2010 FIFA WORLD CUP™

HOST CITY **CAPE TOWN**

GREEN GOAL LEGACY REPORT

GREENGOAL OFFICIAL INITIATIVE

SOUTH AFRICA 2010 FIFA WORLD CUP

CAPE TOWN HOST CITY

SOUTH AFRICA 2010 FIFA WORLD CUP

Cover Photo: A view of action showing Table Mountain at sunset during the 2010 FIFA World Cup™ Quarterfinal match between Argentina and Germany at Cape Town Stadium on 3 July 2010.
Photo: Clive Rose, Getty Images

The 2010 FIFA World Cup™ Host City Cape Town Green Goal programme is proud to have been awarded the International Olympic Committee (IOC) Sport and Environment Award.

Nominated by FIFA, the award recognises the efforts of the Host City to mitigate negative environmental impacts of the World Cup and to maximise the positive environmental and social legacy.

The award was presented at the IOC 9th World Conference on Sport and Environment held from 30 April – 1 May 2011 in Doha, Qatar.

It took the effort of a committed team to realise the environmental and development objectives of the Host City Cape Town Green Goal 2010 projects. Host City Cape Town Green Goal 2010 Co-ordinator, Lorraine Gerrans, holding the IOC trophy.

The Host City Cape Town Green Goal Legacy Report is printed on Sappi Triple Green paper, an environmentally friendly paper stock made from chlorine-free sugar cane fibre and fibres sourced from sustainable afforestation in South Africa.


2010
FIFA WORLD CUP
SOUTH
AFRICA™
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2010 FIFA World Cup™ mascot Zakumi ™ arrives at the match between Uruguay and France at Cape Town Stadium on 11 June 2010.
Photo: Bruce Sutherland, City of Cape Town

A SOCIALLY AND ENVIRONMENTALLY
RESPONSIBLE 2010 FIFA WORLD CUP™

In hosting the 2010 FIFA World Cup™, South Africa faced the dual challenge of managing the major investment and infrastructure development necessary for the event to be a success, while making sure that this was undertaken in a sustainable manner.

The country recognised that an event cannot be called world-class unless it is hosted in a socially and environmentally responsible manner. This presented unique planning opportunities and challenges for Host City Cape Town, which was transformed by the preparations for 2010. One of the key challenges was to ensure that the event left a positive legacy, contributing to the developmental objectives of the city and region, including those of poverty alleviation, skills development, economic growth and environmental sustainability.

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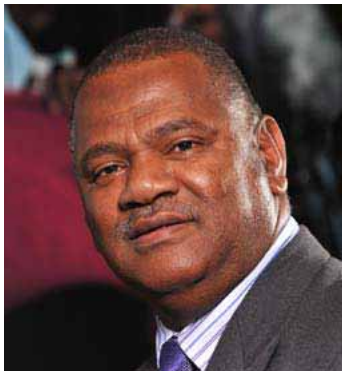
The spectacular setting of Cape Town Stadium and Green Point Park against the backdrop of Table Mountain. Photo: Bruce Sutherland, City of Cape Town



MESSAGE FROM THE EXECUTIVE MAYOR OF CAPE TOWN, ALDERMAN DAN PLATO

The 2010 FIFA World Cup™ has come and gone. For the first time, the world's largest sporting mega-event was hosted in Africa, and has been widely hailed as a major success. The thrill of having some of the world's most famous sporting celebrities and leading soccer teams in Cape Town, and of being the focus of global attention for a month, was indeed worth all the hard work during the six years of preparation.

The 2010 FIFA World Cup™ was a catalyst for major redevelopment in Cape Town. The city has been transformed. New roads were built, investments were made in public transport infrastructure as well as a new bus rapid transport system. Pedestrian bridges were constructed to make pedestrian routes safer and more attractive for workers, visitors and tourists. Trees and fynbos were planted in an effort to green and shade the city.

Through the implementation of the Green Goal programme, the adverse environmental effects that are inevitably associated with organising an event of the scale of the World Cup were kept to a minimum. Significant water and energy savings were achieved, and the waste-recycling target was exceeded at Cape Town Stadium and other event venues.

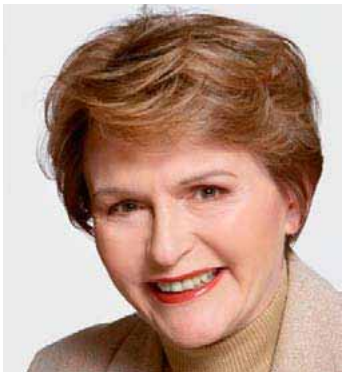
Cape Town is now recognised as a top world destination for hosting major events, and, undoubtedly, considerable socio-economic advantages accrue to the city as a result. However, let us not forget that our natural beauty and significant natural resources represent our most important economic asset. It is critical that we ensure that major events are organised in a manner that enhances, rather than jeopardises, this asset. We must look after our region's limited resources, limit our carbon footprint, and avoid expedient decisions that may have harmful long-term effects.

The promise of a 'legacy' was also a significant factor in South Africa's bidding for and hosting the 2010 FIFA World Cup™. Building unity and pride among South Africans, celebrating Africa's humanity, and ensuring urban and environmental upgrades were mooted to be this event's hallmarks.

A large amount of public money was spent on the World Cup, and we need to ensure that Cape Town is left with a legacy that enhances the city's globally recognised path to sustainability. Now is a good time to examine whether Host City Cape Town has lived up to its promise. This Host City Cape Town 2010 FIFA World Cup™ Green Goal Legacy Report reviews the environmental measures instituted by Host City Cape Town; it assesses their effectiveness and emphasises the lessons learnt, all of which will be useful for those planning future events in Cape Town as well as for the organisers of future World Cup and other major sporting events.

Finally, I would like to pay tribute to the Konrad-Adenauer-Stiftung, whose proactive involvement as both a funder and a partner in our greening programme was a major contributing factor to the programme's successes.

ALDERMAN DAN PLATO
MAYOR OF CAPE TOWN



MESSAGE FROM THE PREMIER OF THE WESTERN CAPE, HELEN ZILLE

We are now proud to present the results achieved by Green Goal 2010. Whereas Germany focused on four main Green Goal projects in 2006, we managed to pick up that baton and expand the programme for the 2010 FIFA World Cup™. Our challenge now lies in expanding the raised awareness into concrete action across the Western Cape, as well as sharing our lessons with Brazil for the 2014 FIFA World Cup™.

The World Cup catalysed investment to improve key infrastructure, and provided an opportunity to position the city and region as responsible hosts of major events. Apart from the physical legacy that the event has left behind, we are pleased that the World Cup also offered organisers the opportunity to educate and inspire local and international fans about the importance of sustainability.

However, there are two areas where we would like to see improvements when hosting future events. Carbon emissions of major events remain one of the biggest environmental challenges. Sporting federations should partner with host nations and cities to reduce the high emissions resulting from the event. Together, we can achieve more.

The other key challenge we face in relation to the greening of major events in future is to broaden the buy-in of all stakeholders. The tourism and hospitality sectors have embraced the principles of environmental sustainability to some degree. However, implementation is not yet meeting the required levels, especially with regard to water use, energy consumption and waste generation. The Provincial Government, together with partner organisations Sustainable Energy Africa, the British High Commission and its agencies, has introduced a green certification system to create incentives for more positive action.

The results and lessons set out in this Host City Cape Town 2010 FIFA World Cup™ Green Goal Legacy Report required the commitment of many stakeholders – from international governments to sponsors, non-governmental organisations, schools, business, sports clubs and society at large. We are grateful to the Konrad-Adenauer-Stiftung for the support provided to the Green Goal 2010 programme.

The 2010 FIFA World Cup™ has been widely praised for confounding the sceptics, and proving that South Africa has the capacity to host world-class events that showcase the best of African hospitality, natural beauty and modern infrastructure. We can now also claim that our collective efforts have contributed to a positive and lasting environmental legacy.

I trust that the organisers of large sporting events in the future will further optimise the achievements and lessons of Green Goal 2010, and that environmental sustainability will be a firmly established, integral part of the FIFA World Cup™ in Brazil in 2014, and thereafter.

HELEN ZILLE
PREMIER OF THE WESTERN CAPE

MESSAGE FROM
HEAD OF THE KONRAD-ADENAUER-STIFTUNG,
SOUTH AFRICA

DR WERNER BÖHLER

In June and July 2010, the world experienced an awe-inspiring football festival, hosted for the first time on the African continent. Also, it was only the second time in the history of the FIFA World Cup™ that the environment was on the agenda.

As a German political foundation, the Konrad-Adenauer-Stiftung (KAS) has fostered and supported the process of democratic transition and consolidation in South Africa for more than 25 years. KAS activities aim to provide platforms for the dissemination of research results and expertise as well as for informed discussions among various target groups.

The Foundation's involvement with the 2010 FIFA World Cup™ started almost four years ago, and was based on the positive experience in Germany with the Green Goal environmental programme when hosting the FIFA World Cup™ in 2006. The Green Goal programme, developed by the German Öko-Institut and supported by the German government, for the first time introduced measurable targets regarding transport and mobility, energy, water, waste and other critical areas.

In 2007, KAS, in partnership with the non-governmental organisation Sustainable Energy Africa (SEA), funded a series of workshops for the City of Cape Town and the Western Cape Provincial Government. The objective was to develop the Green Goal programme further and adapt it to the South African context. In 2008, the Host City Cape Town 2010 FIFA World Cup™ Green Goal Action Plan was launched. A second round of KAS workshops focused on the implementation and monitoring of the 42 Green Goal projects. This led to the production of the Host City Cape Town 2010 FIFA World Cup™ Green Goal Progress Report, which was launched in late 2009.

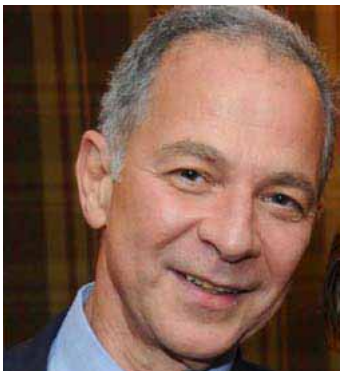
Now, in mid 2011, we celebrate the publication of the Host City Cape Town 2010 FIFA World Cup™ Green Goal Legacy Report. One of the lessons learnt from hosting the FIFA World Cup™ in Germany and South Africa that I would like to highlight is that political will and buy-in are fundamental requirements for hosting an environmentally friendly event.

I feel it is time to make the Green Goal programme an integral part of the contractual agreements between sporting federations and host cities. To consider the environmental impact of an event is no longer a luxury but a necessity.

I would therefore like to urge FIFA to develop binding environmental guidelines for future application in the FIFA World Cup™. The experience with Green Goal 2010 in South Africa has shown that much more would have been achieved by all the host cities had this been the case.

I sincerely hope that this report will assist host cities of future FIFA World Cup™ events to tap into the vast pool of event-greening experience, expertise and networks that has been generated in Host City Cape Town over the past years.

DR WERNER BÖHLER
KONRAD-ADENAUER-STIFTUNG



MESSAGE FROM THE BRAZILIAN AMBASSADOR, JOSÉ VICENTE DE SÁ PIMENTEL

The publication of the 2010 FIFA World Cup™ Host City Cape Town Green Goal Legacy Report is testimony to the fact that the environmental baton has now been handed over from South Africa 2010 to Brazil 2014.

Brazil has a population of some 200 million, compared to South Africa's 49 million. There are large distances to travel between most of the largest cities in Brazil (up to 8 hour flights between the northernmost and southernmost 2014 Host Cities). There will be 12 Host Cities for the 2014 FIFA World Cup™, including the well know cities of São Paulo, that may host the opening match, and Rio de Janeiro, that will be hosting the Final.

Other than that, the two countries share a number of similarities:

- There is a similar system of government to South Africa with Federal (National), State (Provincial) and Municipal (Local) Systems of Government.
- The Brazilian Football Association (CBF) is the Local Organising Committee (LOC) for the Brazilian event and there is already a strong relationship between FIFA, the CBF and the Brazilian government.
- The current stadia require upgrades. New models of financial sustainability are being explored. South African expertise would come in handy.
- Just as in South Africa, legacy of infrastructure, services and facilities are a focus.
- The event legacy is a concern in Brazil and the pressures to host the 2016 Olympic Games suggest lessons from Green Goal can change the way that things are done (behaviour change).

There are already a number of formal links between Cape Town and Brazil. The Provincial Government of the Western Cape has established ties with different spheres of Brazilian government, including the Federal Government and the States of Rio de Janeiro and São Paulo, for example; the Western Cape Provincial Government and São Paulo State are both members of the Regional Government Network. And more recently, South Africa has received a formal invitation to join the Brazil, Russia, India and China (BRIC) group of large emerging economies.

Brazil is eager to learn from South Africa's fabulous success as hosts of the 2010 FIFA World Cup™. All South African host cities and provincial governments have a great deal to teach us. Cape Town and the Western Cape have already practically demonstrated their willingness to share 2010 World Cup greening experiences with Brazil. A workshop entitled, "Sharing Insights on Greening the FIFA World Cup™ with Brazil" was convened in February 2010 and steps identified to further this cooperation have been taken.

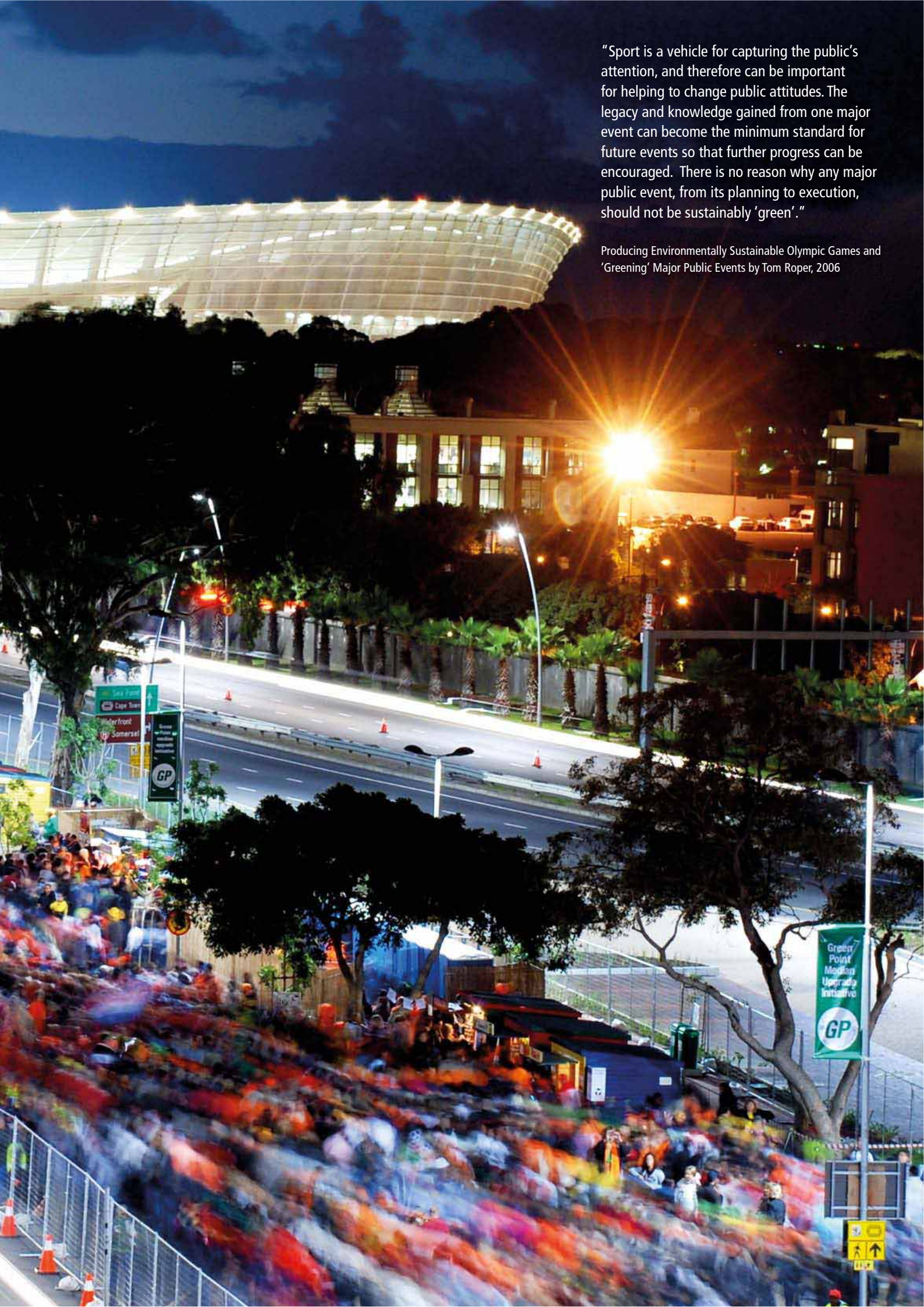
Brazil is extremely fortunate to benefit from the event greening experience and these networks. I am sure that the Green Goal insights will be beneficial during both the 2014 FIFA World Cup™ and the Olympic Games in 2016.

