for bird watching, and these facilities will enhance the tourists' experience of the river.

Following the 2010 FIFA World Cup™, progress is relatively slow due to financial obstacles. However, small steps critical to the programme have been undertaken, including: a bird survey, water quality testing, 1:100 year flood line determination, the collection of 300 trees, in the stream over the next 3 years commencing on Arbour Day 2010, and training of school children on topics such as "What is a Wetland" and on how to identify birds, and the compilation of training manuals. A cornerstone of the project has been the involvement of local schools, local industry, various NGO's (Working for Wetlands, Working for Water, Working on Fire etc.) and the general public.

for the stadium by the Department of Water Affairs. The project is estimated to take three years to complete at a cost of R1,2 million.

CAPE TOWN

Creation of new wetlands and Biodiversity Park. The fynbos garden situated in the Green Point common, near the stadium, can be considered the seminal biodiversity legacy in Cape Town. Although funds were insufficient to construct the garden before the 2010 FIFA World Cup™, financial backing has since been secured and the garden is in progress. It is set to become a tourist attraction in its own right. The availability of non-potable water from the Oranjezicht Springs (see Water Chapter) is enabling the City to develop a series of wetlands-type landscapes. This area will be used to capture and manage water flows with the use of reed-based technologies and vegetation which will also provide habitats for small frogs, insects and birds. The biodiversity garden will include an ECO Centre, facing the wetlands, aimed at educating the public about sustainability in general (Communications and Awareness chapter).

OTHER

Various other projects were undertaken in several other Host Cities, including a R10 million project focusing on the restoration of a 3.5 km reach of local stream (including the removal of alien vegetation) in Polokwane and the restoration of a wetland around Royal Bafokeng Stadium in Rustenburg.

8.2.2 Reforestation

As part their carbon offset programme, the eThekwini Municipality embarked on a number of reforestation projects. While reforestation and tree planting are not always beneficial for biodiversity, the City's programme ensured a strong biodiversity focus in addition to social and carbon offset goals. Instead of a straightforward greening approach, the reforestation programme allowed for linkages and benefits associated

FOOTBALL – SCORING FOR BIODIVERSITY IN AFRICA

In addition to offsetting the carbon emission of seven world cup teams, and in recognition of 2010 being the International Year of Biodiversity, PUMA joined up with UNEP and 12 African football teams to promote awareness-raising about habitat and species conservation among football fans and the general public during worldwide football events, including the Orange Cup of African Nations in Angola and the international friendly games leading up to the 2010 FIFA World Cup™ in South Africa.

Awareness and funds were generated by the teams wearing their "Africa Unity Kits" during the summer games to promote awareness of biodiversity. Copies of the Unity Kit were sold along with Unity-Tees and PUMA "Lacelets" to raise money for conservation programs in Africa. The initiative received the support of several African football stars including Cameroon captain Samuel Eto'o, Didier Drogba and Djimon Hounsou. The campaign's website explains the reason for ramping up the focus on Africa:

"[the] continent hosts exceptional biodiversity including two of the five most important wilderness areas on Earth – the Congo Basin, and Miombo-Mopane Woodlands and Savannas of Southern Africa. Nine of the planet's 35 Biodiversity hotspots, the richest and most threatened reservoirs of plant and animal life on Earth, are also in Africa."

Three causes (decided by an internet vote) to receive support from the programme are: elephants in Ivory Coast and Liberia, community conservation for gorillas, and an endangered lions programme.
Source: planetgreen.discovery.com and PUMA website

with biodiversity conservation, habitat creation, catchment protection, and direct rural social-economic upliftment.

The first project, undertaken in partnership with the Wildlife Conservation Trust, involved the planting of 104,000 indigenous trees planted on 100 hectares for the recreation of an indigenous forest habitat on the site of the municipal-owned buffer strip (originally planted with sugarcane) around the new regional landfill north of Durban.

The second project has been rolled out at Inanda Mountain on Tribal Authority Land, on forest habitat that has been significantly degraded by the presence of alien vegetation. Figures for Phase I of the project have not yet been released at the time of writing; however the second phase will involve revegetation with 100,000 indigenous trees to restore the natural habitat.

8.2.3 Promoting biodiversity-related tourism and education of the public

The UNEP initiative to have 2010 named as the International Year of Biodiversity was intended to help raise awareness of biodiversity and conservation issues worldwide. In keeping with these objectives, some of the programmes detailed above deserve further recognition for their efforts in promoting local biodiversity-related tourism and public education.

The Umgeni River Estuary Precinct has been envisioned as an environmental investment area, to be developed into a space allowing for a combination of biodiversity conservation and human recreation. As part of this scheme a "Green Hub" has been proposed as a central portal through which Durban's natural assets can be marketed and promoted to profile the City's outdoor offerings and nature-based tourism (nature-based activities such as trails, canoeing, bird watching etc.). It will also act as an educational centre promoting sustainable living practises and showcasing green technologies and approaches that can be adopted by individuals, businesses and schools. The intention was to pilot the Green Hub during the World Cup, but construction was only completed after the event. The Hub includes numerous sustainable building features including:

- Natural ventilation design
- Photo-voltaic panels to service the building's full electricity requirements
- No heated water (with the option to buy a solar heater in the medium/long term should the need arise depending on operator)
- Use of low-energy LED lighting
- Low embodied carbon materials used – roof trusses and windows made of timber (as opposed to steel/aluminium)
- Rainwater harvesting (jo-jo tanks) to flush toilets.

The facility is now complete and is awaiting a private-sector partner prior to commencing with its educational and tourist-related promotional activities.

The planned Biodiversity Park and ECO Centre, at Cape Town's Green Point common, is set to soon become a reality. While the Biodiversity Park is intended to serve as a tourist draw-card, the ECO Centre itself will focus on educating the public (locals and visitors) about biodiversity and sustainability. The ECO Centre remains at the advanced planning stages at present. Stadium architects responsible for the upgrade of other buildings in the Green Point district were also appointed to prepare conceptual design drawings of the ECO Centre. Their brief called for the design of a green building that is a demonstration of sustainable building practices. The Centre's footprint is now finalised and the detailed design is being translated into artist's impressions to be used for international fundraising purposes (with an estimated R35 million required for construction). The following will be associated with the ECO Centre:

- A worm farm
- The biodiversity showcase garden
- Organic vegetable gardens and vegetable allotments
- Play areas for youngsters
- A public art pavilion and outdoor art
- A recycling drop-off centre and demonstration area
- A bicycle rental facility.

Umgeni River Estuary Green Hub Building (eThekwini Municipality, 2010)

FIGURE 14. LEGACY SUMMARY FOR BIODIVERSITY

REFORESTATION AND HABITAT RESTORATION

Durban 104,000 indigenous trees planted in partnership with Wildlands Conservation Trust. Plans for a further 100,000 trees to be planted on alien-infested tribal land.

BIODIVERSITY EDUCATION AND TOURISM PROMOTION

Cape Town ECO Centre and Biodiversity Park (currently being developed)
Durban Green Hub Centre, currently awaiting a private sector partner
Mbombela Cooperation of schools for Bergvlam Stream rehabilitation and promotion of bird-watching activities for local tourism

WETLAND AND RIVER MANAGEMENT AND RESTORATION

Cape Town Creation of new wetlands in Biodiversity Park, Green Point
Durban Dune protection and alien vegetation clearing around the Umgeni River Estuary; Princess Magogo Stadium wetland restoration
Mbombela Rehabilitation of Bergvlam Stream; restoration of the large Matsafeni wetland upstream of Mbombela Stadium
Polokwane R10 million towards the restoration of a 3.5 km reach of the stream, removing alien vegetation
Rustenberg Restoration and incorporation of wetland into stormwater management plan
Tshwane 284 ha of alien vegetation cleared

8.3 Outcomes

AS THE UNEP YEAR OF BIODIVERSITY, 2010 was marked by a unified effort across government, parastatals and private organisations to address biodiversity issues in South Africa. A long term and innovative view was taken with projects – the results of which can hopefully be enjoyed by generations still to come.

Although opportunities to address biodiversity issues were not as obvious in comparison to energy and water conservation projects, which could be addressed within the stadium design, several projects stand out as having maximised the potential benefits for biodiversity, including promotion of nature-based tourism and educational facilities.

