

Carbon Emissions



4. Carbon Emissions

The impact of anthropogenic (i.e. human induced) carbon emissions on our natural environment is undeniable and there is sufficient proof to link this to climate change and global warming. Hosting a major event such as COP17/CMP7 would invariably contribute towards generating carbon emissions, especially given the fact that an estimated 17,400 delegates travelled long distance flights to reach the event destination. As the host country, South Africa undertook to host a low-carbon event, a befitting commitment given the nature of the event and the fact that the country had recently gazetted its Climate Change Response Policy.

The management of the carbon emissions resulting from the event relied on the calculation of its carbon footprint to determine the overall impact of the event and work towards an efficient and focused carbon reduction and offset programme. Furthermore, a number of initiatives were put in place to minimise the event's carbon footprint by maximising efforts to avoid and/or reduce carbon production, and to promote carbon sequestration as outlined below.

4.1 Event Carbon Footprint

The COP17/CMP7 carbon footprint comprised the following three components:

Local Carbon Footprint	The eThekweni Municipality measured the local carbon footprint , with a focus on activities that happened in the Durban geographical area during COP17/CMP7
International travel footprint	DEA measured the international travel footprint based on the UNFCCC registration list
National events and activities	DEA also measured the footprint of national events and activities initiated by national government in support of COP17/CMP7, such as the Climate Change Response Summits, the Climate Train and other events.

An outcome of the measurement of the carbon footprint is the publication a Carbon Footprint Disclosure Report.

The process undertaken to develop the report included the development of a first pass carbon footprint estimate prepared in the run-up to the hosting of the conference, using the Greenhouse Gas (GHG) Protocol Corporate Accounting and Reporting Standard methodology. It is the most widely used international carbon calculation methodology, and compatible with other GHG standards such as the ISO14064. In accordance with the GHG Protocol, clear organisational and operational boundaries were

defined and agreed to by all parties. During the event, data was collected to verify the results of the first pass estimate and this data was used to tabulate the carbon footprint.

4.1.1 Results of First Pass Estimate

The initial estimate was based on available, and often limited data, as well as a range of assumptions. Owing to these data limitations, a contingency of 20% was added to the national carbon footprint estimate. This estimate was verified and recalculated based on actual data collected during the COP17/CMP7 event.

South Africa's greenhouse gas emissions per capita are similar to that of industrialised countries, partly because of its strong reliance on coal for the production of electricity - South Africa's current carbon emissions average out to about 11 tonnes a person a year.

Table 20 summarises the first pass carbon footprint estimate for COP17/CMP7 based on a maximum of 25 000, official delegates.

Table 20. First Pass Carbon Footprint Estimate

Component	Activity	Carbon (t CO ₂ e)	Percentage
Local footprint	Energy and water relating to venues and accommodation, as well as travel within Durban (people and products)	15,000	20%
International and domestic travel to reach Durban	Travel to Durban including international flights and land based travel for 25 000 delegates	61,500	79%
National events	Provincial Summits, Climate Train, and other official events and activities as arranged by DIRCO and DEA	400	1%
Total estimated tonnes of CO₂e		76,900	100%

4.1.2 Results of Verified Data

Once the event was convened the carbon emissions calculations were reconsidered in view of the availability of more accurate data. The major change was the number of delegates that attended the Conference. The largest portion of the overall footprint was attributed to international and domestic travel to Durban, making up 80% of the footprint and this was informed by the assumption that 25,000 delegates would participate in the Conference. However, the turnout was lower than expected and this has had quite a significant impact on the footprint as shown in Table 21.

Table 21. Results of Verified Carbon Footprint of COP17/CMP7

Component	Activity	Carbon (t CO ₂ e)	Percentage
Local footprint	Energy and water relating to venues and accommodation, as well as travel within Durban (people and products)	9,289tCO ₂ e	20%
International travel	Travel to Durban including international flights and land based travel for 17,423 delegates	36,000.17 tCO ₂ e	78%
National Events	Provincial Summits, Climate Train, and other official events and activities as arranged by DIRCO and DEA	808.61 tCO ₂ e	2%
Total estimated tCO₂e		46,097.78 tCO₂e	

4.2 Carbon Balance

Managing the quantum of emissions relies on avoidance, reduction, sequestration and offsetting. Avoidance and reduction are the preferred approaches and are considered first and foremost. However, where unavoidable greenhouse gases are emitted due to the nature of the event, the event organisers take responsibility and offset through appropriate mechanisms.