JOSÉ VICENTE DE SÁ PIMENTEL
BRAZILIAN AMBASSADOR

GLOSSARY

ACSA	Airports Company South Africa
BMS	building management system
CBD	central business district
CEMP	construction environmental management plan
CDM	Carbon Demand Management
CFL	compact fluorescent lamp
CO^2	carbon dioxide
CO^2e	carbon dioxide equivalent
CPUT	Cape Peninsula University of Technology
CSIR	Council for Scientific and Industrial Research
CTICC	Cape Town International Convention Centre
CTT	Cape Town Tourism
DANIDA	Danish International Development Agency
dB	Decibel
DEA	Department of Environmental Affairs (formerly Department of Environmental Affairs and Tourism/DEAT)
DEA&DP	Western Cape Department of Environmental Affairs and Development Planning
DOT	Department of Transport
DWA	Department of Water Affairs (formerly Department of Water Affairs and Forestry/DWAF)
ECO	environmental control officer
EIA	environmental impact assessment
EIR	environmental impact report
EMP	environmental management plan
EMS	environmental management system
FCC	FIFA Confederations Cup
FIFA	Fédération Internationale de Football Association
GEF	Global Environment Facility
G-ForSE	Global Forum for Sports and Environment
GHG	greenhouse gas
HCA	host city agreement
HCTOP	Host City Transport Operations Plan
HDI	historically disadvantaged individual
I&AP	interested and affected party
ICLEI	Local Governments for Sustainability
IOC	International Olympic Committee
IRT	integrated rapid transit
IUCN	International Union for Conservation of Nature
IWMP	Integrated Waste Management Plan
JOC	Joint Operations Centre
KAS	Konrad-Adenauer-Stiftung
kW	Kilowatt
kWh	Kilowatt-hour
LED	light-emitting diode
LOC	FIFA World Cup™ Local Organising Committee
MVA	million Volt-Amperes
NDoT	National Department of Transport
NGO	non-governmental organisation
NMT	non-motorised transport
Norad	Norwegian Agency for Development Cooperation
NQF	National Qualifications Framework
PETCO	PET Plastic Recycling Company
PRASA	Passenger Rail Agency of South Africa
PTFE	polytetrafluoroethylene (also known by the DuPoint brand name as Teflon®)
PV	photovoltaic
PVA	public viewing area
PVC	polyvinyl chloride
ROD	Record of Decision
rPET	Recycled Polyethylene Terephthalate
SAFA	South African Football Association
SAPIA	South African Petroleum Industry Association
SAPP	South African Power Pool
SAPS	South African Police Services
SEA	Sustainable Energy Africa
SMME	small, medium and micro-sized enterprise
TET	Tourism Education Trust
tCO^2e	tonnes of carbon-dioxide equivalent
TGCSA	Tourism Grading Council of South Africa
TIC	Traffic Information Centre
TM	Trademark
TMC	Traffic Management Centre
UCT	University of Cape Town
UEMP	Urban Environmental Management Plan
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UPS	uninterrupted power supply
URV	unit reference value
VOC	Venue Operations Centre
VTOP	Venue transport operational plan
VSTS	venue-specific training sites
WSSD	World Summit on Sustainable Development
W	Watt
WWF	Worldwide Fund for Nature

The fan walk was one of the most important legacies of the World Cup, not only achieving local participation for 581 913 ticket and non-ticket holders, but also contributing to the Green Goal target of 50% of fans accessing the stadium by public transport or on foot. Photo: Jeff Ayliffe



"Sport is a vehicle for capturing the public's attention, and therefore can be important for helping to change public attitudes. The legacy and knowledge gained from one major event can become the minimum standard for future events so that further progress can be encouraged. There is no reason why any major public event, from its planning to execution, should not be sustainably 'green'."

Producing Environmentally Sustainable Olympic Games and 'Greening' Major Public Events by Tom Roper, 2006


ASK ME ABOUT GREEN GOAL

HOST CITY CAPE TOWN

SUCCEEDED TO REDUCE THE ENVIRONMENTAL IMPACT OF THE 2010 FIFA WORLD CUP™ THROUGH THE IMPLEMENTATION OF THE GREEN GOAL PROGRAMME.

This report documents the process through which the programme was developed and implemented.

42 projects covering energy-efficiency, carbon mitigation, water conservation, waste management, transport, landscaping and biodiversity, green building, responsible tourism and communication and awareness were actioned over a period of four years.

THE REPORT ALSO PROVIDES RECOMMENDATIONS, WHICH THE AUTHORS HOPE WILL SERVE AS

ENCOURAGEMENT

to the greening efforts of those planning future FIFA World Cup™ tournaments and other mega-events.

EXECUTIVE SUMMARY

From 11 June to 11 July 2010, South Africa made history as the first African country to host one of the world's greatest sporting events – the 2010 FIFA World Cup™. Thirty-two countries had qualified for the tournament, which was held across nine host cities. Ten stadia accommodated the matches, five of which had been newly constructed and the other five upgraded for the event. A total of 309 554 foreign tourists arrived in South Africa for the primary purpose of attending the tournament.

Cape Town hosted eight games, including a quarterfinal and semifinal match, with an average attendance of 63 000 fans at each game. Preparations and infrastructural development associated with the event included the construction of a new 68 000-seater stadium, public transport and electricity infrastructure upgrades, and city beautification. Green Point Common and precinct, adjacent to the new stadium, were also upgraded. Sports complexes in Athlone and Philippi were renovated as part of the legacy to provide better-quality facilities to the people of Cape Town. The total expenditure on infrastructural developments was over R12 billion.

The hosting of mega-events, such as the 2010 FIFA World Cup™, has a tremendous impact on cities. These impacts could be positive, i.e. economic investment for improved infrastructure, facilities and technologies so as to meet the requirements of these events, but could clearly also be negative, i.e. an increase in carbon and other environmental footprints. For developing countries such as South Africa, it is not only about hosting successful mega-events, but also about promoting social, economic and environmental sustainability through these events, especially in cities.

As an official initiative of the 2010 FIFA World Cup™, the Green Goal programme focused on incorporating socially and environmentally responsible decision making into the planning, organisation and implementation of the World Cup in order to leave a positive environmental legacy.

Host City Cape Town committed over R10 million in direct funding to implement the Green Goal Action Plan.

This funding leveraged an additional R8 million in grant funding for the greening of the 2010 FIFA World Cup™ in Cape Town and the Western Cape. Indirect funding from the City of Cape Town, the Provincial Government of the Western Cape and the Department of Transport for major infrastructure projects in support of the Green Goal objectives amounted to approximately R1,9 billion.

Host City Cape Town implemented the Green Goal programme through 42* projects across the following nine environmental target areas:

1. Energy efficiency and climate change
2. Water conservation
3. Integrated waste management
4. Transport, mobility and access
5. Landscaping and biodiversity
6. Green building and sustainable lifestyles
7. Responsible tourism
8. Green Goal communications
9. Monitoring, measuring and reporting

This report presents the findings of the Host City Cape Town 2010 FIFA World Cup™ Green Goal programme. It documents the actual impact of the Green Goal 2010 projects and interventions against predefined targets and objectives, highlighting lessons learnt in the process. The report also documents the four-year process through which the Host City Cape Town Green Goal programme was developed and implemented, including the Green Goal 2010 workshop series and the local and national institutional framework. Finally, the report provides recommendations, which the authors hope will serve as encouragement to the greening efforts of those planning future FIFA World Cup™ and other mega-events in Cape Town, South Africa and the rest of the world.

The Green Goal programme achieved many noteworthy successes. Host City Cape Town exceeded the national targets for waste-to-landfill reduction and the use of public and non-motorised transport by a large margin, thereby significantly reducing the environmental impact of the event. Throughout the World Cup one of the key success factors was the manner in which good waste management added to the general tourist appeal and fan experience.

Of the 42 Green Goal 2010 projects implemented in Host City Cape Town, 17 are legacy projects, meaning that they will be contributing to the well-being of residents long after the 2010 FIFA World Cup™.

The quantifiable impact of the Green Goal 2010 programme can be summarised as follows:

Energy:	Cape Town Stadium achieved an estimated 15% saving in electricity use.
Water:	Cape Town Stadium is estimated to have achieved a 27% reduction in water use.
Waste:	Waste reduction measures were implemented, and 58% of waste generated was diverted away from landfill to recycling. The City therefore well exceeded National Government's waste-to landfill reduction target of 20%.
Transport:	The main mode of transport used to travel to matches was public transport for 40% of fans, with 13% walking. This exceeded the national target of 50% for the use of public and non-motorised transport to the stadium.
Carbon:	Carbon mitigation projects compensated for the events carbon footprint.

Eskom donated renewable energy for Cape Town Stadium, while green energy for the FIFA Fan Fest™ was purchased from the Darling Wind Farm. In one or two areas, more could have been achieved: The greening efforts in the hospitality industry were disappointing, and financial and other constraints hampered the large-scale implementation of carbon mitigation projects. On the other hand, the large proportion of recyclable waste generated at all the venues, and the use of public and non-motorised transport, are glowing success stories.

The 2010 FIFA World Cup™ provided an extraordinary opportunity for the visibility, branding and communication potential of the event to be mobilised for greater environmental and sustainability awareness. The Green Goal programme therefore used the platform afforded by the World Cup to communicate, promote and mainstream sustainability among the broader population, to inspire

behavioural change, and to catalyse a societal shift towards more sustainable lifestyles. The 2010 National Environmental Questionnaire Survey, commissioned by the Department of Environmental Affairs, showed that 35% of respondents in Host City Cape Town were aware of the Green Goal programme or other environmental projects linked to the World Cup. This may not have been the majority of respondents, but it is relatively high, considering that the national Green Goal programme and official mark (logo) were launched only six months prior to the start of the tournament.

Clearly, many aspects of the World Cup were of great benefit to South Africa. The investments in public transport are one of the most significant. The report offers some considerations on how developing countries may host future major events in a manner that best supports their developmental agendas.

Given the environmental imperatives facing the world and the huge impact of mega-events, it is important that the Green Goal concept be further strengthened and developed with each World Cup. The report thus identifies the many lessons that were learnt and documents the positive legacy that can result if greening is fully incorporated into the event planning process from the start. It is hoped that the success of the Host City Cape Town Green Goal programme will serve as encouragement to the greening efforts of those planning future FIFA World Cup™ events, such as Brazil in 2014, Russia in 2018 and Qatar in 2022.

*The original 2010 FIFA World Cup™ Host City Cape Town Green Goal Action Plan identified 41 projects. An additional project was added after the Action Plan was published making the total 42.

INTRODUCTION
AND OVERVIEW

Scoring Green Goals: The international trend towards hosting environmentally responsible events were central motivators for the Host City Cape Town Green Goal 2010 programme. In South Africa, promoting social and economic sustainability, through the event, was also critical.

Siyabonga Mbaleki of Khayelitsha inspires children to realise their potential by being part of a soccer team that he coaches voluntarily.

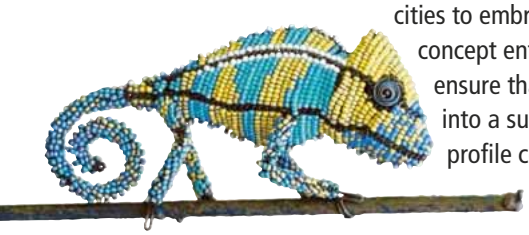
Photo: Nikki Rixon

1 INTRODUCTION
AND OVERVIEW

For the month from 11 June to 11 July 2010, the world's attention was on South Africa, as the first African host country of the world's greatest sporting event – the 2010 FIFA World Cup™. For South Africa, the challenge was not only to host the event successfully from a logistical and operational perspective, but also to ensure that the country's developmental needs were addressed. These concerns and the international trend towards hosting environmentally responsible events were central motivators for the Green Goal 2010 programme in Host City Cape Town, the City of Cape Town, the Western Cape province, and indeed for South Africa as a whole.

Mega-events such as the 2010 FIFA World Cup™ invariably involve huge infrastructure development projects and directing a significant amount of resources to the hosting of the event. This inevitably has a considerable impact on the environmental and social spheres of the host nation, which is an important reason for the establishment of a programme that considers the environmental, economic and social consequences of the choices made in hosting the event.

The Green Goal programme, first implemented during the 2006 FIFA World Cup™ in Germany, had been initiated to reduce the environmental impact of FIFA World Cup™ tournaments, and to support the establishment of a sustainable legacy. The programme was again implemented at national, provincial and host city level for the 2010 FIFA World Cup™. Cape Town was among the South African host cities to embrace the Green Goal concept enthusiastically and to ensure that it was developed into a substantial and high-profile component of hosting the event.



1.1 PURPOSE OF THIS REPORT

This document reports on the results of the Host City Cape Town 2010 FIFA World Cup™ Green Goal 2010 programme. It documents the actual impact of the Green Goal 2010 projects and interventions against predefined targets, objectives and milestones, highlighting lessons learnt in the process.

The report also documents the process through which the Host City Cape Town Green Goal programme was developed and implemented, including the Green Goal 2010 workshop series and the local and national institutional framework.

Finally, the report provides recommendations, which the authors hope will serve as encouragement to the greening efforts of those planning future FIFA World Cup™ tournaments and other mega-events in Cape Town, South Africa and the rest of the world.

This Host City Cape Town 2010 FIFA World Cup™ Green Goal Legacy Report is the third in a series of Host City Cape Town Green Goal reports, the other two being:

- the Host City Cape Town 2010 FIFA World Cup™ Green Goal Action Plan published in October 2008; and
- the Host City Cape Town 2010 FIFA World Cup™ Green Goal Progress Report published in September 2009.

1.2 A BRIEF HISTORY OF THE GREENING OF MEGA-SPORTING EVENTS

The Olympic Games Organising Committee first included environmental protection as one of the requirements for a successful bid to host the Games. In particular, the Summer Olympic Games in Sydney (2000) and Beijing (2008) respectively, the preparations for the London 2012 Games, and the Winter Olympics in Lillehammer (1994), Turin (2006) and Vancouver (2010) all included substantial greening programmes. Each of these further developed areas of best practice, and confronted the challenges of implementing integrated environmental protection programmes for mega-events. The World Summit on Sustainable Development (WSSD) held in Johannesburg in 2002 was one of the first large-scale events in South Africa to undertake a greening component, and was used as a case study in the development of the Green Goal programme for the 2010 FIFA World Cup™. The ICLEI (Local Governments for Sustainability) World Congress hosted in Cape Town in 2006 raised the event greening bar to new levels, and set a standard for other events to emulate.

The Green Goal programme in Germany 2006 was the first greening programme for a football competition. The vision for the German Green Goal programme was simple yet ambitious. It aimed to reduce as far as possible the adverse effects on the environment that would be associated with the hosting of the event. The environmental programme offered the hosts the opportunity to sensitise broad sections of the public on environmental management. The German Green Goal programme focused on four key areas, namely energy, water, waste and sustainable transport. An overall target was to reduce the greenhouse gas (GHG) emissions associated with the event, and offset those that could not be avoided by appropriate offset programmes – thereby effectively hosting a 'carbon-neutral' event. A comparison of the German Green Goal 2006 programme and the Host City Cape Town Green Goal 2010 programme can be found in section 7 of this report.

GREENING the WSSD

WHAT IS EVENT-GREENING?

Event-greening is the process of incorporating socially and environmentally responsible decision-making into the planning, organisation and implementation of, and participation in, an event. It involves including sustainable development principles and practices in all levels of event organisation, and aims to ensure that an event is hosted responsibly. It represents the total package of interventions at an event, and needs to be done in an integrated manner. Event-greening should start at the inception of the project, and should involve all the key role players, such as clients, organisers, venues, subcontractors and suppliers. It aims to achieve the following:

- To improve the resource efficiency of the entire event and supply chain management
- To reduce negative environmental impacts, such as carbon emissions, waste ending up on landfill sites, and the effect on biodiversity
- To increase economic, social and environmental benefits (triple-bottom line)
- To enhance the economic impact, such as local investment and long-term viability
- To strengthen the social impact, such as community involvement and fair employment
- To improve sustainable performance within an available budget
- To present opportunities for more efficient planning and use of equipment and infrastructure
- To reduce the negative impact on local inhabitants
- To protect the local biodiversity, water and soil resources
- To apply the principles of eco-procurement of goods and services
- To raise awareness of sustainability issues among all role players
- To ensure that the aims and objectives are clearly defined and measured

Smart Events Handbook, City of Cape Town

EVENT-GREENING HAS TWO KEY DIMENSIONS:

1. The mitigation of the direct environmental impact, or 'footprint', of the event (including the carbon dioxide emissions, as well as waste created, water and energy used, biodiversity threatened, etc.)
2. The potential of the event to catalyse a broader societal and political shift towards more sustainable lifestyles, and to leave a positive legacy

In terms of the former, the literature is dominated by technical and scientific attempts to calculate baseline emissions and event footprint emissions, or input-output modelling of events. In terms of the latter, Arthur Mol's recent description of the Beijing Olympics as a "sustainability attractor" argued that mega-events can work to inspire, facilitate and focus a wide range of environmental initiatives. Thus, as James Mitchell puts it, greening programmes are far more than publicity stunts or once-off initiatives. Rather, they can instil "a sense of environmental consciousness and global camaraderie connecting all fans and athletes, thus serving as a catalyst for future multilateral efforts to improve our environment".