In many cases, true "legacy" projects, were those borne out of the World Cup, but are ongoing projects that will take (in some cases) several more years before they are fully realised. The momentum created by the World Cup will hopefully see these projects through to completion and allow them to fulfil their potential in terms of educating the public about biodiversity, promoting tourism and enhancing biodiversity throughout South Africa.

JEREMY JOWELL

sustainable tourism

National Greening targets for sustainable tourism at the World Cup were aligned with South Africa's Responsible Tourism Guidelines and a growing recognition of the need to further integrate sustainability principles within mainstream tourism sector in South Africa.

Durban's beachfront.

9.1 Introduction

TOURISM HAS BEEN A BOOMING INDUSTRY IN SOUTH AFRICA in recent years, with the total impact (both direct and indirect) of the tourism industry contributing around R203 Billion (US$26 Billion) to the South African economy (7.7% Gross Domestic Product) each year and employing approximately 869,000 people (WTTC, 2010).

Sustainable tourism is also enjoying a constant and steady growth in popularity as more and more people wise up to its value. By supporting establishments that prioritise the reduction of environmental impact, the public is able to encourage the tourist industry's efforts to reduce energy, water and material consumption, minimising negative impacts on biodiversity, and to enhance respect for and provide benefits to destination cultures and local communities. "Responsible tourism development" has been highlighted by the South African Government (DEAT, 1996) for its enormous potential to create jobs, alleviate poverty, stimulate black economic empowerment (BEE) and promote the development of small, medium and micro enterprises

fast facts IMPACT OF THE WORLD CUP ON SA TOURISM (SOURCE: SAT: 2010)

TOURIST VOLUME	A total of 309,554 foreign tourists arrived in South Africa for the primary purpose of attending the 2010 FIFA World Cup™ • Africa land markets accounted for 32% of total foreign tourists, followed by Europe with 24% and Central and South America with 13%
TOURIST SPEND	The total expenditure in South Africa by tourists who came specifically for the 2010 Fifa World Cup™ was R3,64 billion • Europeans spent the most in South Africa during this period • Most tourists spent their money on shopping, followed by accommodation and food & beverages
LENGTH OF STAY	Average length of stay by these tourists was 10.3 nights • Tourists from Australia and North America stayed in South Africa for the longest duration
GEOGRAPHIC SPREAD	Gauteng, Western Cape and KwaZulu-Natal were the most visited provinces during the 2010 FIFA World Cup™ with more than 80,000 tourists visiting each of these provinces
BRAND AWARENESS	Total awareness of South Africa as a leisure destination increased by 9% following the event The intention to visit South Africa in the short term increased by 35% following the event

TABLE 21. WORLD CUP-RELATED TOURIST NUMBER BREAKDOWN BY REGION (SOURCE: SAT,2010)

North America	Central & South America	Europe	Africa Land	Africa Air	Asia	Australia	Middle East
US 30,175	Brazil 14,815	UK 22,802	Mozambique 24,483	Nigeria 4,324	China 6,760	Australia 12,210	Isreal 2,977
Canada 3,654	Mexico 9,680	Netherlands 8,741	Swaziland 19,593	Ghana 3,578	Japan 4,614	New Zealand 1,636	Saudi Arabia 311
	Argentina 8,757	Germany 8,596	Botswana 16,387	Kenya 2,089	India 3,086		Lebanon 261
	Chile 4,174	France 6,747	Lesotho 12,733	Algeria 1,941	Philippines 2,102		Kuwait 198
	Uruguay 1,359	Portugal 5,348	Zimbabwe 10,351	Mauritius 1,410	Korea Rep. 2,040		Cyprus 156

(SMMEs). Sustainable tourism, therefore, is not only about being 'environmentally friendly', but also focuses on local development and social justice. The field has linkages into the other themes and cross-cutting issues that comprise the National Greening Framework. For example, it has been estimated that an additional 309,554 tourists entered the country as a result of the World Cup (Table 21), resulting in a significant increase in carbon emissions, particularly due to international travel. In terms of the projected estimates for the carbon footprint for the 2010 event (DEAT, 2009), accommodation was the second largest contributor to carbon emissions, second to international and intercity travel.

In a strategic departure from usual FIFA protocol, group stage games were not limited to one geographical area. This allowed for maximum exposure of all Host Cities to high profile games, fairly distributing the tourism-related opportunities associated with them. However, this also meant that with the massive influx of visitors into South Africa, all local Host City municipalities faced the challenge of supplying high quality accommodation while minimising the environmental footprint of the event.

National Greening targets for sustainable tourism at the World Cup were aligned with South Africa's Responsible Tourism Guideline's (DEAT, 2002) and a growing recognition of the need to further integrate sustainability principles into the mainstream tourism sector in South Africa. As the bulk of tourism facilities are run by the private sector it was envisaged that the 'sustainable tourism' component of a National Greening programme would be driven largely by the private sector, with the public sector playing a facilitation role in promoting consistent standards throughout the industry and in promoting its commitment to greening practices.

There is a dedicated core of sustainable tourism proponents both within the public and private sector in the country. Consequently, South Africa has been a player in the global market for sustainable tourism for a number of years, with various private sector accreditation schemes in place, including the Heritage Environmental Rating Scheme, GreenStaySA in the Western Cape and Fairtrade Tourism South Africa (FTTSA). FTTSA, a non-profit organization that promotes sustainable tourism development, is particularly notable for being the world's first (and currently only) Fair Trade certification programme for tourism, while GreenStaySA is a true World Cup legacy project.

Despite the emergence of these innovative schemes, sustainable tourism has remained outside the mainstream of the South African tourism sector with no unified standard nationally. In the years preceding the World Cup, the South African Department of Environment and Tourism sought to formalise national standards for sustainable tourism with the release of the National Minimum Environmental Standard for Responsible Tourism (NMSRT) in November 2009. NMSRT aims first and foremost to establish a common understanding of responsible tourism for both consumers and service providers. Secondly, the NMSRT aims to harmonise the different sets of criteria currently used for certifying the sustainability of tourism businesses. Through this system, an oversight authority will award a seal of accreditation to tourism certification agencies, indicating in turn that these agencies are considered competent to offer sustainability certification schemes to the tourism sector. The system is expected to be officially launched in 2011.

SUSTAINABLE TOURISM, THEREFORE, IS NOT ONLY ABOUT BEING 'ENVIRONMENTALLY FRIENDLY', BUT ALSO FOCUSES ON **LOCAL DEVELOPMENT AND SOCIAL JUSTICE**

HIGHLIGHTS OF SOUTH AFRICA'S NATIONAL MINIMUM ENVIRONMENTAL STANDARD FOR ENVIRONMENTAL TOURISM (NDT, 2009)

The NMSRT consists of 39 criteria divided into the four categories below. In order to be accredited by the Tourism Grading Council of SA (TGCSA), the certification criteria of all the standards in each of the four categories of standards must be reflected.

Sustainable operations and management:

- Employ a suitable long-term sustainability management system.
- Facilitate staff awareness and training on the organisation's Responsible Tourism policy.
- Design and Construct Infrastructure sensitively according to natural or cultural heritage surroundings in siting, design, impact assessment, and land rights and acquisition and use locally appropriate principles of sustainable construction.

Economic:

- Employ people from the local area, with a particular emphasis on historically disadvantaged groups (black people and women), including in management positions.
- Purchase of local and fair trade services and goods, where available, and set targets for improvement.

Social and cultural:

- Contribute to the protection of local historical, archaeological, culturally, and spiritually important sites located on their properties.
- Provide a 'Code of Behaviour' for visits to local cultural, historical and religious sites or communities that has been developed in conjunction with the affected communities.
- Demonstrate support for community development initiatives in consultation with affected communities.

Environmental:

- Measure energy and water consumption and adopt measures to decrease overall consumption.
- Implement and manage actions to reduce greenhouse gas emissions associated with operations.
- Employ a responsible purchasing policy and avoid usage of harmful substances.
- Provide environmental information for visitors so they reduce their impact on natural resources.

