



waste



PETCO



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





Signage promoting recycling at Cape Town Stadium.

7.1 Introduction

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

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

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

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

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

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





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

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

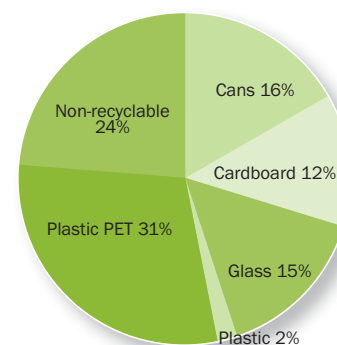
production can be compared must be developed. Such baseline information can be used to measure the point from which improvement can be defined. To this end, a baseline study was carried out through a combination of questionnaires, interviews and match day audits at Vodacom Park, Loftus Versfeld, Royal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

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

7.2 Actions taken

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

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

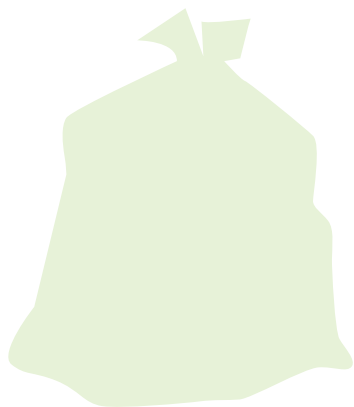


FAST FACTS: CONSTRUCTION WASTE AT THE 2010 FIFA WORLD CUP™

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

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

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



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

FIGURE 11. LEGACY SUMMARY OF ACTIONS FOR WASTE

OPERATIONAL RECYCLING PROGRAMS

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

IMPROVEMENT IN WASTE INFRASTRUCTURE

Cape Town – Inner city recycling stations and installation of permanent ‘Zibi’ split bins in city centre and other locations

CLEAN-UP CAMPAIGNS

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

WASTE AWARENESS CAMPAIGNS

- DEA National Greening – Comic Strip
- Cape Town – “Zibi” and Smart Events Handbook
- DEA/Indalo Yethu – “Green and Clean” Campaign
- Tshwane – Recycle bikes

7.2.1 Expanded Public Works Programme

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

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

7.2.2 Waste separation and recycling

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

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



Waste Management at Soccer City Stadium.

CITY OF JOHANNESBURG

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

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

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

CITY OF TSHWANE

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

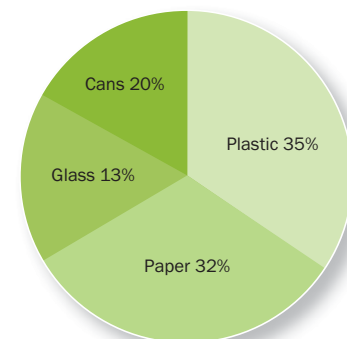
Over 27 tonnes of waste was recycled as a result of this initiative during the World Cup, of which 31% was Plastic, 25% was Glass, 17,3% was cans and 26.4% was paper.

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

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

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

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





Five bin system implemented at Loftus Stadium, Tshwane.

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

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

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

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

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

THE CITY OF DURBAN

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

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

CITY OF CAPE TOWN

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

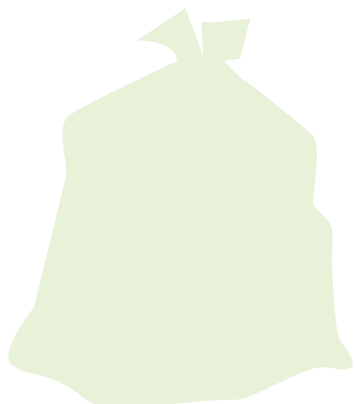


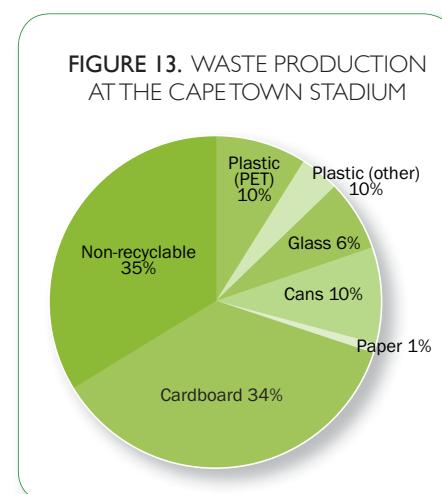
TABLE 18. BREAKDOWN OF WASTE PRODUCTION AT ALL OFFICIAL WORLD CUP VENUES IN CAPE TOWN

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

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

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

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



MBOMBELA

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

MANGAUNG

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

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

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

Waste	Japan V Cameroon	Greece V Nigeria	Slovakia V Paraguay	France V South Africa	Switzerland V Honduras	Germany V England	Totals
Recyclables	2,385 kg	3,277 kg	1,401 kg	3,792 kg	2,099 kg	3,938 kg	16,892 kg
Non-recyclables	1,162 kg	1,453 kg	529 kg	2,310 kg	1,245 kg	1,982 kg	8,681 kg
Total waste	3,547 kg	4,730 kg	1,930 kg	6,102 kg	3,344 kg	5,920 kg	25,573 kg
% Recycled	33%	31%	27%	38%	37%	33%	34%



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

7.2.3 Communications and awareness raising

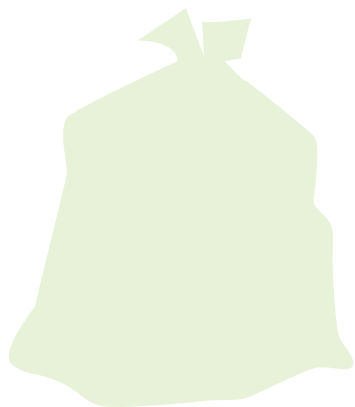
Although urban waste management and access to recycling facilities in South Africa has vastly improved over recent years, waste facilities in the rural and township areas remains hugely undeveloped. Communications campaigns, particularly those that ran outside the confines of the stadium precinct, have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

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



GIVE IT BACK CAMPAIGN

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



COMMUNITY PROJECTS: GREEN AND CLEAN VOLUNTEER CAMPAIGN

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

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



TABLE 20. SUMMARY OF PERFORMANCE AGAINST WASTE

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

7.3 Outcomes

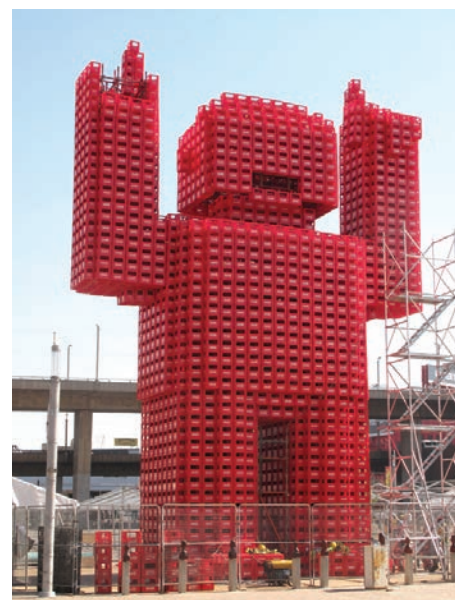
SOUTH AFRICA HAS NEVER BEFORE BEEN EXPOSED to such a level of awareness regarding waste management. The 2010 FIFA World Cup™ saw the country's first nationwide waste separation and recycling initiative, for which the results and lessons learnt can be used to set a precedent for future events. The Host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

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

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

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

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



A NEW TAKE ON WASTE

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