Sources:
Sustainability as a global attractor: The Greening of the 2008 Beijing Olympics by A.P.J. Mol, 2010
Sustainable Soccer: How green projects at international sporting events benefit the fans, the global climate and local populations by J. Mitchell, 2007

Cape Town Stadium under construction in 2009. Photo: Bruce Sutherland, City of Cape Town

1.3 A COMPELLING CASE FOR A SUSTAINABLE EVENT

The hosting of large events, such as the Olympic Games and the FIFA World Cup™, has a significant impact on the resources of the host nation. Major events could affect the environment through damage to natural spaces and biodiversity, consumption of non-renewable resources such as energy and water, emissions into the atmosphere, and the generation of large amounts of waste. However, major events also present an opportunity to introduce green technologies, raise awareness of key environmental issues, and promote sustainable lifestyles.

There currently is an international move towards hosting major events in a more responsible way. The concept of event-greening is becoming more established, with many sporting federations now focusing on environmental and social programmes when organising events.

The International Olympic Committee (IOC) adopted clear principles and guidelines to this end in 1994, when environmental protection was incorporated into the Olympic Charter and environmental protection became the third pillar of the Olympic Movement, alongside sports and culture. Event-greening initiatives were included in the past two FIFA World Cup™ tournaments (2006 and 2010), with Brazil, the next hosts in 2014, already working on their event-greening programme.

In the South African case, the host city agreement (HCA) signed by FIFA, the Local Organising Committee (LOC) and Host City Cape Town in March 2006 included the following clause on environmental protection:

> "The host city undertakes to carry out its obligations and activities under this Agreement in a manner which embraces the concept of sustainable development that complies with applicable environmental legislation and serves to promote the protection of the environment. In particular, the concept of sustainable development shall include concerns for post-competition use of the stadia and other facilities and infrastructure."

Although this clause did not define precisely what was meant by "the protection of the environment", it did point to the need to include sustainable development principles in some of the key areas of organising the event.

Building on the German experience in 2006, Host City Cape Town embraced the opportunity to make the 2010 World Cup as 'green' as possible. The Green Goal programme was contextualised within the overall strategy for sustainability in the city and province, thereby effectively integrating it with the longer-term objectives of the region, and deploying resources in the long-term pursuit of sustainable development.

The Green Goal programme in Germany 2006 was the first such programme for a football competition and featured a striking visual identity.

2006 FIFA WORLD CUP™ GREEN GOAL PROGRAMME IN GERMANY

Shortly after being announced the hosts of the 2006 FIFA World Cup™, the German LOC commissioned a comprehensive environmental concept for the upcoming tournament. A team of researchers from the Öko-Institut and WWF (Worldwide Fund for Nature) in Germany drew up comprehensive guidelines and environmental objectives. The Federal Environment Ministry supported the work right from the start, and the Deutsche Bundesstiftung Umwelt (DBU) (the German Federal Environment Foundation) provided financial support for the preparation and realisation of the concept. By the spring of 2003, the researchers had developed ambitious, measurable environmental objectives for waste, energy, transport and water, and, with regard to global climate protection, organising the 2006 FIFA World Cup™ was to have a neutral effect on the climate as far as emissions within Germany were concerned.

In March 2003, the implementation of Green Goal began. During the ensuing months, the LOC and the independent German research consultancy Öko-Institut worked together with host cities and stadium operators to implement environmental measures in the stadia.

In September 2005, Green Goal received prominent support: The LOC and the United Nations Environment Programme (UNEP) signed a memorandum of understanding, in which they agreed to work together to realise and communicate Green Goal. The then Executive Director of UNEP – and former German Federal Environment Minister – Professor Klaus Töpfer became a Green Goal ambassador. From the end of 2005, FIFA and its official partners (Coca-Cola and Deutsche Telekom) as well as national suppliers (Deutsche Bahn, EnBW) and other business concerns (PlasticsEurope and TOTAL) joined the Green Goal team. They actively supported Green Goal objectives with their own activities, and participated financially in climate protection projects.

Source:
2006 FIFA World Cup™ Green Goal Legacy Report

HOST CITY CAPE TOWN

SETTING THE SCENE

The World Cup was a catalyst for major redevelopment in Cape Town. The City was transformed. New roads, public transport systems, pedestrian bridges, a 65 000-seater stadium and a new park were constructed.

The spectacular setting of Cape Town Stadium and the adjacent Green Point Park, bounded by the Atlantic Ocean and Table Mountain and Signal Hill.

Photo: Bruce Sutherland, City of Cape Town

2 HOST CITY CAPE TOWN
SETTING THE SCENE

2.1 WHERE THE WORLD CUP JOURNEY STARTED

On 15 May 2004, FIFA appointed South Africa as the host of the 2010 FIFA World Cup™. As one of the nine host cities in South Africa, Cape Town was selected to host eight World Cup matches during the month-long event, including a quarterfinal and a semifinal match. The parties' contractual obligations with regard to hosting the event in Cape Town were set out in the HCA with the LOC and FIFA, which was signed on 15 March 2006.

The City of Cape Town (hereinafter 'the City') and the Western Cape Provincial Government (hereinafter 'the Province') developed a joint business plan in 2006, setting out the vision, objectives, infrastructure, operational plans and legacy model for hosting the event. The business plan was based on the following three strategic pillars:

- Compliance with FIFA requirements
- Optimising the developmental impacts, and leaving a legacy
- Maximising the promotional and positioning opportunities

FIFA required a 65 000-seater stadium to host the semifinal of the 2010 FIFA World Cup™ in Cape Town. The existing stadia in Cape Town were not suitable, and it was decided to construct a new stadium in Green Point, near the Cape Town central business district (CBD). The construction of the stadium was subject to an environmental impact assessment (EIA) in terms of South African legislation, and a rezoning process in terms of the local town planning ordinance. The EIA Record of Decision (ROC), which authorised the construction of the stadium, was issued on 1 May 2007.

Uruguayan fans at the match between Uruguay and France, Cape Town Stadium, 11 June 2010. Photo: Bruce Sutherland, City of Cape Town

The City concluded the Terms of Cooperation, an HCA addendum setting out the arrangements for hosting a FIFA Fan Fest™, on 19 March 2008. On 4 December 2009, Cape Town successfully hosted the Final Draw of the 2010 FIFA World Cup™ at the Cape Town International Convention Centre (CTICC). The event was televised live to 55 000 fans at the Long Street festival in Cape Town, and to an estimated 200 million other national and international viewers. Cape Town Stadium was officially handed over to the City on 14 December 2009.

2.2 HOST CITY CAPE TOWN EVENT FOOTPRINT

Cape Town Stadium was the primary venue for the 2010 FIFA World Cup™ in Cape Town. The stadium hosted eight matches during the event, including a quarterfinal and semifinal match, with an average attendance of 63 000 people per match. (See Table 1)

The FIFA Fan Fest™ on the Grand Parade formed part of the key entertainment activities associated with the event in Cape Town, particularly for those without match tickets. The Grand Parade is where former President Nelson Mandela first addressed the nation after his release from prison in 1990. The City of Cape Town invested R16,9 million to upgrade the Grand Parade to be used for the FIFA Fan Fest™ and, in future, as a major assembly point for the people of Cape Town.

The FIFA Fan Fest™ operated for the entire tournament from 11:00 to 23:00, except on non-match days. The venue, which could accommodate up to 25 000 people, offered live broadcasts of all matches taking place in the country on a

TABLE 1: Total attendance at Cape Town Stadium for the duration of the 2010 FIFA World Cup™

Date	Team	Time	Stadium attendance
11 June 2010	Uruguay vs France	20:30	64 100
14 June 2010	Italy vs Paraguay	20:30	62 869
18 June 2010	England vs Algeria	20:30	64 100
21 June 2010	Portugal vs People's Republic of Korea	13:30	63 636
24 June 2010	Cameroon vs the Netherlands	20:30	63 093
29 June 2010	Spain vs Portugal (Round of 16)	20:30	62 855
3 July 2010	Argentina vs Germany (quarterfinal)	16:00	64 100
6 July 2010	Uruguay vs the Netherlands (semifinal)	20:30	62 479

70 m² screen. The Host City Cape Town FIFA Fan Fest™ was the most visited Fan Fest in the country after the Host City Durban Fan Fest™ situated on the Durban beachfront. The FIFA Fan Fest™ attracted more than 550 000 people in total during the tournament.

Entrance to the FIFA Fan Fest™ was free, and live performances by local artists on a huge stage entertained fans between matches. Other attractions included food and drink, five-a-side soccer pitches, and interactive activity zones, including a Green Goal expo. Official 2010 FIFA World Cup™ merchandise and local arts and crafts were offered for sale to fans and tourists.

The fan walk is a 2,6 km pedestrianised walkway between Cape Town Station in the CBD and Cape Town Stadium. Waterkant Street in the CBD was permanently closed and reserved for non-motorised traffic. A new pedestrian bridge was constructed over Buitengragt, and the sidewalk of Somerset Road was widened to increase the footway and include a cycle lane. Somerset Road is flanked by numerous restaurants, pubs, clubs and other entertainment venues, which contributed to the festive atmosphere along the fan walk. On Cape Town match days, the fan walk portion of Somerset Road was a pedestrian-only area, with entertainment and refreshments along the way.

In addition to the official FIFA Fan Fest™, four fan jols elsewhere in Cape Town served as public viewing areas (PVAs), where spectators could watch matches on big screens. These were at the Oliver Tambo Sports Centre in Khayelitsha, the Swartklip Sports Hall in Mitchells Plain, the Bellville Velodrome, and Vygieskraal Stadium in Athlone. These fan jols were open between 11:00 and 23:00 on Cape Town match days, for all Bafana Bafana matches, for the quarterfinal and semifinal matches, and for the final game and the closing ceremony. Five additional fan jols in other parts of the Western Cape (i.e. in each of the five district municipalities) provided an opportunity for rural communities to participate in the 2010 festivities.

The total attendance at all the different venues in Cape Town for the duration of the event is shown in Table 2.

TABLE 2: Total attendance at all venues in Cape Town for the duration of the 2010 FIFA World Cup™

FIFA World Cup™ venues in Cape Town	Total attendance
Cape Town Stadium	507 332
Fan walk	581 913
FIFA Fan Fest™, Grand Parade	558 159
Oliver Tambo fan jol	28 971
Swartklip fan jol	56 118
Bellville fan jol	68 953
Vygieskraal fan jol	21 427
Total	**1 822 873**

FIFA required each host city to make available two venue-specific training sites (VSTSs) for the 2010 FIFA World Cup™. Athlone Stadium and Philippi Stadium, both located in previously disadvantaged areas of the city, were upgraded for this purpose. Athlone Stadium was upgraded to a 30 000-seater stadium through the addition of two new stands. At a cost of R408 million, the stadium received a number of other improvements, including the size and quality of the pitch, security fencing and controlled access, floodlights and other lighting, media facilities and change rooms. The Province, owner of Philippi Stadium, invested R54 million to upgrade that stadium's stands, floodlighting, media facilities and pitch. These investments were part of the 2010 legacy to create world-class facilities in historically disadvantaged areas.

2.3 EVENT OPERATIONS

A dedicated 2010 office was established in the City of Cape Town, working closely with the 2010 unit in the Department of the Premier of the Western Cape. The directors and staff regularly met with the LOC and FIFA, and facilitated a number of inspections by FIFA, its technical advisors and the media prior to the event.

Host City Cape Town created 18 multidisciplinary work streams to deliver the event. The work streams were tasked to develop action plans and oversee the implementation of these plans within the set budget and timeframes.

The City hosted a number of events in the run-up to the 2010 FIFA World Cup™, including the Final Draw. These events were used to assess Cape Town's readiness to host the tournament. Three test events in Cape Town Stadium provided an opportunity to refine event operational plans, both inside and outside the stadium.

The Host City Cape Town Green Goal team participated in a programme to observe and share lessons from the FIFA Confederations Cup™ (FCC), which had been held in South Africa one year before the World Cup, and gained valuable insight that particularly influenced the waste management and volunteer programmes in Cape Town during the 2010 FIFA World Cup™.

Host City Cape Town appointed 504 volunteers (421 public volunteers and 83 City of Cape Town staff supervisors) to assist with the logistical operations of the 2010 FIFA World Cup™. The volunteers assisted at the FIFA Fan Fest™, fan walk, fan jols, main transport hubs and traffic warning zones, media centres and volunteer centre.

During the event, venue operations centres (VOCs) were set up at each of the 2010 FIFA World Cup™ venues, staffed by members of the South African Police Service, disaster and emergency services, utility services, and other line functions. The VOCs reported to a joint operations centre (JOC), which, in turn, reported to a national operations centre. Matters that could not be dealt with at the VOCs were escalated to the JOC. Debriefing meetings were held after each event in Cape Town Stadium to inform the city manager and his executive management team on the match-day operations and any potential changes to the plans.

Shuttle buses transported fans to and from Cape Town Stadium. Photo: Bruce Sutherland, City of Cape Town

2.4 TRANSPORT OPERATIONS

The Host City Transport Operations Plan (HCTOP) was developed over a period of three years. Key stakeholders were engaged in the planning process including the National Department of Transport (NDoT), PGWC, FIFA, LOC, the South African Police Services (SAPS), Airports Company South Africa (ACSA), Metrorail and PRASA and the taxi associations.

In the six months before the World Cup, the focus turned to the implementation of transport related items in six key areas:

- The venue transport operational plan (VTOP) in the Green Point precinct including Cape Town Stadium, the V&A Waterfront and surrounding residential and business areas.
- The venue transport operational plan (VTOP) for the Cape Town CBD and fan walk.
- VTOPs for the four fan jols of Swartklip, Vygieskraal, Bellville Velodrome and OR Tambo.
- Event related transport services which included top up of existing public transport services, implementation of new services, negotiations with service providers and the use of non-motorised transport (NMT).
- The resources required to implement the plan.
- The communication of information relating to the transport services that would be provided and to ensure appropriate implementation, the related impacts on the citizens and businesses of Cape Town.

An extensive range of transport related infrastructure projects, costing an estimated R6,8 billion were completed in time for the World Cup. In conjunction with the delivery of the Transport Operational Plan (costing less than the budgeted R80 m), these not only successfully met World Cup requirements, but also delivered a number of transport legacy aspects.

The commuter rail system formed the backbone of the public transport service. This was enhanced by a park-and-rail strategy incorporating 25 key stations on the network which acted as the official entry points onto the system. In combination with the three road-based park-and-ride venues, public transport became a major mover of people during the event and thus limited the concentration of traffic outside the VTOP focal points. This successfully prevented any congestion.