9.2 Actions taken

FOR MANY HOST CITIES, attracting World Cup visitors (during tough economic conditions) was the objective of their tourism strategies, rather than sustainable tourism *per se*. While some Host Cities undertook focused sustainable tourism programmes, and organised initiatives such as capacity building workshops, a large proportion of them put the emphasis on marketing and communicating their existing tourist attractions, often concentrating on natural and traditional cultural attractions. Provincial reports to the Tourism Cluster in August 2010 confirmed that KwaZulu-Natal, North West, Eastern Cape and Mpumalanga were successful in attracting visitors to sites and amenities other than soccer games: Kruger Park, for instance, saw a 26% increase in visitor numbers over the tournament period (TCC, 2010). The following section outlines some of the initiatives undertaken in the nine FIFA World Cup™ Host cities.

CITY OF CAPE TOWN – PUTTING ITSELF ON THE MAP

The City of Cape Town recognised and responded to the potential for sustainable tourism initiatives to deliver results early on in the preparations for the 2010 FIFA World Cup™. This leadership role was perhaps due to the city's status as the 'tourism capital' of South Africa.

The Cape Town Green Map – directing tourists to Cape Town's greenest hotspots.

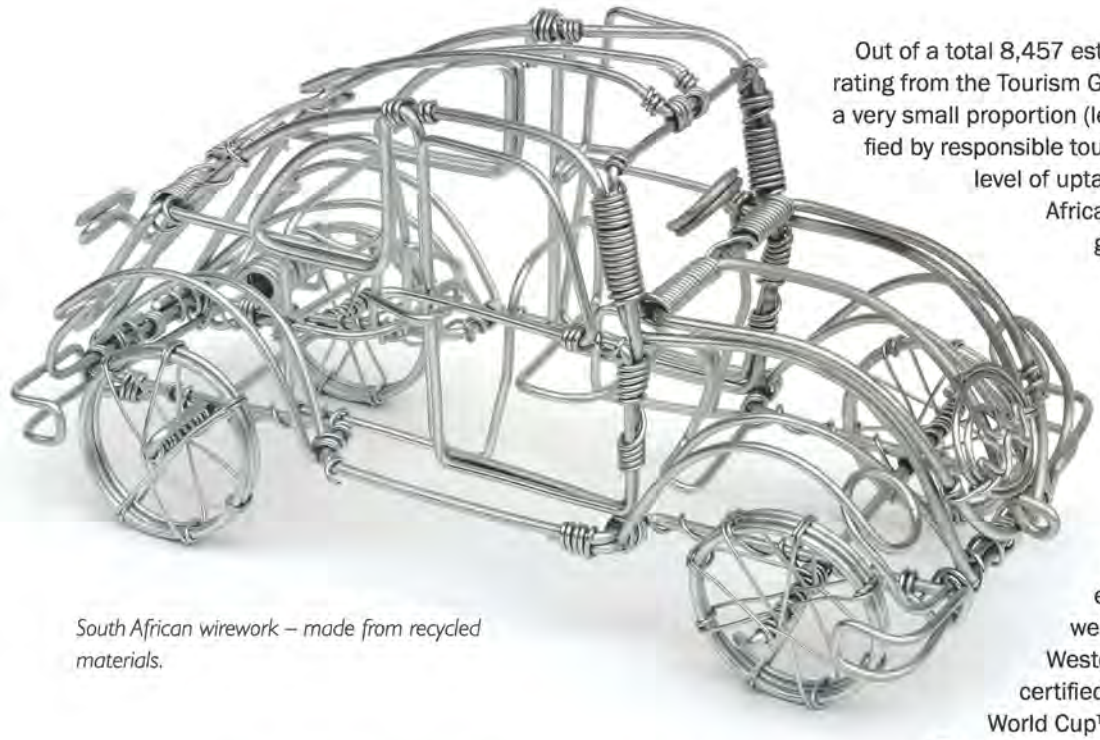
In November 2007 Cape Town held its first Responsible Tourism workshop and during March 2008 held the 'Painting the Town Green Workshop', which sought to persuade visitors and residents alike to adopt more sustainable lifestyles. Cape Town also published a green map of the city and surrounding areas, available in hard copy and on the internet. The green map is based on the Open Green Map System (www.greenmap.org), thereby benefiting from Greenmap.org's resources and mapping technologies. Cape Town has joined over 350 'Green Map' cities in 50 countries on the Greenmap.org website (CoCT, 2009).

The primary objective of the Cape Town Green Map was to inform Capetonians and visitors of opportunities to experience and support Cape Town's wealth of natural resources and sustainable green living options. The green map provides a fresh view of the city's environment and showcases tourist hot spots and locations of ecologically sensitive areas and activities in and around Cape Town. Included in the map are nature reserves, ecotourism sites, organic and farmers' markets, recycling drop-off centres, etc. The map creates an incentive to the City's commercial sector to become more environmentally aware and adopt green and/or sustainable practices and operating procedures.

The Cape Town green map is available in both a printed and an online interactive version on www.capetowngreenmap.co.za.

GREENSTAYSA

Arguably the most significant accomplishment under the sustainable tourism banner in Cape Town was the launch of the GreenStaySA rating for accommodation establishments. Although conceived as a national scheme, it was championed by Cape Town's Green Goal campaign with partner funding from the British High Commission and United Kingdom Department for Environment, Food and Rural Affairs (DEFRA), to facilitate the implementation of a sustainable tourism rating scheme.



South African wirework – made from recycled materials.

Out of a total 8,457 establishments certified with a star rating from the Tourism Grading Council of South Africa, only a very small proportion (less than 500) are currently certified by responsible tourism schemes. Although the low level of uptake by tourism enterprises in South Africa is not unusual when compared to global experience, it is an indication that responsible tourism certification is not yet mainstreamed in South Africa. GreenStaySA emerged out of a pilot project run in 2004 under the Cleaner Production programme of the Western Cape DEA&DP, in which nine accommodation establishments participating in a pilot project were audited for energy and water consumption, as well as waste management. Three Western Cape Hotels were GreenStaySA certified by the start of the 2010 FIFA World Cup™, including the Hollow on the Square Green Annex in Cape Town, the Eendracht Hotel in Stellenbosch and Fancourt Resort in George, with the intention to roll out on a wider scale in the months and years following the 2010 event.

The GreenStaySA rating system focuses on environmental criteria only. All accommodation establishments, however small, can use the online GreenStaySA tools and resources in order to improve their environmental footprint. The tools and resources that have been developed include a self-assessment tool to assess current environmental performance, and a technical manual to assist accommodation establishments in the implementation of environmental interventions.

A PARTICULARLY INTERESTING ASPECT OF [RUSTENBURG'S] ACCOMMODATION ARRANGEMENTS WAS THE SELECTION AND PROFILING OF **'HOME-STAYS'**, AND A BUDGET ALLOCATION TO SUPPORT **FLEA MARKET-BASED SMALL AND MEDIUM SIZED ENTERPRISES**

HOSTING A RESPONSIBLE EVENT

Responsible tourism training workshops were convened in Cape Town in late 2009 by the DEA&DP and GreenStaySA. GreenStaySA have been working with the DEA, Tourism Grading Council of South Africa, Indalo Yethu, and Fair Trade in Tourism South Africa to develop and implement a national standard for responsible tourism and an accreditation system for certification agencies in South Africa (CoCT, 2009), as discussed above.

Cape Town's Responsible Tourism roll-out included a range of awareness-raising products and training sessions, including a published code for responsible conduct and a "Responsible Traveller Tips" guide on how to behave responsibly towards communities and the environment in South Africa. To build on the legacy outcomes of the FIFA World Cup™, the city scheduled a workshop series on Responsible Tourism for Business over the duration of the event and in the months following.

Cape Town noted the imperative not to lose momentum, to support the legacy of 2010 greening and prepare the tourism industry for the challenge of building a sustainable destination (CoCT, 2010). The city also published the Smart Events Guide to greening events, which was aimed at venue managers amongst other key event role-players.

NELSON MANDELA BAY

To augment its competitive advantage as a tourism destination, Nelson Mandela Bay rolled out a number of sustainable tourism ventures. Among these was a programme that trained 30 tourism ambassadors, tourist guides and museum staff members as cultural and heritage guides. The municipality also facilitated an innovative programme, part of the SA Host Tourism Enterprise Program, to train bed and breakfast owners, tour guides, tour operators, caterers, travel agents, events coordinators, taverners, local tourism organisation (LTO) members, community members and tourism officials on sustainable tourism. Additional workshops on sustainable tourism were run with some 40 SMMEs.

JOHANNESBURG AND TSHWANE

It was estimated that over a million people visited the City of Johannesburg over the June-July period. This staggering number is a result of its being the anchor Host City for the tournament and its close proximity to two other Host Cities, namely Pretoria and Rustenburg, forming the most geographically compact Host City complex in the country. With a view to capitalising on this opportunity, Johannesburg's tourism initiatives had an eye firmly on the prize of visitors returning for longer stays in the future. This saw the City's ventures geared largely towards creating awareness of its tourism and cultural assets in general, rather than profiling 'green' tourism issues. These awareness campaigns profiled the African cultural aspects of the City and its connections to the rest of Africa. An improvement in the geographic spread of promoted attractions means that a visitor's experience is more diverse and inclusive. This in turn promotes the social benefits associated with tourism.

The GreenStaySA accreditation scheme was promoted by Host City Tshwane via an information session hosted during May 2009. This involved making both internal and external role-players aware of their responsibilities while at the same time drawing attention to the information available on Tshwane Tourism's website.

ETHEKWINI

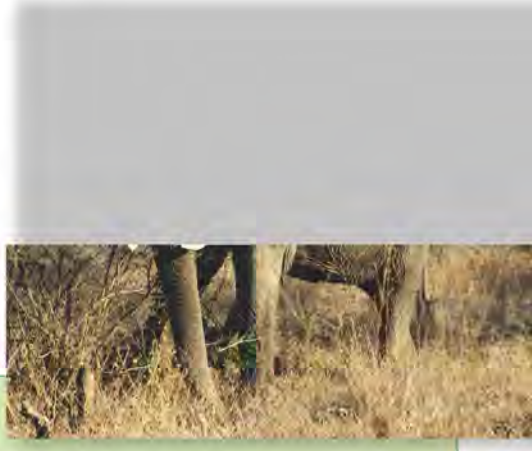
The Umgeni River Estuary Green Hub developed by eThekwini Municipality is intended as a central portal through which Durban's natural assets are marketed to profile Durban as an outdoor destination (nature based activities such as trails, canoeing, bird watching etc.) with year-round warm weather. The centre will also promote sustainable living practises by offering "greening" information and showcasing green technologies and approaches that can be adopted by individuals, businesses and schools. The Green Hub is currently awaiting a private sector partner to launch its services.

POLOKWANE

The Host City of Polokwane distributed a questionnaire to its tourism establishments that probed their involvement in greening approaches to get a handle on the level of sustainability awareness in the region and, in so doing, raise awareness of the concepts. The city also arranged for training of about 200 tourism guides in the five major European languages.

RUSTENBURG

Rustenburg worked to actively profile its ecological and cultural/heritage diversity. A Visitor Information Centre costing R7,5 million was built to promote the region's tourism products and attractions, with 'routes' linked to mining, eco-tourism and culture and heritage being developed. A particularly interesting aspect of their accommodation arrangements was the selection and profiling of 'homestays', and a budget allocation to support flea market-based small and medium sized enterprises (Rustenburg Host City, 2010) which would spread the economic benefits of the tournament to grassroots level.



WORLD CUP RESULTS IN RENEWED INVESTMENT

Perhaps a little football-fatigued, many tourists visiting South Africa were eager to explore other dimensions of the diverse natural and cultural heritage attractions beyond the event and outside of the Host Cities. The Kruger National Park enjoyed increased visitor numbers, partly due to its proximity to the Host City of Polokwane. The establishment of an Eco-Tourism Park at the Tshikuyu Village in Limpopo Province on the outskirts of the Kruger Park, which was completed in January 2010, represented just one example of a renewed vigour for investment in the South African tourism industry.

The R30 million project, which started in 2007, has played (and will continue to play) a vital role in providing accommodation to tourists visiting the Park during the 2010 FIFA World Cup™ and beyond. The project has already created 93 temporary jobs in construction and created a further 200 jobs in the fields of security, cleaning, game ranging, maintenance and other services.

The Park's visual menu includes a an array of wild herbivores such as kudu, impala and zebra. A cultural village has also been established where tourists can enjoy performances of different types of cultural dances and buy local crafts. (BuaNews, 2010)

The launch of the Green Passport campaign in June 2010. A key initiative in the "Reduce the Carbon Footprint of Major Sporting Events" project.

TOWARD A GREEN GROWTH PATH

Indalo Yethu is a legacy project of the World Summit on Sustainable Development. It is an agency of the Department of Environment Affairs. It manages the National Eco-endorsement System and implements programmes to create an eco-conscious society through awareness, income generation, and skills development in the green sector. (Source: indaloyethu.co.za)

GREEN PASSPORT

The Green Passport, developed by the DEA in partnership with UNEP and GEF, aimed to encourage visitors to make responsible travel choices while visiting South Africa for the 2010 FIFA Soccer World Cup™. The Green Passport included a 32 page booklet (translated into French and Spanish through a partnership with Indalo Yethu) packed with greening tips and information on responsible tourism within each Host City. The booklet encouraged tourism that respects the environment and positively affects the economic and social development of the local community, with the intention that travellers would also take this new awareness back to their home countries.

The 2010 Green Passport website (www.greenpassport.co.za) also provided travellers with important information including:

- Host City Green Goal plans and achievements
- Green accommodation, restaurants and activities
- Specific guidelines for sustainable tourism
- A carbon footprint calculator and tips on how to reduce one's personal footprint. Offset projects were attached to the carbon calculator, enabling travellers to calculate and offset their emissions against the project of their choice.

The DEA aimed at distributing the Green Passport to 100,000 spectators. However, the roll-out of the scheme was phased to allow for the most popular tourist destinations to receive the first copies of Green Passports. This resulted in locations like Cape Town receiving the Green Passports well ahead of other locations. Nevertheless, Green Passports were provided for distribution in all nine Host Cities, provincial coordinators, environmental volunteers and FIFA information kiosks. Distribution took place primarily in airports, shopping malls, tourist information centres and attraction sites with the assistance of environmental volunteers from all nine provinces.

NATIONAL DEPARTMENT OF TOURISM 'KNOW YOUR CITY, KNOW YOUR COUNTRY' PROGRAMME

A Tourism Ambassador has to know his or her city and know their country. This initiative, implemented by the National Department of Tourism in collaboration with the LOC, involved training up a pool of volunteers and equipping them with the necessary knowledge to become representatives of SA during the World Cup.The program followed from a similar smaller scale project run as part of the Confederations Cup in 2009. Each Host City ran the module, led by two facilitators per Host City, who conducted two-hour training sessions with volunteers. A total of 18,049 volunteers were trained during the course of the program (NDT, 2010)

A GREENER FUTURE FOR SA TOURISM

As important as it is to apply due consideration to sustainability issues, this is only truly useful if it translates into hands-on application and on-the-ground action. The DEA conducted three national training workshops with sector departments, provinces and Host Cities during March 2009 in partnership with the UK Department for Environmental, Food and Rural Affaris and the UK Travel Foundation on responsible tourism initiatives. The result of these workshops is a programme funded by the Travel Foundation which is now in place to work with at least 100 accommodation facilities across three locations in South Africa. The programme focuses on educating management and staff on the financial and environmental benefits of reducing their water and energy consumption. It also assists them in carrying out appropriate measures through workshops, audits and training, as well as the basics of waste minimisation.

The idea is to apply a robust evaluation of each facility, carried out through audit reports. These in turn will inform tailor-made recommendations for each facility. March 2011 is marked on the calendar as the time by which each of the hotels must have been trained up and have implemented the recommended changes. Successful implementation is expected to lead to savings in water and energy consumption of 10% in the first year. Ongoing monitoring (funded by the Travel Foundation) will inform a final report in October 2011 to demonstrate the actual level of savings achieved.

There are only winners in this scenario – the environment benefits from a reduction of the carbon footprint of tourism, and the establishments themselves will enjoy the monetary savings with an overall 10% reduction in consumption per guest-night.

9.3 Outcomes

ONE OF THE KEY LEGACY OPPORTUNITIES presented by the 2010 FIFA World Cup™ is the platform that the event provides to leverage international and local media attention on the issue of sustainable tourism. The ultimate aim of the projects highlighted in this section was to create a behavioural shift in favour of positive environmental attitudes. Although progress in this focus area was notable, it was unfortunate that FIFA and MATCH contracts with hotels and venues were drawn up before the greening programmes had consolidated their requirements, and therefore no sustainability-related commitments could be included in the terms for these establishments.