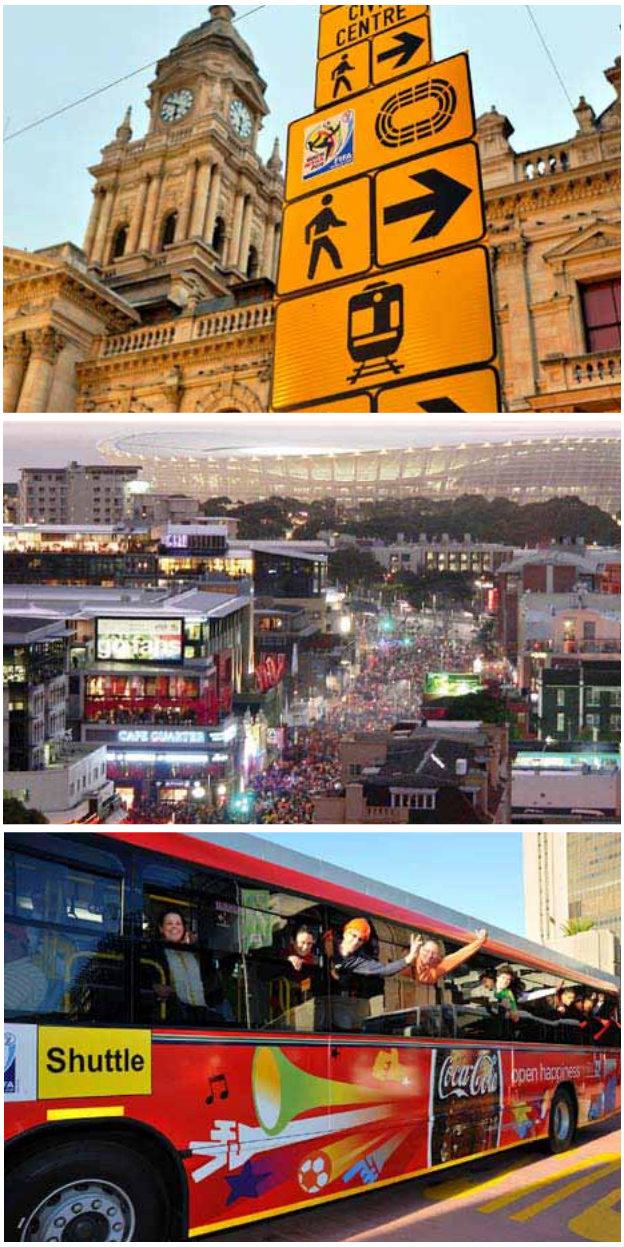
Road-based public transport systems were also established to complement the rail system. These included a new temporary service provider (a consortium between the existing public transport bus service provider and mini-bus taxi operators) for operating the IRT buses (used on the stadium shuttle route, airport and inner city loop services) and providing the shuttle services for the road based park-and-ride, as well as concluding an agreement with the mini-bus taxi industry to provide feeder services for the public transport system and spectators.

Numerous back office support systems were established to ensure and support the implementation and functional operation of the transport operations on the ground. The newly built Traffic Management Centre (TMC) formed a focal point for these systems as it housed key mechanisms for identifying and responding to incidents and with the Transport Information Centre (TIC) communicating on both public and private modes of transport.

The successes of the transport system were evident by the increased number of people who used the services during the event period. An estimated 1 070 000 event related passenger journeys were made to and from the CBD on the rail network. The number of people parking remotely and using public transport or dedicated shuttles through the park-and-rail and park-and-ride operation increased from an estimated 10 000 to 30 000 people per match day (3 500 to 10 000 cars) at the selected entry points. The plan of using the "Spoke and Hub" strategy proved its worth in easily allowing these large amounts of people to move to the Stadium, the V&A Waterfront, or the FIFA Fan Fest™.

An estimated 235 000 people were transported via the stadium shuttle over the eight match days, with the fan walk becoming an attraction in its own right. An estimated 581 913 ticket and non-ticket holders used the fan walk to be part of the World Cup vibe. Their combined use contributed to the success of getting people to and from the stadium so efficiently.

A total of 137 management staff and 406 support staff formed the transport related human resource team needed to manage and monitor the implementation of the plan.



Successful transport measures played a large role in the movement of fans to and from Cape Town Stadium. Photo: Bruce Sutherland, City of Cape Town

Without the combined dedication of these people along with the crucial relationships that they had created during the planning phases of the project with other disciplines such as Traffic, SAPS, Metrorail, TransPeninsula and the mini-bus taxi industry, the successful management of the transport system during the 2010 FIFA World Cup™ would not have been possible.

A very important aspect of implementing the transport plan was communicating it through various mediums to defined stakeholders and the general public. Reiterative media inserts, presentations and meetings with the key stakeholders before the World Cup kept them fully informed on items such as road closures and transport options. Real-time transport management occurred through the Traffic Information Centre (TIC) (with five foreign languages) acting as the public call centre (taking 210 000 calls during the event) and the Traffic Management Centre (TMC) which enabled the management of on-the-ground incidents.

It was evident that demand management played a role in reducing background traffic. With the closures of schools, universities and the buy-in from business to adjust their working hours, peak hour demand on the roads was noticeably reduced. This significantly helped with the management of commuters.

An aerial view of the thousands of fans who walked to Cape Town Stadium along the fan walk. Photo: Bruce Sutherland, City of Cape Town

2.5 BUDGET

The budget for hosting the 2010 FIFA World Cup™ came from various sources, and comprised a capital budget and an operating budget. The budget requirements were set out in a joint business plan by the City and the Province, which was submitted to National Government in 2006. Various national government departments provided funding in line with the national government guarantees contained in the bid documentation and host nation agreement signed with the South African Football Association (SAFA) and FIFA. To illustrate the vast budget requirements for hosting such a mega-event, Table 3 outlines the expenditure in Host City Cape Town on infrastructural developments only.

The operating cost of hosting the 2010 FIFA World Cup™ was incurred over a period of four years leading up to the event. A grant from National Government covered approximately 23,4% of the total operating cost of R368,1 million. The Green Goal programme was partly funded from this grant.

The City of Cape Town was subject to a number of audits on administrative and financial aspects by National Government, all of which reported satisfactory results.

TABLE 3: Expenditure on infrastructural developments in Cape Town

Host City Cape Town infrastructure expenditure	Expenditure
Cape Town Stadium	R4,4 billion
Access to stadium in CBD proximity	R298 million
Green Point Common and precinct	R576 million
Inner-city transport system	R42 million
CBD infrastructure and upgrades	R590 million
Local roads and sports facilities	R513 million
Major access roads to the CBD	R1,8 billion
Public transport	R4,2 billion
Total	**R12,4 billion**

2.6 LEGACY

The legacy of the World Cup is found in both its infrastructure and socio-economic impact (Figure 1). Cape Town now has a new world-class, multipurpose 55 000-seater stadium in arguably the most beautiful setting in the world. Since the tournament, this facility has already hosted an international soccer match and some of the biggest names in the music industry, including U2 and Neil Diamond. Also, the substantial investment in upgrading Athlone and Philippi stadia has provided world-class facilities in previously disadvantaged areas of the city.

In addition the following are legacies of the World Cup:

- The upgraded Green Point Common and the creation of the new, already well-utilised Green Point Park and sports clubs have added substantial value to this previously neglected green space in the city.
- The Grand Parade is now established as Cape Town's premier assembly area, and will serve this purpose for many years to come.
- Residents and visitors will benefit from the upgraded airport and rail stations as well as the new integrated rapid transit (IRT) bus system.
- New road infrastructure will ease congestion on some of the city's main access routes, saving time and money and benefiting the environment, as less idling on congested roads results in reduced carbon emissions.
- Cape Town International Airport was upgraded at a cost of R1,2 billion to cater for the 2010 FIFA World Cup™ traffic as well as projected demand up to 2015.
- The 2010 FIFA World Cup™ has seen a total of R14 billion in public sector investments in the city. The private sector's confidence in Cape Town as a destination is reflected in the nine new hotels that were built in the city before the event. The World Cup provided a unique global marketing opportunity. It is estimated that a cumulative viewership of more than eight billion television viewers watched the matches with the World Cup final between Spain and the Netherlands attracting more than 700 million viewers. If only a tiny percentage of those people decide to come to South Africa on holiday in the next two or three years, that will more than pay for the total World Cup bill.
- Professional workers, service providers and volunteers working before and during the event (including 2 600 workers on the stadium site at the height of construction and 2 000 volunteers working during the event) gained valuable skills and expertise.
- The Green Goal legacy opportunity was two-fold, namely investment in the environment, and increased environmental awareness that would promote a change in behaviour towards the environment.
- The first FIFA Football for Hope Centre in Africa was constructed in Khayelitsha, Cape Town, including a playing field, community centre and a life skills and HIV/Aids awareness programme.
- The City applied preferential procurement to ensure that historically disadvantaged individuals (HDIs) and businesses as well as small, medium and micro-sized enterprises (SMMEs) benefited from the World Cup spend.

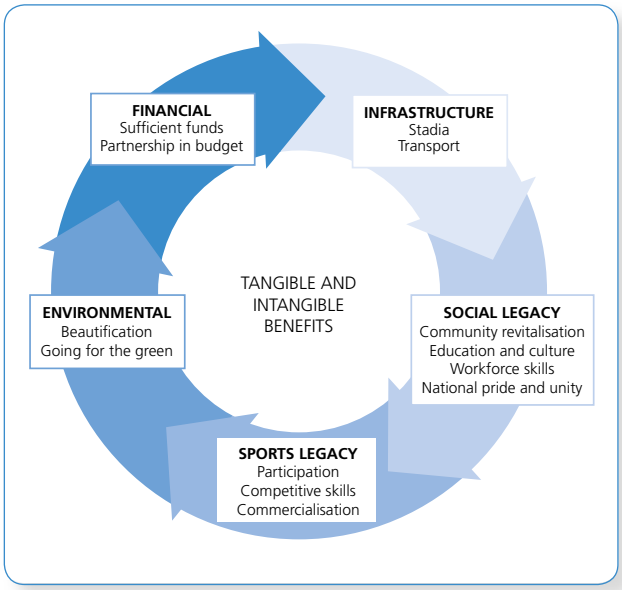


FIGURE 1: Cape Town and Western Cape legacy model

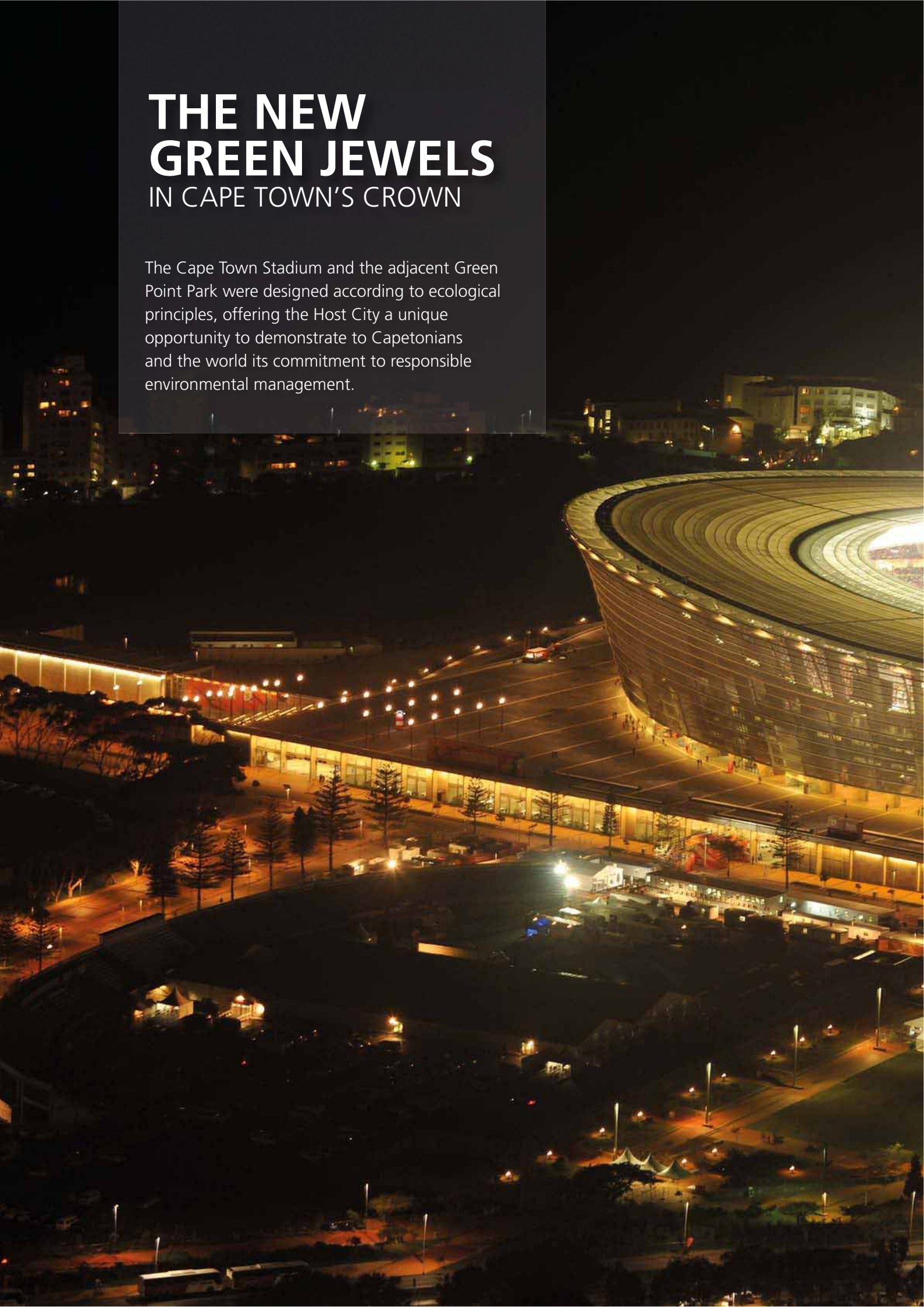
FROM WORLD CUP TO WORLD MAP THE LEGACY OF THE WORLD CUP

The World Cup is directly responsible for the positive long-term tourism percentage growth outlook for South Africa in the next five years. From television viewership and cyberspace presence, to perfect hosts of a global spectacle, the impact of the 2010 FIFA World Cup™ will go a long way to improving perceptions of South Africa and improving the country's brand value significantly.

Source:
Grant Thornton says World Cup dramatically increased national brand value for South Africa, Press release by Gillian Saunders, Grant Thornton, South Africa, 29 October 2010

THE NEW GREEN JEWELS
IN CAPE TOWN'S CROWN

The Cape Town Stadium and the adjacent Green Point Park were designed according to ecological principles, offering the Host City a unique opportunity to demonstrate to Capetonians and the world its commitment to responsible environmental management.



Energy efficient lighting illuminates Cape Town Stadium during the FIFA 2010 World Cup™ Semifinal match between the Netherlands and Uruguay on 6 July 2010.

Photo: Bruce Sutherland, City of Cape Town

3 THE NEW GREEN JEWELS IN CAPE TOWN'S CROWN

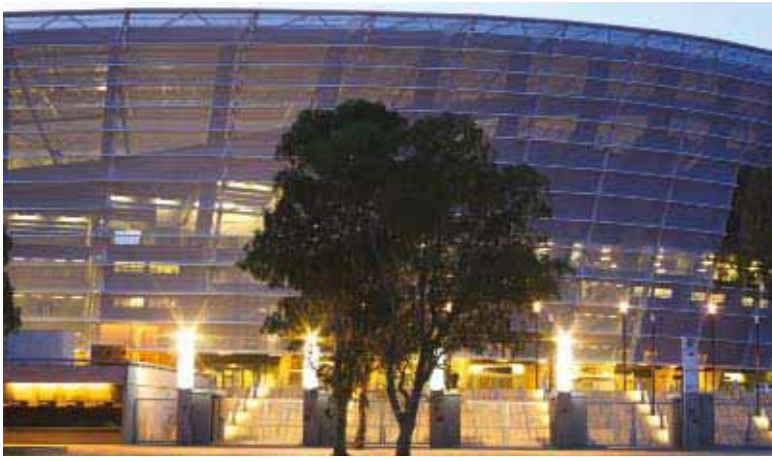
3.1 CAPE TOWN STADIUM

The construction of the new Cape Town Stadium was the biggest single infrastructural investment for Host City Cape Town. At the time, the construction of the new stadium on Green Point Common was a controversial decision, and was delayed by public appeals as part of the EIA, but, eventually, the development of the stadium was approved along with a new layout for Green Point Common.

Preparations for construction began in March 2007. In 33 months, joint contractors Murray & Roberts and WBHO completed the project at a cost of R4,4 billion. The project architects were a partnership between GMP Architekten of Germany and two local firms, Louis Karol & Associates and Point Architects. A total of 2 600 on-site jobs were created to construct the stadium, and 1 179 artisans received training from the contractors.

For the eight World Cup matches, the stadium had a seating capacity of 68 000, including 13 000 temporary seats that were removed after the event to leave 55 000 permanent seats. The stadium is state-of-the-art and designed for comfort, safety and visibility. The venue can be evacuated in 15 minutes. The geometry of the bowl provides for the best spectator viewing with no seat further than 190 m away from the furthest corner of the pitch and as many as possible seats within an optimal viewing distance of 150 m. This feature distinguishes it from many of the world's top stadiums.

The outer façade made from polytetrafluoroethylene (PTFE)-coated glass fibre forms a concave vertical curve with horizontal undulations, giving it a scale-less appearance. It provides for protection against strong winds and heavy rainfall, while allowing natural light and ventilation and reducing noise emanating from the stadium.