Although in many ways already a pioneer in this sphere, South Africa still has a long way to come with respect to building a fully-fledged sustainable, or eco-tourism industry. It is hoped that the World Cup provided a vital awakening to both the tourism professionals in South Africa and consumers alike. The work done by those attempting to disseminate the sustainable tourism grading systems has been most impressive. Notable achievements include the establishment of GreenStaySA , and the Travel Foundation's valuable engagement with training and accommodation facilities in South Africa.

ONE OF THE KEY LEGACY OPPORTUNITIES PRESENTED BY THE 2010 FIFA WORLD CUP™ IS THE PLATFORM THAT THE EVENT PROVIDES TO **LEVERAGE INTERNATIONAL AND LOCAL MEDIA ATTENTION ON THE ISSUE OF SUSTAINABLE TOURISM**

communications & awareness

The 2010 FIFA World Cup™ offered South Africa a unique opportunity to showcase how the country can respond to the environmental challenges facing our region and our planet, and what each of us can do to make a difference.

10.1 Introduction

Environmental awareness can, in part, be linked to an awareness and appreciation for one's own community in general. The South African "Fly the flag for football" campaign was launched in early April 2009 by a voluntary association of marketing and communications specialists from government and the private sector, and the 2010 National Communication Partnership in 2009. The message of the campaign was to encourage the public to fly the national flag as a symbol of South Africa's country's pride and unity. The statement, "The Champions are coming – Ke Nako – Celebrate Africa's Humanity", aimed to reveal the hospitable and friendly nature of South Africa, and the principles of "ubuntu" (i.e. treating other people with respect and dignity) as one of the key pillars of our nation and upon which our culture is built. The campaign was communicated through a series of road shows targeting communities and institutions of higher learning in the 2009 FIFA Confederations Cup Host Cities. The campaign called for a "can do" attitude, and a willingness to demonstrate our country's hospitality. Campaigns like "Fly the flag" helped to nurture a stronger unity amongst South Africans and a platform from which the numerous environmental initiatives could enjoy a greater success.

The 2010 FIFA World Cup™ offered South Africa a unique opportunity to showcase how the country can respond to the environmental challenges facing our region and our planet, and what each of us can do to make a difference. To this end, the National Greening programme objectives specifically included raising awareness about environmental best practice among the general public, including both locals and international tourists. The National Greening programme also aimed to enhance the nation's experience and understanding of the value of responsible environmental management.

A diverse cross section of people was recognised as key role players in the 2010 World Cup, from contractors to service providers, vendors, football fans, and the FIFA Family. These were all targeted as part of the national and local greening objectives. Systematic communication programmes worked to ensure that awareness campaigns reached residents and visitors beyond the matches, as well as at fan parks and events where traders and service providers were not bound by FIFA regulations. Host Cities committed to proactive planning and, along with other role players, made every effort to inform local residents about what they were aiming to achieve through their greening programmes and, where possible, to involve them. Local residents were frequently offered opportunities to participate in greening events while visitors attending events were alerted to the respective Host City's environmental management initiatives through creative media.

GETTING THE MESSAGE ACROSS

The City of Cape Town screened short awareness raising videos in the fan parks before games.

Social marketing techniques were used to communicate public interest messages, particularly where behaviour change was desired. An interactive media tool used by many Host Cities (and other organisations) prior to the event was the use of websites that allowed visitors and residents to learn more about the Host Cities for trip-planning details like transport and accommodation. The websites also served as online resources to persons wishing to learn more about the event's greening programmes in the various Host Cities.

10.2 Actions taken

10.2.1 South Africa's Volunteering Spirit

TEAM GREEN 2010

Volunteering programmes provided ordinary citizens with the opportunity to participate in the World Cup, as well as gain knowledge and experience about

THE ZAKUMI PHENOMENON

FIFA and South Africa's iconic mascot for the 2010 World Cup. "He wants to create a good mood for the fans and raise the excitement for the 2010 FIFA World Cup, the first on African soil. He is a proud South African and wants to ensure that the world will come together in South Africa," explained Lucas Radebe, former captain of South Africa's national team and close friend of Zakumi. (Source: southafrica.info/2010/ zakumi.htm)

Environmental volunteer training in Tshwane.

event greening. The training programme included clear regulations and guidelines for the volunteers.

The DEA trained 350 volunteers and an additional 100 were trained by Indalo Yethu to become "Team Green 2010", and were provided with distinctive branded clothing displaying the slogan 'Come play green with us''. Volunteers were placed in all nine provinces between 7th June and 16th July 2010 in areas outside the official FIFA venues, and in some cases within the official fan parks. Other areas for volunteer placement included tourism information centres, shopping centres, airports and public viewing areas. Students (youth) from within the environmental field of study were recruited from tertiary institutions around the country to support the environmental volunteer programme for a period of six weeks and a volunteer training manual was developed in partnership with DEFRA, UK. This training manual was used by all Host Cities and the LOC to instruct their environmental volunteers. In addition to advocating sustainable environmental management the volunteers were responsible for distributing green passports, pamphlets on the national greening programme, and conducting surveys.

The data gleaned from these DEA-commissioned surveys (15,066 surveys completed in total) informed a study carried out by the University of KwaZulu-Natal to assess the effectiveness of the communication and awareness initiatives undertaken in the nine host provinces (DEA, 2010c). The number of volunteers placed within each province was proportionate to the size and/or density of the various provinces. All environmental volunteers trained and placed through the DEA received a certificate of recognition for their participation during the hosting of the 2010 FIFA Soccer World Cup™.

10.2.2 Host Cities

In addition to being trained to support greening initiatives, volunteers provided general assistance during the tournament. A total of 67,999 people from 170 countries applied to volunteer for the World Cup nationally. The 2010 FIFA World Cup™ registered more volunteers than the 2006 FIFA World Cup™ (held in Germany), with the highest number of applicants received from (in descending order):

- Nigeria
- USA
- Brazil
- Zimbabwe
- Italy

The Mbombela Municipality recognised the importance of volunteering in the preparations for the tournament. They therefore placed an invitation on their website inviting all people with a volunteering spirit to apply. In Nelspruit alone, more than 5,000 volunteers were signed up to assist the with World Cup activities. In fact, Nelspruit registered the fifth largest number of volunteers, beating metropolitan cities like

67,999 PEOPLE FROM 170 COUNTRIES APPLIED TO VOLUNTEER FOR THE WORLD CUP. **THE 2010 FIFA WORLD CUP™ REGISTERED MORE VOLUNTEERS** THAN THE 2006 FIFA WORLD CUP™ IN GERMANY

FUNCTIONAL AREAS FOR VOLUNTEERS

Accreditation
Administration
Environmental Services
Information Services
Information Technology & Telecommunication
Language Support
Legal
Logistic Services
Marketing
Media
Protocol Services
Spectator Services
Ticketing
Transportation
Ushering Services
Volunteer Management

Durban. The screening of applicants and interviews were conducted from January 2010 and compulsory training started with the selected volunteers in March 2010. In addition a Volunteers Newsletter was published highlighting achievements during the event.

The eThekwini Municipality also advertised the volunteer programme on their official website. They appealed to city lovers to become ambassadors for Durban for assistance within sectors like transport, security, information and general logistics. Specialist volunteers were also targeted, including medical practitioners, translators, people from the legal fraternity, and information technology experts. Volunteers were required to have a good technical sporting knowledge, language and media skills. The eThekwini Municipality planned to train and deploy 900 volunteers selected from over 5,000 applicants. These volunteers manned the airport, "park and ride" areas, fan fests, fan parks, public viewing areas, the beach front, and Florida Road, among other areas in Durban. By mid-June 2010, the management team found itself responsible for the deployment, and co-ordination of 950 general volunteers, 50 child minders, 50 translators and 300 stadium volunteers (working in and around the Moses Mabhida Stadium) (Adendorff, 2010).

The LOC identified sixteen functional areas for volunteers. Among these were environmental services informing spectators of the environmental management initiatives in the stadium precinct and other areas. FIFA's 2010 team of 1,200 volunteers (throughout SA) assisted mainly at the stadiums, airports, and official hotels accommodating the FIFA officials and soccer teams.

The City of Cape Town's 2010 volunteers (600 in total), were selected from all corners of Cape Town to represent the full spectrum of our society and were clearly identifiable in their bright orange uniforms. This group of volunteers assisted at all areas managed by the City of Cape Town including: fan fest on the grand parade; the fan walk linking the CBD to the Cape Town Stadium; the four fan jols at Athlone, Bellville, Khayelitsha and Mitchell's Plain; the Fan Collection Areas at Thibault Square and Pier Place on the Foreshore; the "park and ride" facility at UCT; and Cape Town's entire CBD. Many of the volunteers also assisted the City's Sports & Recreation Department running holiday programmes for learners during the extended school holiday. Ranging from 18 to 75 years of age, the volunteers were provided with basic training in customer service, first-aid, security, tourism, social responsibility, transport and municipal procedures. All volunteers received training in environmental awareness, irrespective of their functional area and further training was provided for those assisting with recycling and waste management during the event.

A total of 535 volunteers in Johannesburg assisted various local government departments and created a reliable volunteer database and workforce for the city's future usage. This programme efficiently utilised the country's skilled workforce, especially within the entertainment industry, educational institutions, and business and public areas (e.g. hotels, malls, main routes etc.) and showcased the city in the best possible way. Volunteers benefited through these programmes through the development of lifetime skills and expertise provided through training (e.g. tourism, customer care, administration and logistics etc.).

Soccer City volunteers waiting for their round of duty.

JOBURG'S EXPERIENCE: LESSONS LEARNT

- Recruit smart, informed, hardworking, self- and results-driven people to work with you and for you
- Effective communication, interpersonal, and people management skills
- Consider demography during recruitment (e.g. women, men, youth, people with disability, race groups, retired, unemployed, employed, students etc.)
- Constructive, informed management and team leadership
- Be visionary and plan strategically
- Have an established work plan (e.g. put systems in place prior to attempting anything)

It is hoped that the experience and exposure accumulated by the volunteers during the World Cup will not only equip them with vital skills for future employment, but also result in the channelling of this knowledge and skills back into their respective

Durban's Green Goal message.

communities. Although some Host City volunteer programmes did not remunerate volunteers, the national programme resulted in temporary job creation for the unemployed and students who played a role in the "2010 Team Green" throughout South Africa.

10.2.3 Green Messaging in Print Media

CARTOON STRIPS

The DEA National Greening programme produced a series of six cartoon strips carrying environmental messages in Sotho, Zulu, English and Afrikaans. The cartoons were printed in national newspapers, and were also screened on the SABC, the national television broadcaster, during June and July. This communications campaign proved to be a success story in information-sharing with the public on Greening 2010 actions: what was being done and why; as well as a means to influencing the long-term environmental awareness of locals and visitors beyond matches, fan parks and other formal events. The use of cartoons made the information campaign more accessible to youngsters, ensuring a focus on educating the youth of the country on environmental issues.

"SOCCER AND THE ENVIRONMENT" FOR SCHOOLS

In keeping with the educational flavour of the communications and awareness campaign, the *Making Connections – Soccer and Environment* project was conceptualised by the team responsible for the Local Agenda 21 programme in partnership with a local NGO, Youth Unlimited. The initiative was supported by both the City of Cape Town as well as eThekwini Municipality. Together, the team worked to develop a poster and conceptualise the messages. The poster was successfully piloted as an environmental education tool at a Manenberg youth football tournament in 2006.

The World Cup created an opportunity to develop the poster into a resource which, together with an environmental education programme, aims to raise awareness

The Soccer and Environment handbook.

LOCAL AGENDA 21

Agenda 21 is a global action plan for socially, economically and environmentally sustainable development. It was adopted at the United Nations Conference on the Environment and Development held in Rio de Janeiro in June 1992 (Earth Summit).

Principles for Local Agenda 21 in South Africa:

- People-centred development
- Meeting basic needs
- Integrated planning and development (i.e. a move from a more sectoral approach)
- Sustainable development.

(Source: eThekwini Municipality website)

IN A BID TO RAISE ENVIRONMENTAL AWARENESS DURING THE WORLD CUP, THE CITY OF TSHWANE **DEVELOPED AND DISPLAYED 1,000 GREEN GOAL POSTERS**

and change behaviour among South Africa's youth. The 2010 Green Goal soccer and environment educational programme targeted school children in Grade 7 (age 13) with the updated and FIFA-approved posters. An educational programme, including an interactive theatre production, has been developed, using concepts from the poster and a booklet to support the message of environmental protection. This is supported by a teachers' guide containing suggestions on how to integrate the soccer and environment concepts within the Grade 7 curriculum.

Greening Durban 2010, in collaboration with Imagine Durban and the provincial Department of Agriculture and Environmental Affairs, distributed the posters and booklets. The goal is to promote the link between soccer and a healthy environment in all Grade 7's throughout the eThekwini Municipality and KwaZulu-Natal province.

ENVIRONMENTAL AWARENESS IN TSHWANE

In a bid to raise environmental awareness during the World Cup, the City Of Tshwane developed and displayed 1,000 Green Goal posters at the fan fest, public viewing areas, nature conservation sites, and areas where waste recycling was conducted. Four hundred green message posters were also developed and placed at different locations throughout the city. Other communications initiatives of the City of Tshwane focused on information leaflets to educate people, for example on use of appropriate bins to discard waste.

Volunteer training (left) and Tshwane's Bill Boards along major transport routes (right).

10.2.4 Guidelines

The Greening Durban 2010 programme, led by the eThekwini Municipality's Environmental Planning and Climate Protection Department (EPCPD), prepared a series of guidelines aimed at ensuring that the 2010 FIFA Soccer World Cup™ was hosted in an environmentally sustainable manner. In addition, the eThekwini Municipality produced a Guide to Durban's Nature Attractions and Outdoor Experiences. This guide encourages people to visit nature reserves and find ways to minimise their footprint on the natural environment in order to support the on-going protection of biodiversity. The guidelines can be downloaded off the eThekwini Municipality official website and are available for distribution to community and school groups.

THE ETHEKWINI GREEN GUIDELINE SERIES INCLUDE:

Energy Efficiency Guideline	The purpose of this guideline is to promote the design and construction of energy and resource efficient buildings within the eThekwini Municipality
Water Conservation Guideline	The purpose of this guideline is to provide information to consumers on how to save water by implementing a water use efficiency programme on residential, commercial and institutional properties
Waste Managment Guideline	The purpose of this guideline is to provide pointers on how to contribute to a more sustainable waste management future in Durban
Green Landscaping Guideline	The purpose of this guideline is to improve biodiversity and ecosystem functioning while creating landscapes that are useful to and benefit human beings in a range of ways.

10.2.5 Promotional and Educational initiatives

ECO HUBS

Host Cities Durban and Cape Town demonstrated their focus on raising awareness among the general public through the development of "green education centres", namely the uMgeni River Estuary Green Hub in Durban and the Eco Centre in Cape Town. Both these facilities have been envisaged as fulfilling a dual purpose: (i) promoting sustainable tourism and (ii) raising awareness and educating the public around environmental issues and "green living". Both are intended to showcase available green design and technologies, and to promote sustainable living practises and educating and inspiring people to change their behaviour and become more environmentally conscious in their daily lives. The Green Hub is currently awaiting a private sector partner to launch its services, while the Eco Centre is at an advanced feasibility stage.

MBOMBELA GREEN GOAL PROMOTIONAL MATERIAL

Mbombela undertook several communications and promotional initiatives around sustainability. These included the production of a green leaflet educating people on the sustainability projects initiated, the creation of a webpage aimed at raising awareness on the City's Green Goals, as well as the distribution of "everyday" goods such as car license stickers and car magnets bearing awareness messages.

ZIBI – CAPE TOWN'S WASTE CONSCIOUS OSTRICH

"Zibi", the popular rubbish eating ostrich (originally part of the Keep SA Beautiful campaign initiated three decades ago) was brought back into public awareness campaigns (though having enjoyed a make-over and sporting Bafana Bafana soccer colours) to promote good waste management i.e. anti-littering, waste reduction, promotion of split bin initiatives and other campaigns that the City is currently, and will in the future, be running.