Energy efficient lighting illuminates Cape Town Stadium. Photo: Bruce Sutherland, City of Cape Town

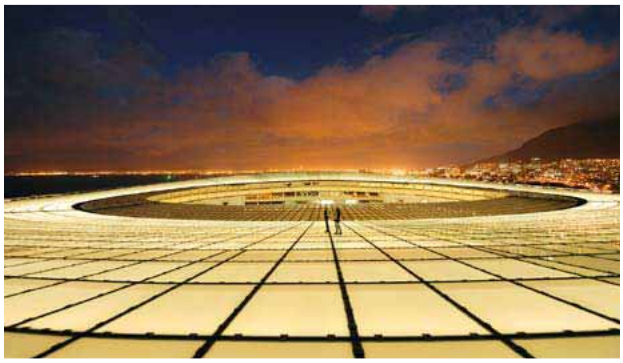
The roof is made up of an outer compression ring that rests on 72 columns, and links to the inner tension rings with a system of trusses and cables. The inner tension ring houses the lights for the playing field which removes the need for traditional high-mast lighting and keeps the roof profile clear. Three hundred and sixty 2 kW spray lights are located in the roof to form a 'ring of fire'. They are focused and have been tested to deliver at least 2 500 lux in the vertical plane. This provides for ideal high definition television coverage.

Glass panels of 16 mm thick were used to weigh the roof down and let natural light through to the stands below. The glass roof also protects spectators from harsh weather. A transparent, woven polyvinyl-chloride (PVC) mesh fabric was used under the glass roof to screen the roof construction members and mute noise. Rainwater is harvested at the two lowest points on the roof, and stored on the nearby golf course for irrigation purposes.

The construction of Cape Town Stadium was carried out according to an environmental management plan (EMP). During construction, two environmental control officers (ECOs) were on site full-time to monitor environmental compliance and advise the principal contractor and subcontractors on environmental mitigation measures. During the excavation phase, they were assisted on-site by a professional archaeologist. Method statements were approved for construction activities that dealt with environmental impacts, such as the removal of trees, pouring of concrete, excavations (in particular sensitivity to archaeological remains), dust abatement, stormwater management and waste management. Topsoil from the site was collected and retained during construction for later use in landscaping. On-site greywater and spring water was used for dust control during construction.

Cape Town Stadium was planned as a multipurpose venue to host rugby and soccer matches as well as music concerts and other major events. Its location within walking distance from the CBD and the popular V&A Waterfront makes it one of the most accessible large-event venues in South Africa.

The stadium design includes technologies that promote energy and water efficiency. Details of specific measures are included in Section 6.



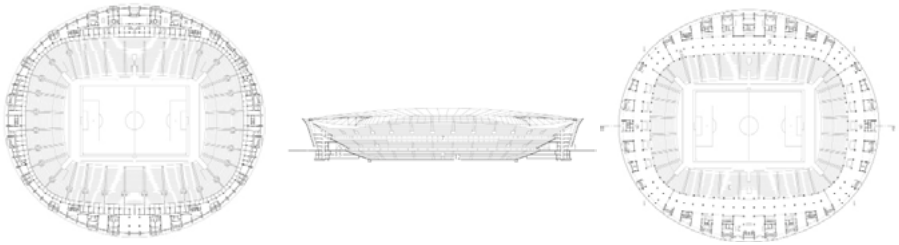
Construction and aerial views of Cape Town Stadium. Photo: Bruce Sutherland, City of Cape Town

ENVIRONMENTAL IMPACT ASSESSMENT

In terms of South African environmental legislation, an EIA was required for the construction of the proposed new stadium, the construction of Granger Bay Boulevard, the upgrade of associated electrical infrastructure, and the establishment of an urban park within Green Point Common. A scoping report was released in June 2006 and, together with the plan of study for the assessment phase, was accepted by the competent environmental authority, the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP). Following that, the assessment phase of the EIA process was initiated, which assessed inter alia socio-economic, heritage and visual impact. The results culminated in a draft environmental impact report (EIR). The draft EIR was distributed to stakeholders and interested and affected parties (I&APs) for their comment. A report was compiled to address the comments received, after which the final EIR as well as the proposed construction environmental management plan (CEMP) were submitted to DEA&DP. The ROD that authorised the construction of the stadium and related infrastructure was issued on 1 May 2007.

COMPLIANCE MANAGEMENT SYSTEM

One of the conditions of authorisation for constructing Cape Town Stadium was the development and implementation of an environmental management system (EMS). In November 2009, Council adopted a customised compliance management system for the Cape Town Stadium and Green Point Common that was to ensure that the operation of these facilities complied with all relevant legislation and would meet sustainability criteria into the future.



CAPE TOWN STADIUM QUICK FACTS

95% of demolished components from the old Green Point stadium salvaged, recycled or reused

- Low-flow showerheads minimise water usage
- Water-cooled variable refrigerant volume (VRV) system used for air conditioning enabling significant energy savings
- Insulated panels behind the fabric façade reduce the need for cooling
- Taps with self-closing valves and aerators

RAINWATER
HARVESTED AT TWO LOWEST POINTS ON ROOF

- **A STORAGE** tank provides back-up pumped water for pitch irrigation
- **CONSTRUCTION** carried out in accordance with Environmental Management Plan (EMP)
- **OUTER FAÇADE** allows for natural light and ventilation
- **THE BUILDING** is raked outwards to shade itself

Energy-efficient lighting including LED

Noise impact assessment carried out

The stadium was completed in 33 months at a cost of R4.4 billion

3.2 GREEN POINT PARK

Cape Town Stadium is situated on the 85 ha Green Point Common. Green Point Common is a significant open space in the heart of Cape Town, and has played a significant role in the history of the city. Green Point Common was once a seasonal vlei known by the Dutch settlers during the 18th century as "De Waterplaats" (the Foreshore). The vlei was filled in during the early 20th century and, in 1923, the Union Government granted the land to the citizens of Cape Town for sports fields and general public recreation purposes.

Before the construction of the stadium, the area had been used for various sporting and community facilities for more than a century. The first rugby and soccer matches in Cape Town were played on the Common, and the Common is still home to the oldest rugby, soccer and cricket clubs in Cape Town.

The construction of the new stadium necessitated the reconfiguration of Green Point Common, which allowed for the creation of a new 12,5 ha public park, the Green Point Park, on the western edge of the Common.

The main, tree-lined pedestrian boulevard runs between Somerset Road and the Mouille Point lighthouse and beachfront promenade.

Green Point Park was designed according to ecological principles. A biodiversity garden showcases the indigenous vegetation of the region, while spring water diverted from the slopes of Table Mountain is stored in ponds and wetlands to replace potable water for irrigation. A hydroturbine generates electricity from the spring water supply. Future developments planned for the park include a Smart Living Centre to promote sustainable living in an urban environment, an indigenous nursery, a horticultural training centre and weekend fresh-food markets. Waste separation at source and recycling are promoted.

The park was officially opened to the public on 9 February 2011.

Capetonians enjoy the new Green Point Park spring water. Photo: Bruce Sutherland, City of Cape Town

HOST CITY CAPE TOWN
GREEN GOAL PROGRAMME

Greening the 2010 FIFA World Cup™ required a huge effort that involved many partnerships. The Host City Cape Town Green Goal 2010 Action Plan was launched by the Premier of the Western Cape and the Executive Mayor of Cape Town to the tunes of the Vuvuzela Orchestra.

The Vuvuzela Orchestra against the backdrop of Table Mountain at the launch of the Green Goal Action Plan in September 2008.

Photo: Bruce Sutherland, City of Cape Town

4 HOST CITY CAPE TOWN

GREEN GOAL PROGRAMME

Host City Cape Town understood that the successful implementation of the Green Goal Action Plan and programme required an integrated, consultative approach, involving a number of stakeholders. In October 2006, the City and Province produced a joint business plan for the greening of the World Cup, which included a set of high-level principles and list of projects that could be implemented as part of the programme.

The main objectives with the implementation of this business plan were to:

- green the 2010 FIFA World Cup™ event footprint; and
- leave a positive environmental legacy.

A positive legacy was pursued by considering the impact of decisions and actions in both the short and long-term; implementing activities that promote sustainability; prioritising infrastructure development that will have lasting benefit for the broader Cape Town community; raising public awareness, and encouraging behavioural change as a result of the interventions implemented.

The following principles were included in the original event-greening business plan:

- Sustainable procurement
- Sustainable construction
- Integrated waste management
- Water management
- Energy efficiency and climate change
- Air quality management
- Biodiversity conservation
- Social development
- Responsible tourism

Consul General of the Federal Republic of Germany, Hans-Werner-Bussmann, with the Executive Mayor of Cape Town, Alderman Dan Plato and Premier Helen Zille at the launch of the Green Goal 2010 Progress Report, September 2009.

- Participation, communication, education and public awareness
- Monitoring and evaluation
- Leaving a positive green legacy

To give effect to the business plan principles, Host City Cape Town, in partnership with KAS, developed a programme of consultation with stakeholders (the Green Goal workshop series) with a view to preparing a Green Goal Action Plan.

4.1 WORKSHOP SERIES 1
AUGUST 2007 TO MARCH 2008

Five workshops took place between August 2007 and March 2008, attended by national, provincial and local government, non-governmental organisations (NGOs), business, the media, the LOC, international experts and civil society. The primary objective of this workshop series was to inform and guide the completion of the Host City Cape Town 2010 FIFA World Cup™ Green Goal Action Plan, and to select a range of projects that would form the basis of the host city's greening effort. Two discussion forums, respectively looking at carbon offsetting for 2010 and the urban park around the stadium, also took place during this period.

The workshops covered the following themes:

- Green Goal principles and priorities
- Green building, the stadium, biodiversity and landscaping
- Responsible tourism

- Integrated waste management
- 'Painting the town green': Using Green Goal 2010 to persuade residents, visitors, and the FIFA family to adopt greener lifestyles

One of the challenges facing the Green Goal 2010 team was narrowing down the list of potential project ideas submitted at the workshops. A final list of 41 projects under nine themes was identified for inclusion in the Green Goal Action Plan. (A further project was added later making the total 42.)

The following criteria were used to select the projects:

- Legacy: Potential to provide long-term benefits to residents of the city and the province, in particular to less-advantaged groups
- Level of completion: Projects that were either scoped or already under way
- Visibility: Projects that were visible and able to capture the imagination of residents and visitors
- Duration of project and financial feasibility: Projects that could be undertaken and completed within the available time and budget parameters
- Impact on global warming: The implementation of carbon mitigation projects that reduce energy consumption and carbon emissions

The 42 projects were divided into nine themes according to their main focus areas:

1. ENERGY EFFICIENCY AND CLIMATE CHANGE
   Minimise the carbon footprint of the 2010 event
2. WATER CONSERVATION
   Minimise the use of potable water, and promote conservation of water resources
3. INTEGRATED WASTE MANAGEMENT
   Avoid, reduce, reuse and recycle waste
4. TRANSPORT, MOBILITY AND ACCESS
   Promote energy-efficient and universally accessible mobility, and minimise air pollution
5. LANDSCAPING AND BIODIVERSITY
   Promote indigenous landscaping, and enhance biodiversity
6. GREEN BUILDING AND SUSTAINABLE LIFESTYLES
   Promote environmental awareness, sustainable lifestyles and environmentally efficient building practices
7. RESPONSIBLE TOURISM
   Promote responsible tourism for 2010 and beyond
8. GREEN GOAL COMMUNICATIONS
   Communicate the Green Goal message to residents and visitors
9. MONITORING, MEASURING AND REPORTING
   Monitor, measure and report on progress with the implementation of Green Goal

The Grand Parade was upgraded at a cost of R16,9 million and hosted the FIFA Fan Fest™ where all 64 matches were screened to as many as 25 000 fans at once.
Photo: Bruce Sutherland, City of Cape Town

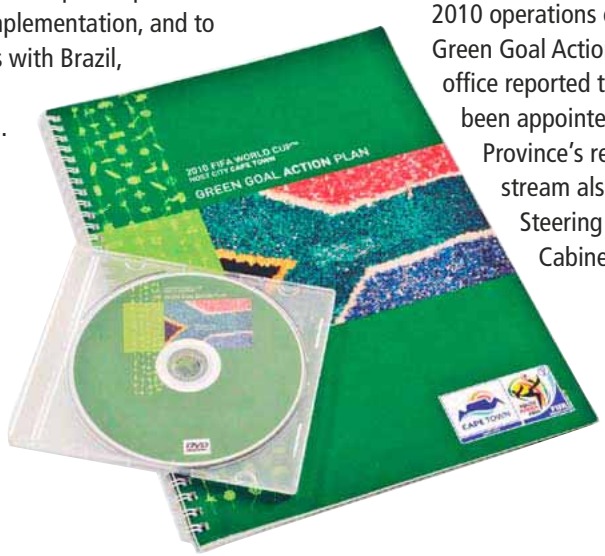
4.2 WORKSHOP SERIES 2
FEBRUARY TO APRIL 2009

In 2009, a second series of Green Goal 2010 workshops took place to support project implementation and monitoring. The aim of these workshops was to fine-tune a number of key projects identified during the first workshop series; to develop strategies to raise additional funds for projects still lacking the necessary budget; to keep stakeholder groups informed of progress with respect to project implementation, and to strengthen the relationship between the City, the Province and external stakeholders and partners further.

The second series of Green Goal 2010 workshops can be outlined as follows:

- "Scoping, planning and implementing the carbon-offsetting action plan for Host City Cape Town". Identifying and agreeing on a short list of carbon-offsetting projects for implementation, and formulating an initial action plan towards hosting a low-carbon event in Cape Town.
- "The proposed Smart Living Centre in Green Point Park". Informing participants about Green Point Park, a 2010 legacy project adjacent to the new Cape Town Stadium, and the proposed Smart Living Centre and its activities.
- "Taking responsibility for tourism during the 2010 FIFA World Cup™". Reviewing the projects that promoted responsible tourism in the Host City Cape Town Green Goal Action Plan, and that contributed towards the formulation of the 2010 FIFA World Cup™ Responsible Tourism Declaration by Host City Cape Town.

In early 2010, a final workshop took place to review the lessons learnt during implementation, and to share these experiences with Brazil, who are hosting the 2014 FIFA World Cup™.



Green Goal workshop in action. Photo: Sheryl Ozinsky

4.3 PROJECT IMPLEMENTATION

The Host City Cape Town Green Goal Action Plan was launched by the Premier of the Western Cape and the Executive Mayor of Cape Town on 17 October 2008. An environmental work stream with representatives from various City departments as well as Province was established to oversee the implementation of the action plan. The plan's implementation was further managed by a dedicated Green Goal manager in the City's event operations office. Integration with the other work streams, including those on city beautification, utilities, safety and security, transport and communications, was critical to ensure that the Green Goal objectives were included in all aspects of event operations.

4.4 INSTITUTIONAL ARRANGEMENTS

4.4.1 Host City Cape Town

The environmental work stream was one of 16 work streams formed to develop and implement the World Cup operational plans. The City appointed a Green Goal manager in the 2010 operations office to oversee the implementation of the Green Goal Action Plan. Within the City, the 2010 operations office reported to a mayoral subcommittee that had been appointed to oversee the 2010 preparations. The Province's representative in the environmental work stream also served on the Provincial 2010 Technical Steering Committee, which reported to Provincial Cabinet.

4.4.2 Local Organising Committee (LOC)

FIFA tasked SAFA with the responsibility to organise, stage and host the event. The SAFA LOC consequently appointed an environmental manager and, in consultation with the Department of Environmental Affairs (DEA), established the Environmental Forum, a substructure of the LOC's Legacy Committee. The Environmental Forum brought together representatives from the 2010 FIFA LOC, DEA, national and provincial government departments, the Department of Water Affairs (DWA), the nine host cities, and resource agencies such as the International Union for Conservation of Nature (IUCN), UNEP and the United Nations Development Programme (UNDP). The purpose of the Environmental Forum was to serve as a steering committee, planning, coordinating and monitoring national 2010 greening activities related to the stadia, fan parks, training grounds, accommodation facilities, and the networks and amenities that service and connect them. The Öko-Institut was contracted to use their experience as coordinators of the 2006 Green Goal programme in Germany to advise the South African LOC.

Five working groups were established, and action plans were developed for each of them. The implementation of the action plans required additional funding, which was not forthcoming in all instances and resulted in some action plans not being fully implemented.

The LOC developed an environmental strategy, which outlined the strategic objectives of the green goal programme, including the following:

- To establish the overall greening approach for 2010
- To coordinate key stakeholders in the implementation of the 2010 greening programme
- To green all LOC facilities, operations and events
- To guide the greening of FIFA activities and events
- To support host cities with greening activities
- To undertake 2010 Green Goal monitoring

Flowing from the environmental strategy, national minimum environmental standards, targets and a monitoring framework were developed. Two targets were adopted by host cities at national level, namely a waste reduction target, and a target relating to the use of public transport by spectators on match days.

Two stadium baseline studies were commissioned by the LOC to provide a better understanding of resource use at existing stadia. This enabled an assessment of resource savings potential, which informed the compilation of minimum environmental standards and greening targets for the 2010 FIFA World Cup™.

The LOC, with assistance from InWEnt, developed a monitoring and reporting framework, which was piloted during the FCC and used by some host cities during the 2010 FIFA World Cup™.

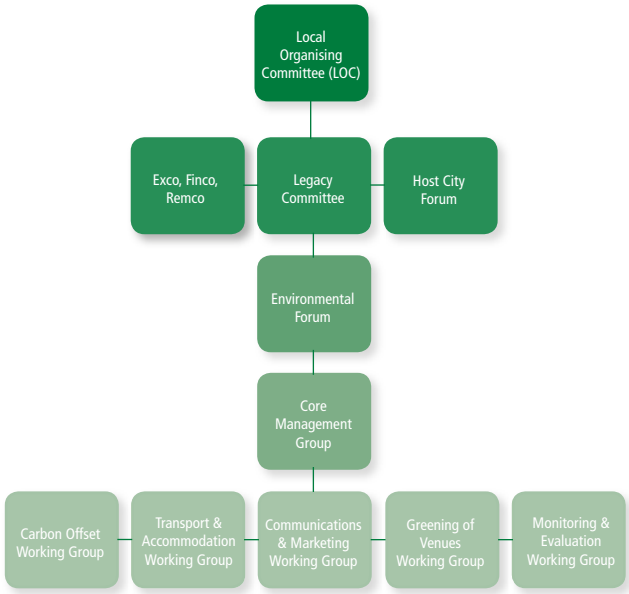


FIGURE 2: Environmental structures of the 2010 FIFA LOC

> "Great experience - I have learned alot from Green Goal. Cape Town is a great destination."
>
> Martin Koopman, Fan Fest visitor

4.4.3 National Department of Environmental Affairs (DEA)

DEA is the mandated custodian of environmental management in South Africa. The Department was represented on the LOC Board, and served on the Environmental Forum as well.

As part of the national greening programme, the Department in 2007 developed a business plan for greening the 2010 FIFA World Cup™, which informed the National 2010 Greening Framework published in 2008. The framework included a programme of action for environmental best practice; socio-economic development; education and awareness; monitoring, evaluation and reporting, and sustainable development to leave a positive legacy for future generations.

In conjunction with the LOC environmental forum, DEA undertook the following specific tasks:

- Provided support to the LOC
- Provided support to host cities in assessing their environmental management objectives and performance
- In partnership with the Norwegian government, coordinated the investigation of the total carbon footprint associated with hosting the 2010 FIFA World Cup™
- With support from the Danish International Development Agency (DANIDA), reviewed the greening measures taken in five World Cup stadia, with a view to developing a toolkit for designing and constructing green stadia, promoting the concept of green building, and strengthening future greening initiatives
- In partnership with UNEP and the Global Environment Facility (GEF), implemented a carbon reduction programme in six host cities, including the retrofitting of solar-powered streetlights and traffic lights, and the installation of solar-powered billboards
- In partnership with UNEP approached representatives of participating nations to offset the team's carbon footprint. Eleven of the 32 participating teams offset their carbon emissions, including Algeria, Cameroon, Cote d'Ivoire, Ghana, Uruguay, Italy, Switzerland, Chile, England, the Republic of South Korea and Serbia. The teams' carbon footprint includes international flights to and from South Africa, domestic flights and coaches to and from group matches for teams and officials, and accommodation in hotels – a total of approximately 6,050 tonnes of greenhouse gas emissions
- Developed a guideline for the greening of large sporting events – a practical toolkit to implement an event-greening programme
- Developed a training manual for the LOC environmental services volunteers, and recruited an additional 450 environmental volunteers to assist host cities to implement the national greening programme during the 2010 FIFA World Cup™
- Published six cartoon strips with environmental messages in four languages – Sotho, Zulu, English and Afrikaans – in a national newspaper, and developed animations for screening on the national public broadcaster, targeting both domestic and international audiences
- Developed a 'Green Passport', which was distributed in the host cities and at the main airports during the 2010 FIFA World Cup™
- Conducted a non-motorised transport (NMT) pre-feasibility study in all nine host cities, with the support of the German Development Bank KfW. Key projects will now be implemented as a legacy project after the 2010 FIFA World Cup™
- Assisted the LOC in producing a legacy report on the 2010 greening programme, based on host city and LOC Environmental Forum report assessments

FIGURE 3: Sample of cartoon strips published to raise awareness of the 2010 greening programme

4.5 INTERNATIONAL COOPERATION

GTZ (the German Gesellschaft für Technische Zusammenarbeit) and InWEnt (Internationale Weiterbildung und Entwicklung GmbH), which, since January 2011, both form part of the GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit), facilitated an exchange between Germany and South Africa as hosts of the 2006 and 2010 FIFA World Cup™ respectively.

InWEnt hosted two workshops aimed at building capacity for the implementation of the Green Goal programme. The first workshop shared lessons from the 2006 Green Goal programme in Germany, while the second workshop focused specifically on waste management.

In addition to the workshops, InWEnt facilitated visits from a number of specialists to share experiences and participate in workshops relating to the implementation of the Green Goal programme in Cape Town.

In May 2009, InWEnt also assisted the LOC to develop a Green Goal 2010 monitoring matrix, and facilitated a workshop on the monitoring and evaluation requirements that were to be tested during the FCC.

The Öko-Institut in Germany – the organisation that had been tasked with the development of the first Green Goal concept for the 2006 FIFA World Cup™ – facilitated a study tour in November 2008 for host city representatives to engage with members of the 2006 FIFA World Cup™ planning teams and other specialists relating to waste management, carbon offsetting, stadium EMSs, and transport for the event.

The Konrad-Adenauer-Stiftung (KAS), in turn, supported the Host City Cape Town Green Goal programme from the outset. KAS facilitated several opportunities to present the Green Goal Action Plan to German agencies in South Africa, and hosted a breakfast in November 2009 to brief ambassadors and consuls-general in Cape Town before the Final Draw. Also in November 2009, KAS facilitated a study tour for the five winners of the 2010 Impumelelo Sustainability Awards, including the Host City Cape Town Green Goal programme, to share project lessons with stakeholders in Germany.

The Host City Cape Town Green Goal Action Plan was presented at the 8th Global Forum for Sports and Environment (G-ForSE) conference in Alicante, Spain, in October 2008. The lessons from the implementation of the plan were also presented at the 9th G-ForSE meeting held in Nairobi, Kenya, from 8 to 10 November 2010.

Chancellor of Germany, Angela Merkel, accompanied by the Executive Mayor of Cape Town, Alderman Dan Plato and Premier Helen Zille during the FIFA 2010 World Cup™. Photo: Bruce Sutherland, City of Cape Town

OVERALL IMPACT
OF THE GREEN GOAL 2010 PROGRAMME

The Green Goal 2010 programme achieved many noteworthy successes, exceeding the national target for waste-to-landfill reduction and use of public and non-motorised transport.

Excellent waste management during the World Cup added to the tourist appeal and fan experience.

Photo: Rob Oettle

5 OVERALL IMPACT

OF THE GREEN GOAL 2010 PROGRAMME

Host City Cape Town succeeded to reduce the environmental impact of the 2010 FIFA World Cup™ through the implementation of the Green Goal Action Plan.

Host City Cape Town exceeded the two national targets – a 20% waste-to-landfill reduction, and 50% of fans travelling to matches by public transport and on foot – and met its objectives to reduce the overall environmental impact and leave a positive legacy.

The visibility, branding and communication potential of the World Cup afforded Host City Cape Town the opportunity to create greater environmental and sustainability awareness. Using the World Cup platform, the greening campaign communicated, popularised and mainstreamed norms of sustainability among the general public, inspired behavioural change, and attempted to bring about a broader shift towards more sustainable lifestyle choices.

Fans at the match between Italy and Paraguay, Cape Town Stadium, 14 June 2010. Photo: Bruce Sutherland, City of Cape Town

The table below summarises the quantifiable impact of the Green Goal programme, showing the overall success of the initiative in Host City Cape Town.

TABLE 4: Quantifiable impact of the Green Goal programme linked to key environmental indicators

Key data indicators	Indicator	Success	Comment
WASTE			
Overall % recycled	58%	Successful ☺	Well exceeded target of 20% reduction in waste to landfill
ACCOMMODATION			
Electricity, water and waste reduction	No indicators were set	Room for improvement 😐	No FIFA requirements to implement greening measures in the accommodation sector for 2010 FIFA World Cup™
ELECTRICITY			
Average energy saving at Cape Town Stadium	15%		Energy-saving measures in Cape Town Stadium
Green electricity donated for Cape Town Stadium (MWh)	268 746	Successful ☺	Eskom purchased 2418.71 GWh of certified green electricity, which was spread over the nine host cities
Green electricity purchased for FIFA Fan Fest™ (kWh)	145 725		Very significant measure with large impact, reducing carbon impact of FIFA Fan Fest™ to nil
WATER			
Average water saving achieved at Cape Town Stadium	27%	Successful ☺	Water-saving measures in the Cape Town Stadium
TRANSPORT			
Public transport and non-motorised transport use to match venues	53%	Successful ☺	Met national target of 50% of fans travelling to the stadium using public transport or non-motorised transport (survey showed 40% used public transport and 13% walked)
CARBON FOOTPRINT			
Offset from efficiency and renewables projects	15%		Solar water heater and efficient lighting projects led to significant reductions. Bulk Eskom certificate purchase for the entire country and fan fest green electricity purchase further contributed
Offset from green electricity certificate purchase	80%	Successful ☺	
Total reduction and offset (incl international travel)	95%		Overall almost all CO^2 emissions were offset, including international travel
AWARENESS			
Proportion of fans aware of Green Goal initiatives	35%	Moderate success 😐	While this achievement is significant, an earlier launch of the Green Goal brand may have resulted in greater impact

THE GREEN GOAL 2010 PROJECTS

Of the 42 Green Goal projects implemented in Host City Cape Town, 17 are legacy projects, meaning that they will be contributing to the well-being of Capetonians and visitors long after the 2010 FIFA World Cup™.

The Green Goal Expo at the FIFA Fan Fest™ was constructed out of recycled milk crates, conveying the importance of touching the earth lightly.

Photo: Stephen Lamb

6 THE GREEN GOAL 2010 PROJECTS

6.1 PROJECTS AT A GLANCE

Of the 41* projects that were described in the Host City Cape Town Green Goal Action Plan launched in October 2008, 37 were fully implemented, three partially implemented, and one is still under way. One additional project was added after the Green Goal Action Plan was launched and was completed. Seven carbon mitigation projects were also completed.

Solar water heaters for low-income households in Darling were installed as part of Green Goal 2010. Photo: Coco van Oppens

TABLE 5: Green Goal projects summary

Target area	Project	Budget	Status
1. Energy efficiency and climate change Minimise the carbon footprint of the 2010 event	Determining the carbon footprint of the 2010 event	City: R148 500	Completed
	Identifying and implementing carbon mitigation project(s) in Cape Town/Western Cape	DANIDA: R8 million Province: R1,5 m	Completed
	Installation of energy-efficient technologies in stadia and training venues, and at the FIFA Fan Fest™ and PVAs	Included in stadia capital and operating budgets	Completed
2. Water conservation Minimise the use of potable water, and promote conservation of water resources	Identifying alternative sources of water for irrigation of Green Point Common, and implementing most feasible option	City: R25,5 million	Completed
	Installation of water-saving devices in stadia (Cape Town, Athlone and Philippi) and training venues	Included in stadia capital and operating budgets	Completed
3. Integrated waste management Reduce, reuse and recycle waste	Operational waste minimisation in stadia, the FIFA Fan Fest™, PVAs and training venues in the run-up to and during the event	Included in IWM capital and operating budgets	Completed
	Green Goal branding of recycling bins and waste minimisation signage	Included in IWM capital and operating budgets	Completed
	Recycling drop-off centres in the CBD and on the Atlantic seaboard	City: R1,14 million	Under way

* Additional project implemented after Green Goal Action Plan was launched

Target area	Project	Budget	Status
4. Transport, mobility and access Promote energy-efficient and universally accessible mobility, and minimise air pollution	Development of bicycle and pedestrian facilities	R183 million from City, Province and Department of Transport budgets	Completed and ongoing
	Development of public transport infrastructure	R1,76 billion from City, Province and Department of Transport budgets	Completed and ongoing
	CBD bicycle services	No budget required	Partially implemented
	Eco-taxis/fuel-efficiency programme	City: R153 208 SAPIA: R25 000	Completed and ongoing
5. Landscaping and biodiversity Promote indigenous landscaping, and enhance biodiversity	Indigenous gardening training programme for Green Point Park staff	Included in biodiversity showcase garden budget	Completed
	Biodiversity showcase garden at Green Point Park	City: R723 000 in addition to existing capital budget for construction of Green Point Park	Completed
	Student landscape design competition for Mouille Point beachfront and promenade	City: R20 000	Completed
	City beautification and tree-planting campaign	City: R5,2 million in addition to existing capital and operating budgets	Completed
6. Green building and sustainable lifestyles Promote environmental awareness, sustainable lifestyles and environmentally efficient building practices	Smart Living Centre in Green Point Park	City: R200 000 DANIDA: R190 000 R35 million still required for construction of Smart Living Centre	Partially implemented
	Undertaking and monitoring green review for Cape Town and Athlone stadia	DANIDA: R508 704	Completed
	Cape Town Green Map	City: R622 000 Sappi: R80 000 Cape Town Tourism: R50 000	Completed and ongoing
	2010 Green Goal volunteer training module	City: R75 907	Completed
	Green Goal soccer club competition	City: R198 013	Completed
	Soccer and environment educational poster and guide	City: R343 278 DANIDA: R52 213	Completed
	Green Goal short films	City: R30 000 Province: R26 000 DANIDA: R22 000 KAS: R20 000	Completed
	Anti-littering and waste recycling campaign	City: R60 000 in addition to existing communications budgets	Completed and ongoing
	"Drink tap water" campaign	City: R60 000	Completed
	Green procurement for 2010 events	City: R34 200 (e-ball) and R15 700 (kelp vuvuzelas) in addition to existing event budgets	Completed
	Greening of 2010 events	Included in event budgets	Completed

Target area	Project	Budget	Status
7. Responsible tourism Promote responsible tourism for 2010 and beyond	Code of responsible conduct for visitors	City: R250 000 in addition to existing Cape Town Tourism budget	Completed and ongoing
	Responsible-tourism awareness and training	City: R200 000 in addition to existing Cape Town Tourism budget	Completed and ongoing
	Environmental certification system for accommodation sector: GreenStaySA	British High Commission and United Kingdom Department for Environment, Food and Rural Affairs: R1,372 million	Completed and ongoing
	Smart Events Handbook*	City: R249 871	Completed
8. Green Goal communications Communicate the Green Goal message to residents and visitors	Green Goal workshop series 1 and 2	City: R25 000 KAS: R822 000	Completed
	Green Goal brand development and activation	City: R120 000	Completed
	Briefing for potential Green Goal funders	No budget required	Partially implemented
	Green Goal marketing and communications plan and roll-out	City: R50 000	Completed
	Green Goal ambassadors	Province: R15 000	Completed
	Green Goal website and online resources	Included in the City website maintenance budget	Completed
	Online press resources and materials	Included in existing media budgets	Completed
	Green Goal expo	City: R532 473	Completed
	Green Goal 2010 awards	No budget required	Completed
9. Monitoring, measuring and reporting Monitor, measure and report on progress with the implementation of Green Goal	Procedures and methodologies	No budget required	Completed
	Targets and baseline studies	City: R148 000	Completed
	Annual reports and legacy report	City: R100 000 KAS: R350 000 Sappi: R80 000	Completed

* Additional project implemented after Green Goal Action Plan was launched

A football game during the construction of the Cape Town Stadium.

Photos: Bruce Sutherland, City of Cape Town


PTC
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TEAM GREEN POINTS
10

6.2 PROJECTS BY THEMATIC AREA

1 ENERGY EFFICIENCY AND CLIMATE CHANGE

One of the key overarching aims of Host City Cape Town's Green Goal effort was to ensure that the 2010 FIFA World Cup™ was a low-carbon event. This specifically related to ensuring low climate change impact through the reduction of GHG emissions. Where GHG emissions could not be avoided, they were mitigated through a range of Green Goal 2010 carbon mitigation projects. The objective of the carbon mitigation programme was to compensate for unavoidable GHG emissions, such as activities related to transport (ground and air travel), higher energy use in stadia, and visitor accommodation.

THE PROJECTS

1.1 Determining the carbon footprint of the 2010 event

1.2 Identifying and implementing carbon mitigation project(s) in Cape Town/ Western Cape

1.3 Installation of energy-efficient technologies in stadia and training venues, and at the FIFA Fan Fest™ and PVAs

PROJECT ACTIONS

1.1 Determining the carbon footprint of the 2010 event

In 2008, DEA together with the local UNDP office and the Norwegian Agency for Development Cooperation (Norad) initiated a process to design, mobilise resources for, and implement a plan of action to make the 2010 FIFA World Cup™ a carbon-neutral event. International consulting firm Econ Pöyry was commissioned to conduct a feasibility study and prepare recommendations.