10.3 Outcomes

The success of awareness initiatives (Table 22) as part of the environmental initiative at the 2010 FIFA World Cup™ can, and should, now be used to inform events in the future, and lessons learnt will be vital in terms of improving the success of similar initiatives in years to come. The surveys undertaken by the national volunteers provided some insight into the effectiveness of some of the communication campaigns initiated. According to the results of the survey a large proportion had not been aware of environmental initiatives linked to the World Cup (89.6%) other than the volunteer scheme itself. Respondents that had been cognisant of the issue cited the One Goal project, advertisements, environmental initiatives at fan parks, tree planting, city level greening programmes, conservation initiatives, FIFA Green Goal, Green Cartoons and waste separation, and water and energy conservation during the World Cup itself (DEA, 2010b). Actions around recycling and tree planting appeared to be the initiatives that generated the highest level of awareness.

TABLE 22. A SUMMARY OF COMMUNICATIONS AND AWARENESS INITIATIVES

National greening intentions for communications and awareness	Initiatives to meet intentions
Inclusive information sharing about what is being done through Greening 2010 and why it is being done	• Green Goal posters and billboards (e.g. Tshwane) • Information pamphlets (e.g. recycling of waste in Tshwane) • Host City official websites • Volunteer programme • Green Passport booklet and website
Outreach to residents and visitors beyond matches, fan parks and events	• General campaigns e.g. Fly the Flag for Football and the Diski Striker • Promotional "gifts" (e.g. car licence disk holders in Mbombela) • Branding of minibus taxis
Sensitisation of vendors and service providers to Greening 2010 objectives	• Accreditation
Involvement of schools and the youth	• eThekwini Green Guidelines • Soccer Series poster and booklet
Showcasing and explanation of water-wise technologies, energy-efficient appliances, and waste recycling initiatives	• Eco-centres • Cape Town Green Map

Of those respondents who were aware of environmental/greening projects, just over half (50.7%) indicated that they were informed of the green programmes/initiatives via the Green Volunteer programme. This was followed by information received via television (16.6%), newspapers (10.8%), the internet (6.9%) and radio (5.4%) (DEA, 2010c). A distinctly higher awareness is noticeable among residents of Host Cities that had stronger communications campaigns in place.

South Africa made a conscientious effort to realise the intentions set out by the National Greening objectives and, through the use of various communication strategies and different communications media, to raise awareness and to promote the principles of sustainable development to the South African people and World Cup visitors alike.

OTHER INTERESTING SURVEY FINDINGS:

- More than 50% of the respondents indicated that environmental best practices were used in the accommodation facility for conserving water and conserving electricity
- The main modes of transport used by the respondents to travel from their place of accommodation or residence to World Cup venues/activities were private vehicles, mini bus taxis, and car rentals
- The majority of respondents planned to visit conservation areas in South Africa which indicates a high interest in the country's natural assets
- The majority of respondents indicated that they would visit South Africa again and recommend it as a tourist destination.

(Source: DEA, 2010)

A passionate South African fan prepares for the game ahead.

JEREMY JOWELL

conclusion

For South Africans, the moment Sepp Blatter announced the winners of the bid for the 2010 FIFA World Cup™ marked the start of a common journey towards the greatest show the country has ever put on.

'THE CHALLENGE OF THE EVENT WAS CLEAR.... **TO HARNESS THE ENERGY, MOMENTUM AND HIGH SPIRITS** IN SUCH A WAY AS TO MAXIMISE THE LONG TERM BENEFIT TO THE COUNTRY AND ITS PEOPLE

Certain events have the power to touch millions in an instant, and these universal common references are capable of uniting people across the globe. Many of us will have been asked where we were when the Berlin Wall fell. Most could tell you on what type of television set they watched Nelson Mandela take his first steps as a free man. Some could share how they learned of the ANC's banning, or where they were when humans landed on the moon.

For South Africans, the moment Sepp Blatter announced the bid winners of the 2010 FIFA World Cup™ marked the start of a common journey towards the greatest show the country has ever put on. The 11th of June 2010 marked a turning point in the rich and varied history of South Africa. The challenge of the event was clear: Firstly, to confound the critics and demonstrate that Africa was ready to host the world's most cherished sporting event; and secondly, to harness the energy, momentum and high spirits in such a way as to maximise the long term benefit to the country and to people.

Those individuals within each Host City, tasked with incorporating greening initiatives into host city planning during the extensive preparations, in many ways went above and beyond in efforts to incorporate policy which aimed to create a truly sustainable event. The projects outlined in the preceding chapters have illustrated just how ambitious and comprehensive some of these plans have been. Against some considerable odds – from logistical headaches, to financial setbacks – the municipalities pulled off a great success story. The 2010 FIFA World Cup™ is a study in South Africa's trademark talent for overcoming obstacles, finding ways around problems, and the can-do attitude for which it is famous.

Hopefully this report has gone some way to showing those that experienced the World Cup just how much more went into it than what was visible from ground-level. Beyond the soccer, beyond FIFA, and beyond 2010, these projects are about a better future for South Africa, and what it means to create a sustainable legacy.

The objectives in review

MAINTAINING MOMENTUM FOR THE PROMOTION OF SUSTAINABILITY BEYOND 2010: The DEA's National Greening programme served as an overarching guideline in support of the Host Cities in their quest for sustainability. For reasons outlined earlier, setting quantitative targets would have been unrealistic and counter-productive. However, the efforts of each city in the journey towards sustrainability are certainly worth highlighting.

No wasted opportunity

The National Greening Objectives for waste:

- Minimise waste generation
- Maximise waste sorting, re-use and recycling.

Never before has the South African public been so conscious of sustainable waste management. Visible and easy-to-use waste management systems meant that people understood, on a practical level, the simple things that can be done to make a big difference.

Clean-up campaigns, two-bin systems, the use of recyclable materials – and the various other initiatives – had the dual advantage of substantially reducing the event's carbon footprint while at the same time pushing the country towards a culture of waste minimisation.

Lighting the path towards an energy-efficient future and alternative-source power

National Greening Objectives for energy:

- Minimise consumption of energy
- Maximise use of renewable energy.

Any event of this scale is going to be incredibly energy intensive, and any host country has to go to some lengths to ensure that, in accordance with FIFA directives, there are

no disastrous power outages or shortfalls. For South Africa this was an area already fraught with the pressures of over-extension of the electricity grid and power generation infrastructure. It was unquestionable that, wherever possible, steps needed to be taken to change the way South Africans consumed energy – by changing the dominant paradigm of high energy consumption.

In some ways, South Africa's response was somewhat mixed, with some stadiums adopting sophisticated and revolutionary energy-efficient designs and others representing missed opportunities. Initiatives like the Coega Windfarm in Nelson Mandela Bay, the nationwide GEF-funded solar power street greening programme and the Mbombela solar initiative represent modest, but extremely important strides towards the goal of sustainable energy generation, and the start of the move away from coal-powered electricity. While South Africa still has a long way to go before it joins the ranks of some nations in terms of renewable energy, these developments are most encouraging. Moreover, the energy efficiency techniques employed at some stadiums will inform standards for future building construction.

Making inroads into green mobility

National Greening Objectives for transport:

- Minimise use of private vehicles to access 2010 events and games
- Maximise availability, accessibility and efficiency of public transport systems
- Reduce carbon emissions from public transport systems
- Maximise access for pedestrians and cyclists, and provide appropriate surfacing and lighting.

There can be no question that the people of South Africa embraced every new transportation provision on offer. From shuttle services to "park and ride" and park and walk" facilities, to pedestrianised walkways and bicycle-friendly routes, people responded with enormous enthusiasm, flocking in their droves to take advantage of the various new and slick operations. Many people took the trains for the first time in years, while municipalities invested substantial amounts of money in new public transport schemes.

The need for a functional and accessible public transport system has been mounting in urgency for years, and represents a concern both social and environmental. Calculations made before the World Cup took place foretold some alarming levels of carbon impact associated with travel to the event. This was a forgone conclusion and simply a matter of geography, with South Africa being about as far away from other football-loving nations as could be.

That was an unavoidable reality, but one that was given due attention and addressed in the form of investigating numerous offset programmes. Difficulties regarding funding have limited the impact in this area, however long term reduction in carbon intensity of the South African transport system has been improved through various transport initiatives, many of which were accelerated in anticipation of the World Cup. The Rea Vaya BRT system, the Gautrain and infrastructural upgrades such as high occupancy vehicle lanes are all significant changes that have implications for improved quality of life for generations to come. In reality, the 2010 FIFA World Cup™ provided the momentum to take public transport developments out of the conceptual stages and make them a reality.