Green electricity for the FIFA Fan Fest™ was purchased from the Darling Wind Farm. Photo: Bruce Sutherland, City of Cape Town

The study concluded that the estimated carbon footprint of the 2010 FIFA World Cup™ was more than 896 000 tonnes of CO^2 equivalent (tCO^2e), with an additional 1 856 000 tCO^2e contributed by international travel. The former value was more than eight times the estimated footprint of the 2006 FIFA World Cup™ in Germany, which had been stated as 100 000 tonnes in the Green Goal Legacy Report published by the German LOC. Reasons for the South African event's significantly higher footprint included the lack of high-speed rail links in South Africa, which meant that most visitors needed to fly multiple times between matches, which in turn led to much higher transport emissions. Passenger car use would also be higher. Although major efforts were being made to upgrade public transport options, the reality was that much of this travel still needed to be undertaken in passenger cars or small buses, rather than light rail as in Germany. Other reasons included the construction of five new stadia (with embedded carbon from their construction) and the fact that South Africa is a more GHG-intensive economy than many European countries, with electricity primarily being generated from coal instead of cleaner energy sources, which in turn gives rise to higher CO^2 emissions.

The carbon footprint of hosting the World Cup in Cape Town was estimated at approximately 150 000 tonnes (excluding international air travel to the city), representing approximately 15% of the national estimate. This excluded the carbon emissions from the FIFA Fan Fest™, fan jols and the hosting of the Final Draw, which added another 30 tonnes, bringing the total estimate for Cape Town to 180 000 tCO^2e. (See Table 6 and Figures 4 and 5.)

It was estimated that it would cost between $8 and $14 per tonne to offset South Africa's domestic carbon footprint related to the 2010 FIFA World Cup™. In the absence of a clear national framework pertaining to carbon neutrality, Host City Cape Town decided to follow the lead of London (host of the 2012 Summer Olympic Games), aiming to host a low-carbon event as opposed to a carbon-neutral event. While some carbon offset projects were undertaken (see next section), the focus was on seeking long-term energy efficiency within existing projects.

Cape Town's carbon footprint shown in Table 6 below was primarily made up of the city's proportional share of inter-city transport, followed by transport to and from match venues and venue and accommodation electricity use.

TABLE 6: Carbon footprint of the 2010 FIFA World Cup™ in Cape Town

	CO^2e tons	%
Stadium	298	0,1%
PVAs	78	0,0%
Fan fest	99	0,0%
Transport to and from match venues	4 737	1,4%
FIFA fleet	124	0,0%
Travel to and from airport/transport hub and accommodation	336	0,1%
Inter-city transport (arrivals in Cape Town)	104 079	31,0%
Stadium construction materials	3 473	1,0%
Accommodation	15 197	4,5%
Electricity use in other venues and stadium precinct	764	0,2%
International travel - Cape Town share	206 288	61,5%
Total (with international travel)	**335 472**	**100,0%**
Total (no international travel)	**129 184**	

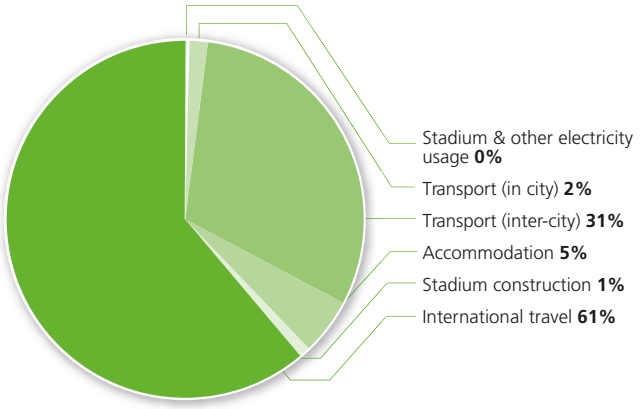


FIGURE 4: Cape Town's carbon footprint for the World Cup event (including international travel)

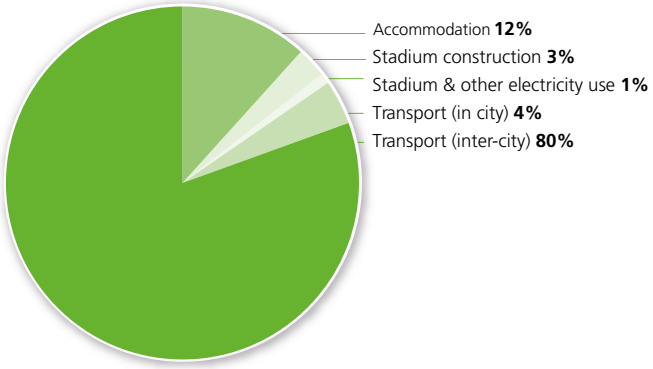
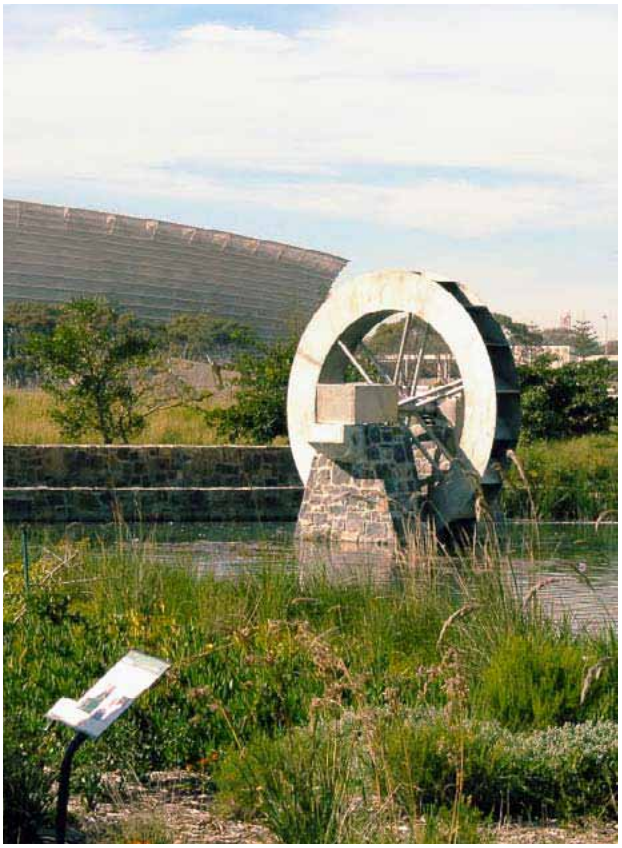


FIGURE 5: Cape Town's carbon footprint for the World Cup event (excluding international travel)



The new water wheel at Green Point Park set in motion by spring water piped from the Oranjezicht Springs. Energy generated from the wheel will be used to power lighting in the Park. Photo: Marijke Honig

> **"Carbon emissions during the 2010 event will remain one of the biggest environmental challenges for Host City Cape Town."**

Extract from a speech delivered by the Premier of the Western Cape, Helen Zille at the launch of the Host City Cape Town Green Goal 2010 Progress Report, September 2009

1.2 Identifying and implementing carbon mitigation project(s) in Cape Town/Western Cape

In January 2009, the Royal Danish Embassy and DANIDA announced that they had allocated R7,5 million to the City and the Province to mitigate and offset carbon emissions emanating from the hosting of the 2010 FIFA World Cup™. A KAS-sponsored carbon offset workshop was convened by Host City Cape Town in February 2009 to review potential projects that could be implemented with this grant.

Seven projects were subsequently approved for funding, including both mitigation and offset initiatives. They are as follows:

1. Installation of LED retrofit in Green Point Stadium
2. Installation of energy-efficient floodlights and electricity submeters at Philippi Stadium
3. Retrofitting of traffic lights along protocol routes with LED lights
4. Retrofitting of streetlights along protocol routes with low-energy luminaries
5. Retrofitting of Council-owned buildings with energy-efficiency measures
6. Installation of solar water heaters for low-income households in Darling
7. Installation of a hydroelectric turbine to generate electricity from spring water in Green Point Park

The impact of some of the carbon avoidance initiatives are shown in Tables 7 to 10.

In addition to the above initiatives, carbon savings also resulted from the use of public transport and NMT options to access Cape Town Stadium and the FIFA Fan Fest™. It is estimated that 3 903 tons CO^2e was saved by the use of public transport and walking to games compared with if only private vehicles had been used.

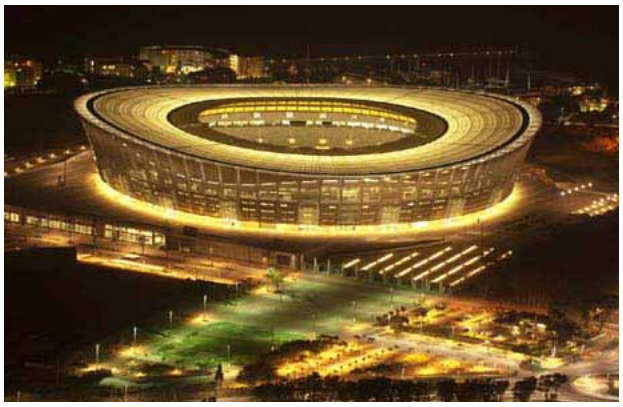
The total amount of energy requirements during the World Cup in South Africa was estimated at 360 GWh for the accommodation sector and stadia precincts. In partnership with Eskom and its Southern African Power Pool (SAPP) partners, a total of 2 418,71 GWh of certified renewable energy was generated, imported from SAPP, and supplied to the Eskom grid as part of the total energy mix for the duration of the World Cup.

TABLE 7: Carbon mitigation initiatives in Host City Cape Town

Project	Description	Benefit of carbon reduction
LED retrofit in Cape Town Stadium	At the time of construction, fluorescent tubes were the most cost-effective and energy-efficient option to provide feeder and escape lighting in the stadium. LED technology has since become more affordable, and was consequently installed to provide emergency lighting, taking advantage of the significant energy saving over fluorescent tubes.	The installation of LED lighting on the emergency lighting circuit reduced the electricity load from 1116,9 kW to 632,9 kW. This translates into an energy saving of 56% or 2 119 482 kWh per annum i.e. 21 120 tCO^2e over their lifetime.
Energy-efficiency measures in Philippi Stadium	The old stadium floodlights were replaced with energy-efficient floodlights. Electricity sub-meters were installed to monitor electricity use in various areas.	The replacement of the stadium floodlights reduced the total electricity load from 315,7 kW to 126 kW. This translates into an energy saving of 12 096 kWh per annum i.e.151 tCO^2e over their 15 year lifetime.
Retrofitting of traffic lights	Replaced incandescent lamps with LED luminaires.	Replacement of 75 Watt incandescent with 7.5 Watt LED at 36 intersections. Average electricity costs at intersection with incandescents amounts to R13 140 per annum. Average electricity costs at intersection fitted with LED's amounts to R8 760 per annum. Average saving is 43% and 2 971 tCO^2e reduction for the 15 year lifespan of the product.
Retrofitting of streetlights	Replaced mercury-vapour luminaires with high-pressure sodium-vapour luminaires.	7 663 tCO^2e reduction for the 10 year lifespan of the product.
Retrofitting of Council-owned buildings	Energy efficiency retrofits of Durbanville, Fezeka, Ottery and Plumstead Civic Centres included solar water heating, lighting retrofit, geyser blankets, timers and controls on A/C units and power factor correction.	Anticipated monthly kWh savings of between 15% and 18%.
Darling solar water heaters	Solar water heaters were installed in 540 low-cost houses in Darling, near Cape Town.	Average saving of 900 kWh for water heating per household per annum. 1,4 tCO^2 reduction per annum per unit over the 20 year lifespan of the product (i.e. 15 120 tCO^2 over 20 years).
Hydro-electricity from spring water in Green Point Park	Hydro-electricity generated by the spring water flowing into the Green Point Park.	73 tCO^2 reduction from use of hydro-electricity in Green Point Park (5 kW turbine generating 73 000 kWh/year of electricity).
Green electricity purchased for FIFA Fan Fest™	Electricity purchased from the Darling Wind Farm.	Equivalent of 145 725 kWh wind energy purchased, i.e. 145 tCO^2e.
Green electricity donated for Cape Town Stadium	Eskom donated hydro-electricity.	Equivalent of 268 746 MWh hydro-energy donated, i.e. 267 792 tCO^2e.

TABLE 8: Energy savings from energy efficient lighting in stadia

Stadium	Cape Town	Philippi
Previous load kW	1116,8	315,7
New load kW	632,9	126,0
Load difference kW	483,9	189,7
Run time	12 hrs per day	4 hrs per day
Days per year	365	24
Total savings kWh pa	**2 119 482**	**12 096**



A view of Cape Town Stadium at night. Photo: Bruce Sutherland, City of Cape Town

TABLE 9: Energy saving from retrofitting of streetlights

Location	Old luminaire (W)	New luminaire (W)	Savings per luminaire (W)	Quantity	Total savings in kW	Total savings kWh pa
Buitengragt	250	150	100	54	5,40	21 681,00
Buitengragt	400	250	150	100	15,00	60 225,00
CBD	250	150	100	300	30,00	120 450,00
Alicedale	80	70	10	264	2,64	10 599,60
Hazendal	80	70	10	349	3,49	14 012,35
Athlone main routes	400	250	150	900	135,00	542 025,00
				1 967	**191,53**	**768 992,95**

A view of Adderley Street at night. Photo: Bruce Sutherland, City of Cape Town

Lessons learnt on energy-efficiency and climate change projects

The hosting of a carbon-neutral event in a developing country such as South Africa is an expensive undertaking. The lack of public transport and renewable-energy infrastructure contributed to a significant increase in the carbon footprint, compared to events in countries where this infrastructure is already in place. In addition, South Africa is a long-haul destination, which means that international air travel significantly increased the carbon footprint. Consequently, visitors' expected length of stay in rented accommodation was also projected to be longer, thereby further increasing the footprint.

In developing its offset projects, Green Goal 2006 in Germany excluded any carbon emissions associated with international air travel to the event, as it maintained that travel outside of Germany lay beyond the scope of the German LOC's mandate. Yet, international air travel is by far the highest source of World Cup-related carbon emissions.

The workshop on carbon offsetting convened by Host City Cape Town in February 2009 to scope potential carbon mitigation/offset projects, identified the following lessons learnt:

- For projects to influence awareness and behaviour, they must be implemented (or at least partially implemented) by the beginning of the year of the event. Therefore, the process should start at least two years prior to the event.
- An upfront commitment to fund the offsets is needed – one cannot rely on voluntary contributions during the event.
- Projects may initially need government or donor funding.
- National governments need to partner with FIFA to implement a national carbon offset programme. This should happen early on already. (FIFA contributed 40 000 Euro for carbon offsetting during the 2006 FIFA World Cup™.)
- Use a well-established and recognised international standard, such as the Clean Development Mechanism (CDM), Gold Standard (GS) or Voluntary Carbon Standard (VCS), as this will provide credibility and integrity to the programme.
- The geographic location of offset projects should be carefully considered. Given the extent of the carbon footprint, and the imperative for an African legacy from the 2010 event, it made sense to invest in carbon-offset projects in more than one country.
- Consider project scale, as this is important for transaction costs. There is merit in doing a few large, development-oriented projects (such as energy-efficient low-cost housing) instead of various small ones.

Significant financial resources are required to offset carbon emissions through sustainable projects. In the South African context, it was therefore more feasible to aim for a low-carbon event, focusing on measures to reduce energy requirements and increasing the share of public transport to reduce carbon emissions. Grant funding through the Urban Environmental Management Programme (UEMP) of the Royal Danish Embassy acknowledged this constraint, and host cities used the grant to invest in projects that will continue to deliver long-term energy savings as opposed to carbon offsetting.

TABLE 10: Energy saving from retrofitting of traffic lights

Aspects	Old luminaire (W)	New luminaire (W)	Savings per luminaire (W)	Quantity of lights*	Total savings in kWatts	Total savings kWh pa
Traffic lights	75	7.5	60	500	10,00	87,600
Pedestrian signals	75	7.5	60	255	7,65	67,014
Arrow signals	75	7.5	60	168	5,04	44,150
					22,69	**198,764**

* not all lights are on at the same time

1.3 Installation of energy-efficient technologies at Cape Town Stadium and training venues, and at the FIFA Fan Fest™ and PVAs

The inclusion of energy efficient technologies was a requirement of the project briefs of the various design teams responsible for the design of the new Cape Town Stadium and upgrades to the Philippi and Athlone Stadiums.