Safeguarding the source of life

National Greening Objectives for water:

- Minimise consumption of water (improve conservation of water)
- Maximise rainwater capture and grey-water recycling
- Protect wetlands
- Minimise pollution of water resources.

Stadium design once again took the lead in this area. These colossal structures and their surrounds would require huge volumes of water, both for the building stages and their functioning during and after the World Cup. The key was to move away from a grossly wasteful use of potable (drinking quality) water for functions where non-potable water (whether stormwater, recycled "greywater", or groundwater) would do. It was here that some of the finest examples of sustainable water systems can be seen, with the design of new stadiums or retrofitting of existing ones to maximise water efficiency. The kind of comprehensive consideration applied to water efficiency solutions,

Pedestrianisation of the Moses Mabhida Stadium.

which saw ecological sanitation systems in the form of reedbed filtration of stormwater, large-scale recycling of irrigation water, rainwater capture, engineering projects to make use of unutilised lake and spring water, and the selection of indigenous drought tolerant plants for landscaping, is the kind of big-picture approach that is required for truly sustainable development. Smart and timely interventions saw that 80% of the water used at the pitch at Soccer City is recycled, 30% of the concrete mix used for the Peter Mokaba Stadium was recycled, and an intelligent pitch irrigation system at the Princess Magogo Stadium that allows for the reclamation and reuse of 50-60% of the water used.

While these developments are indeed encouraging and worthy of commendation, the country still faces some deeply distressing prospects regarding water availability in the near future, and the unfortunate truth is that, as is so often the case, a number of schemes were unable to reach fruition due to a lack of funding. However, where there was national or donor funding, Host Cities took action on some innovative and promising projects – the resurrection of the Oranjezicht Springs in Cape Town and greater attention being paid to wetland rehabilitation. With some luck, the halted projects, such as the augmentation of the North End Lake in Nelson Mandela Bay, will soon secure the funding they need to reach fruition.

WHEN IT COMES TO THE QUESTION OF 'LEGACY', **ALTERING THE WAY IN WHICH PEOPLE PERCEIVE, THINK AND BEHAVE** IS THE ONE ACHIEVEMENT THAT EXCEEDS ALL OTHERS

Turning over a new leaf

National Greening Objectives for biodiversity and the urban environment:

- Maximise protection and enhancement of biodiversity and ecological systems
- Maximise recreation and tourism experiences associated with biodiversity.

The beauty of urban greening initiatives is that, like developments in the transport sector, they are plainly visible to the public and are accessible to all. Promoting a culture of environmental awareness involves encouraging individuals to enjoy what nature has to offer. Tourists travel from all over the world to experience the exquisite natural gifts of the country, but many residents of this majestic country seldom have the opportunity to take advantage of those same joys.

While biodiversity took a back seat to more urgent issues like waste management and water efficiency, the area was given attention in the form of a number of ambitious initiatives. Host Cities focused on urban landscaping and the creation of public parks and encouraging activity in these spaces. In the creation of connections between recreational pursuits and green spaces, we see moves towards long-term, integrated sustainability. Other projects achieved notable clean-ups of riverine habitats and restoration of wetlands, which are so critical to the world's biodiversity.

As with a number of the sectors covered in this report, the promotion of biodiversity, and the projects that have been rolled out for its nurturing, have immediate benefits socially and long-term benefits such as carbon reduction, flood mitigation and water resource protection, not to mention the benefits for animals whose habitats have been disrupted being given the chance to flourish in restored forests and wetlands.

If you build it, they will come

National Greening Objectives for sustainable tourism:

- Maximise energy and water use efficiency in all hotels, guest houses and B&Bs
- Minimise waste generation in hotels, guest houses and B&Bs, and maximise waste sorting, re-use and recycling
- Establish an environmental rating system based on clear criteria and standards
- Maximise opportunities to sensitize visitors to the need to conserve water and energy.

The tourism industry in South Africa is showing no signs of slowing down, but getting the ball rolling on sustainable policy in the sector is taking a little longer to catch up. There is, however, a growing population of informed travellers who are aware of initiatives like GreenStaySA and other sustainable tourism accreditation schemes. Possibly the most laudable accolade for the country is the certification programme Fairtrade Tourism South Africa, the first organisation of its kind worldwide. While these initiatives reflect a relatively small proportion of the industry in total, their resourcefulness and sheer innovation are a reflection of true visionary spirit.

With increased awareness, the future of sustainable tourism promises job creation, poverty alleviation, BEE stimulation and SMME development.

Changing the things we can & offsetting those we can't

National Greening Objectives for carbon emissions

- Minimise carbon emissions; and
- Where carbon emissions cannot be eliminated, maximise benefits to South Africa by setting up carbon-offset programmes within South Africa or in African countries.

The carbon footprint the 2010 FIFA World Cup™, taking into account energy, waste, transport, biodiversity and tourism, is massive. It was predicted long before the advent of the 2010 FIFA World Cup™ that it would have the highest ever release of carbon emissions of any World Cup. The numerous projects highlighted in the chapters that preceded this were all, to some degree, motivated by a desire to mitigate these emissions. South Africa is a developing country and so is beleaguered by numerous concerns calling for attention, and carbon offsetting does not always enjoy priority status ahead of others like improving employment and basic housing conditions. South Africa has not, as yet, been required to commit to binding carbon reduction targets under UNFCC Kyoto Protocol. Despite this, and the absence of direct formal carbon-offsetting policies from FIFA, the country rose to the occasion in demonstrating its ability, and sense of responsibility, to attempt to reduce the carbon intensity of the event as far as practically possible.

For these reasons, the efforts of Host Cities to mitigate emissions are all the more praiseworthy. The Host City of Durban was outstanding in its pursuit of a carbon neutral event, and it has been truly exceptional in its efforts to offset the emissions resulting from the 2010 World Cup. This status – as South Africa's only carbon neutral host city – is yet to come to fruition as the identified carbon offset projects go through final approval. However the commitment demonstrated by eThekwini Municipality is likely to see carbon neutrality become a reality in about three years.

The inalienable fact, however, is that many opportunities to offset the World Cup carbon emissions were lost due to a lack of funding. The country has learned that financial support needs to be secured upfront if these projects are to be successful.

When knowledge is power

National Greening Objectives for communications and awareness:

- Inclusive information sharing about what is being done through Greening 2010 and why it is done
- Outreach to residents and visitors beyond matches, fan parks and events
- Sensitisation of vendors and service providers to Greening 2010 objectives
- Involvement of schools and the youth
- Showcasing and explanation of water-wise technologies, energy-efficient appliances, and waste-recycling initiatives
- Communicating to the FIFA Family and others, including sponsors.

The focus areas listed above were addressed with great care, effort and attention, and each initiative was in itself of enormous value to the development of South Africa and the environment. When it comes to the question of a 'legacy', altering the way in which people perceive, think and behave, is the one achievement that exceeds all others. The varied communications and awareness campaigns, targeting both schools and adults alike, ensured that many South Africans were made aware of environmental and sustainability issues around them, often for the very first time.

The 2010 FIFA World Cup™ was the country's chance to shine, and shine it did, for the world audience, but more lastingly so, for the South Africans who lived it. From volunteer ambassadors who held forth on the many splendours of their country, to the catchphrase "Ke Nako" (meaning 'we can'), South Africans came together to show the world, and themselves, what this country is capable of, and what it can become. The country took centre stage and demonstrated its ability to host a spectacular event. The world watched intently for one month, but it was the attention of the people who live in South Africa that truly experienced the uniqueness of the World Cup, from the moment it was announced and into the future. The vision of those who worked tirelessly to realise the successes of the World Cup has meant that not only will 2010 live on as a happy memory of a joyous occasion, but that the people of South Africa now live in a country slightly different than it was before, and one is which is more aware and committed to a path of sustainable development than ever before.

Coca-Cola™ provided 10 Host City stadiums with collection bins and plastic polyethylene terephthalate (PET) bottles and also sponsored a number of projects in the run up to the 2010 FIFA World Cup™ as part of the Coca-Cola™ National Schools Recycling Programme.

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