A maximum demand of 8 MVA electricity is provided to the Cape Town Stadium from a nearby 150 MVA sub-station. Some of the main demand items are flood lighting (1 MVA), accommodation lighting (1,5 MVA), ventilation (1,5 MVA) and air conditioning (2 MVA). A total of 5 MVA permanent standby power generation is possible for essential use, including of rotary Uninterrupted Power Supply (UPS) to the flood lighting, to ensure a smooth changeover in the event of grid power failure.

Energy-efficient flood lights and sub-metering were installed in Philippi Stadium.
Photo: Bruce Sutherland, City of Cape Town

The following energy-efficiency measures were included in the Cape Town Stadium design:

- The building was designed to rake outward to shade itself, and the exterior mesh cladding allows 30% light filtration. The fabric allows for natural ventilation, while the light colour reduces thermal radiation.
- The translucent glass roof facilitates natural lighting.
- The open concourse facilitates natural ventilation, and the 5 m gap between the inner and outer skins of the façade provide for passive ventilation through a stack effect.
- A water-cooled variable refrigerant-volume cooling system is used for air-conditioning. This system is estimated to be 13% more efficient than the normal split-type air-conditioning system.
- Compact fluorescent lamps (CFLs) are used where possible. Where halogens are used, they are 45% more efficient than the standard fittings. No incandescent lamps were used.
- A building management system (BMS) allows for manual and automatic control and monitoring of air conditioning, lighting and other systems in different areas of the stadium.
- Carbon dioxide (CO^2) monitors in the parking garage control the ventilation fans.
- A building management system (BMS) has been installed with centralised control over various systems, including access control, closed circuit television, fire detection, lighting, public address system and two LED screens. Through optimisation significant energy savings has been achieved.
- Light-emitting diode (LED) lighting was installed after the World Cup, which has improved the energy efficiency of the emergency lighting circuits by 98%.

See Table 11 for figures relating to electricity-saving interventions and Figure 6 for electricity use breakdown at Cape Town Stadium.

The stadium professional team conducted a detailed feasibility study to scope the installation of PV systems on the roof of Cape Town Stadium. The study concluded that, although this was technically possible, it was not financially feasible within the given budget provisions.

The architectural team also considered the use of LED lighting for the façade of the stadium. However, the LED installation would have added another R15 million to the total stadium budget, which made the intervention unaffordable at the time. However, following the World Cup, LED lighting was installed on the emergency lighting circuit, as the technology had become more affordable.

The upgrade of the two VSTSs, Athlone and Philippi stadia, provided an opportunity to replace outdated lighting with energy-saving technologies. As part of the 2010 carbon mitigation strategy, the Province installed energy-efficient floodlights at Philippi Stadium. It is anticipated that the resultant energy saving will be as much as 60% per annum. Electricity submetering was also installed, which assists with the monitoring of energy use in various parts of the stadium. No mechanical/artificial ventilation is used in the upgraded buildings, and all internal areas are naturally ventilated. The existing Athlone Stadium had good natural ventilation and natural lighting, which were also incorporated into the new stands. The stadium has a BMS that allows selective switching-on of lighting in the stadium, as required. CFLs were installed during the upgrade, and feature lighting was connected to a timer or light sensor.

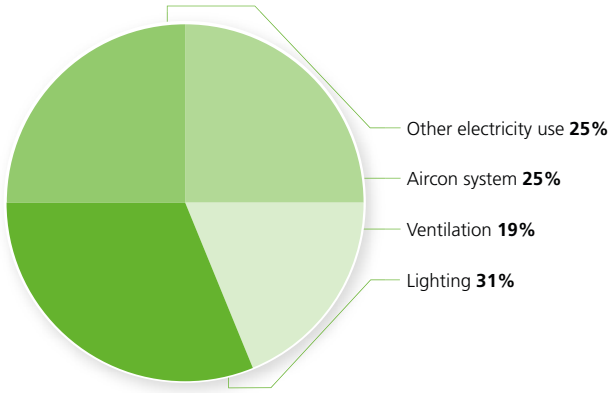


FIGURE 6: Electricity use breakdown for Cape Town Stadium during the World Cup events

TABLE 11: Cape Town Stadium electricity-saving interventions

Use category	Intervention	% Saving for technology	% Total consumption	% Saving on total consumption
Air-conditioning system	Efficient air-conditioning system	13%	25%	3,3%
Ventilation	Variable-speed fans	10%	19%	1,9%
Lighting*	Efficient lighting	26%	31%	8,0%
			Total saving	**13,0%**

Electricity and carbon savings from the above interventions	
Total electricity consumption for event	299 400 kWh
Total CO^2 emitted for event	298 tCO^2e
Total saving for event	39 281 kWh
Total CO^2 reduction for event	39 tCO^2e

* note that an LED lighting retrofit was undertaken after the event, and thus savings figures will increase significantly for post-event use.

Lessons learnt on the installation of energy-efficient technologies

When building new stadia and implementing green technologies, it is important to intervene in the site selection and design phases to ensure that the facility is designed and built in line with green building principles. The work of the green review team was useful, and led to certain efficiencies being pursued. However, in practice, recommendations are often altered during the construction process, and final installation depends on timing, budget and technical considerations within a pressurised construction programme, where different priorities have to be balanced. The consideration of environmental concerns during this process requires explicit prioritisation and a dedicated budget. Some of these recommendations are likely to be considered in the legacy scenario after the World Cup.

It is interesting to note that technologies that were not readily available when the stadium construction commenced, such as an integrated solar roof and LED lighting, have since become more common and, therefore, a constant review of new technologies should be undertaken throughout the design and construction process.

Key references for energy efficiency and climate change

- ECON Analysis, in association with the Energy Research Centre, University of Cape Town. December 2006. Pre-feasibility CDM assessment for the new Green Point Stadium. Commissioned by the Provincial Government of the Western Cape.
- Econ Pöyry AB. November 2008. Carbon Footprint for the FIFA 2010 World Cup™. Oslo, Norway. Commissioned by Norwegian Agency for Development Cooperation (Norad). ISSN 0803-5113.
- Econ Pöyry AB. August 2009. Carbon Footprint of Cape Town. Commissioned by Host City Cape Town.
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- Sustainable Energy Africa and Steadfast Greening. July 2008. Green Goal 2010: Guidelines, Standards and Business Plan for Greening 2010 FIFA World Cup™. Cape Town. Commissioned by FIFA Local Organising Committee (LOC) (Unpublished).
- Urban Environmental Management Programme and Green by Design WSP. 2008. 2010 FIFA World Cup™ Green Point Stadium: Environmental Performance Enhanced. Pretoria, South Africa. Commissioned by Department of Environmental Affairs and Tourism, funded by the Royal Danish Embassy, South Africa.

Solar panels on digital traffic signage help to reduce the City's energy bill. Photo: Bruce Sutherland, City of Cape Town

2 WATER CONSERVATION

Water sustains all life on earth and, therefore, the conservation of this precious resource is a priority in water-scarce regions such as Cape Town. Water conservation and water demand management could be implemented through efficient technologies and behavioural changes. For the 2010 FIFA World Cup™, the aim was to reduce water consumption, specifically potable (drinking) water, through the use of efficient fixtures, controlled irrigation and public awareness. The use of rainwater, greywater and other non-potable sources was encouraged wherever possible, as well as the protection of water resources through the use of environmentally friendly products to clean stadia and maintain pitches. In creating new construction surfaces, the use of permeable materials for paving and walkways was also promoted.

THE PROJECTS

2.1 Identifying alternative sources of water for irrigation of Green Point Common, and implementing most feasible option

2.2 Installation of water-saving devices in stadia (Cape Town, Athlone and Philippi) and training venues

PROJECT ACTIONS

2.1 Identifying alternative sources of water for irrigation of Green Point Common, and implementing most feasible option

Following the decision to construct the new Cape Town Stadium and, as part of the project, to redesign the Green Point Common area, the need to provide a sustainable water supply for irrigation to ensure a green commonage with sports fields, a golf course and other landscapes was identified as a key element of the project.

While the use of potable water for irrigation was an option, the very high demand on the City's scarce water resources would have always placed this area under risk during times of water shortages. Therefore, in 2008, the City commissioned a feasibility study for other water sources

Water from the Oranjezicht Springs creates wetland ponds in Green Point Park. Photo: Bruce Sutherland, City of Cape Town

for irrigation as opposed to potable water, which had been used previously. The study investigated, among other things, desalinisation, feasibility of boreholes, greywater treatment, rainwater harvesting, and the harvesting of spring water from the slopes of Table Mountain. The study concluded that the harvesting of spring water from the Oranjezicht Springs on the slopes of Table Mountain was the most cost-effective way to reduce the use of potable water for the irrigation of the Common. At the time, the spring water ran through the stormwater network into the sea. The spring water was not potable, and would have required treatment to meet drinking-water standards.

The total amount of irrigation water required was approximately 580,12 Mℓ/year. The flow from several springs is collected in a chamber constructed in 1853. The flow in the chamber is measured as being some 22 l/s (1 900 m/day) to a maximum of about 39 l/s (3 370 m/day). This year-round rate of flow is more than sufficient to meet the annual irrigation needs of the greater Green Point Park.

The decision to use spring water for irrigation influenced the redesign of the Green Point Park, allowing the optimisation of this water source through a number of water features, including wetlands, ponds, and the demonstration and use of renewable energy. The capacity of the ponds is 25 000 m^3. The water ponds collect stormwater as well as provide short-term water storage. By optimising all the design elements and parameters, it was further possible to spread the peak water demand over a 24-hour period and to provide water under pressure, thereby limiting the need for pumping.

Low-flow irrigation fittings were installed to reduce flow rates and landscaping is predominantly indigenous, further reducing the irrigation demand peaks.

CAMISSA - THE PLACE OF SWEET WATERS

The history of Cape Town's establishment as a trading post and refreshment station in 1652 is directly linked to springs as a source of fresh water from the slopes of the mountain. The use of this spring was formalised in 1682, with a chamber to protect the Main Spring built in 1813. Over time, the spring water was canalised and, today, it is mostly conveyed underground through a series of pipes and stormwater drains, eventually draining into Table Bay. The harvesting of this water for irrigation purposes presented a significant opportunity to elevate the role that water played in the history of Cape Town. The Reclaim Camissa project, for example, is working to restore the historical connection between the mountain and the sea, and to develop heritage and tourist resources throughout the CBD linked to the springs and rivers on the slopes of the mountain. In the Khoisan tongue, "Camissa" means 'the place of sweet waters.'

Arcus Gibb. August 2008. Preliminary Investigation Report – Feasibility Study: the Supply of Irrigation Water to Green Point Common

Stadsfontein Spring then and now.

The Wetland Ponds at Green Point Park. Photo: Bruce Sutherland, City of Cape Town

2.2 Installation of water-saving devices in stadia

The Cape Town Stadium water supply consists of three incoming domestic mains. A storage tank provides back-up pumped water for the VIP western side. The pitch irrigation water is also drawn from this tank to help facilitate a regular turnover of water.

Roof drainage is achieved through a symphonic drainage system comprising of twelve 160 mm downpipes, concentrated at the north and south ends.

The following water-efficiency measures were included in Cape Town Stadium's design:

- Toilets in the VIP special-guest areas are fitted with dual-flush mechanisms.
- All taps have self-closing metering valves and aerators, and low-flow showerheads have been fitted.
- The landscaping design favours water-wise, indigenous plants.
- Rainwater and stormwater harvested off the stadium roof, pitch, podium surface and park is directed to a detention pond for reuse for irrigation.
- A natural soccer pitch with artificial matting was specified to help reduce the need for irrigation.

At the time of the green review (end 2008) the overall saving from the different interventions is estimated to have been 27% below the baseline, which is a significant achievement (Table 12).

Water-saving measures were also included in the upgrade of Athlone and Philippi stadia. Dual-flush was specified for the VIP toilets; taps were fitted with self-closing metering valves, and low-flow showerheads were installed.

Lessons learnt on water conservation projects

The use of spring water for irrigation results in a significant saving of potable water previously used for this purpose. Efficient irrigation systems will prevent the spring water from being wasted. As a legacy project of the Green Goal programme, the project also created renewed interest in the role that water had played in the development of Cape Town. A project to make the historical spring vaults and infrastructure accessible to the public and tourists is under way.

The initiatives to reduce the amount of potable water used in the new Cape Town Stadium contributed to a significant reduction in the use of potable water. An independent panel of green architects appointed by DEA recognised the applied technologies as best practice in sustainable stadia design.

However, as with the installation of energy-efficient technologies, water-saving devices must be specified in the design stage already, as it is difficult to retrofit some of these to existing buildings.

Key references for water conservation

- Arcus Gibb. August 2008. Preliminary Investigation Report – Feasibility Study: the Supply of Irrigation Water to Green Point Common. Reference number R030800196. Cape Town, South Africa. Commissioned by the City of Cape Town.
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- Urban Environmental Management Programme and Green by Design WSP. 2008. 2010 FIFA World Cup™ Green Point Stadium: Environmental Performance Enhanced. Pretoria, South Africa. Commissioned by Department of Environmental Affairs and Tourism, funded by the Royal Danish Embassy, South Africa.
- WORLDSPORT. July 2010. Host City Cape Town 2010 FIFA Fan Fest™ Green Goal Report.

TABLE 12: Cape Town Stadium water-saving interventions

	Baseline % of total	Baseline kℓ/ year	Baseline kℓ/ year	Interventions	% Saving for intervention	kℓ/year Saved (excl landscaping)
Pitch irrigation	16,4%	10 532	10 532	Hybrid pitch	50%	5 266
Hand basins	3,5%	2 276	2 276	Self-closing taps	60%	1 366
Toilets	11,0%	7 086	7 086	Dual flush in VIP toilets (not public toilets)	5%	354
Urinals	3,5%	2 218	2 218			-
Showers	0,5%	347	347	Low-flow showerheads	50%	174
Catering	2,3%	1 498	1 498			-
Cleaning	4,5%	2 900	2 900			-
External landscaping	58,2%	37 441				
	Total	**64 299**	**26 858**		**Total saved/year**	**7 160**
					Overall % saved	**27%**


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3 INTEGRATED WASTE MANAGEMENT

Waste is a challenge during major events such as the 2010 FIFA World Cup™. The City estimated that fans would produce 0,275 kg of waste per day during the event.

Therefore, in May 2006, the City adopted an Integrated Waste Management Plan (IWMP), which subscribed to waste minimisation principles (avoid, reduce, reuse, recycle), with sending waste to landfill indicated as a last resort. The policy applied to all 2010 FIFA World Cup™ venues and events held in Cape Town.

THE PROJECTS

3.1 Operational waste minimisation in stadia, the FIFA Fan Fest™, PVAs and training venues in the run-up to and during the event

3.2 Green Goal branding of recycling bins and waste minimisation signage

3.3 Recycling drop-off centres in the CBD and on the Atlantic seaboard

PROJECT ACTIONS

3.1 Operational waste minimisation in stadia, the FIFA Fan Fest™, PVAs and training venues in the run-up to and during the event

3.2 Green Goal branding of recycling bins and waste minimisation signage

The LOC and host cities set a target of 20% for diversion of waste from landfill sites for the 2010 FIFA World Cup™. Host City Cape Town, in turn, set this as a target for the operators of the FIFA Fan Fest™, the fan walk and fan jols. All operators were required to introduce measures to avoid, minimise and recycle waste.

Examples of waste avoidance measures put in place at the various venues included the following:

- Used reusable crockery and cutlery rather than disposable cutlery and tableware in the hospitality areas of all venues.
- Used reusable plastic crates instead of single-use cardboard boxes for catering supplies in Cape Town Stadium hospitality areas.
- No promotional handouts at the entrance gates to Cape Town Stadium, the FIFA Fan Fest™ and fan jols.
- Scanned tickets at the entrance gates to Cape Town Stadium, eliminating the need for ticket stubs.
- Used dispensers for condiments and sugar at the FIFA Fan Fest™ instead of single-serving sachets.
- Used draught and soda fountains for serving soft drinks at the FIFA Fan Fest™, thereby avoiding spent glass and plastic bottles and cans.
- Made available reusable, commemorative cups at the FIFA Fan Fest™.
- Encouraged fans to drink tap water (as opposed to bottled water) at water fountains in eight locations at the FIFA Fan Fest™ as well as along the fan walk.
- Limited packaging of merchandise sold at Cape Town Stadium and the FIFA Fan Fest™.

Where waste could not be avoided, measures were taken to minimise waste or use packaging and materials that could be recycled. Examples included the following:

- Minimised packaging of food sold at kiosks, giving preference to cardboard and paper products that decompose quickly.
- Recycled polystyrene packaging used at the FIFA Fan Fest™ through a local polystyrene recycling company.
- Sold all beverages at Cape Town Stadium in recyclable PET plastic bottles.
- Restricted use of glass containers in public areas to reduce the risk of injury to the public and service providers.

LOC signage promoting recycling in Cape Town Stadium.

Photo: Bruce Sutherland, City of Cape Town