Table 22 highlights the initiatives that were put in place and the carbon savings yielded as a result. The remainder of the chapter provides details on each initiative.

Table 22. Carbon savings

		Once-off / duration of event	10 years	20 years
Carbon Project Type	Project	Estimated Carbon Saving	Estimated Carbon Savings	Estimated Carbon Savings
Avoided emissions				
Green energy for the event	Hydro energy donated by Eskom	460,288 tCO ₂		
Hazelmere Solar PV Farm	32 solar photovoltaic tracker systems		13,789 tCO ₂	
Demonstration Solar PV Unit	1 solar photovoltaic tracker system at the CCR Expo	2 tCO ₂		
Subtotal		460,290 tCO₂	13,789 tCO₂	
Emission Reductions				
Energy efficiency in and around the Durban ICC			485 tCO ₂	
Climate Change Response Expo	Energy efficient lighting	5 tCO ₂		
Climate Change Response Expo	2 SWHs	0.1 tCO ₂		
SWH Clinics	69 Solar Water Heaters at Clinics and 2 SWHs at schools		1,123 tCO ₂	
Sustainable Energy Access for All	School retrofit: perimeter lighting		13 tCO ₂	
Sustainable Energy Access for All	Energy efficient cookstoves		816 tCO ₂	
Sustainable Energy Access for All	Decentralised solar lighting		125 tCO ₂	
Cato Manor Green Street			1050 tCO ₂	
Subtotal		5.1 tCO₂	3,612 tCO₂	

		Once-off / duration of event	10 years	20 years
Carbon Project Type	Project	Estimated Carbon Saving	Estimated Carbon Savings	Estimated Carbon Savings
Carbon Sequestration				
Greening of the Enyokeni Royal Palace	Planting of 35,000 trees			6,731 tCO ₂
KZN Integrated Greening Programme	294 672 trees will be grown			23,120 tCO ₂
Subtotal				19,850 tCO₂
Total		460,295.1 tCO₂	17,401 tCO₂	19,850 tCO₂

Table 23 presents the carbon balance for the event based on emissions created from international and domestic travel and pre-COP events and carbon savings that arose as a result of savings accrued during the event.

Table 23. Carbon balance based on once-off carbon savings

Carbon emissions emitted	International and domestic travel to reach Durban and National Events	36,808.78 tCO ₂ e
Carbon savings	Once-off savings	460,295.1 tCO ₂ e
Balance		-423,486.32 tCO ₂ e

4.3 Carbon Avoidance

4.3.1 Green energy for the event

Eskom, in association with the Southern African Power Pool members, committed to donating their renewable energy generated during the period 28 November 2011 to 9 December 2011. It was confirmed that after the event **464,937.09MWh** of energy generated from renewable sources was donated as indicated in Table 24.

Table 24. Renewable Energy Generated 28 November 2011 to 09 December 2011 per station

Supplier	Source	Location	Installed Capacity (MW)	Actual MWh
Eskom	Klipheuwel Windfarm	Klipheuwel	3.2 MW	82.75 MWh
Eskom	Gariiep Hydro-Electric Power Station	Northern Cape	360 MW	8,397 MWh
Eskom	Vanderkloof Hydro-Electric Power Station	Northern Cape	240 MW	19,573 MWh
Eskom	Run of River (RoR) - southern region	First Falls	6.4 MW	
		Second Falls	11 MW	
		Mbashe	42 MW	
		Ncora	2.4 MW	
	Total RoR		61.8 MW	7,700.48 MWh
SAPP	Cahora Bassa	Mozambique & Nampower	2 388.6 MW	425,338 MWh
SAPP	Lesotho Electric Company	Lesotho	72 MW	3,845.85 MWh
Total		Grand Total		464,937.09MWh

4.4 Carbon Reduction

4.4.1 Hazelmere Solar PV Farm

A total of 32 of 38 solar photovoltaic tracker systems were erected north of Durban at Hazelmere to feed into the Eskom grid. The anticipated output was 477 kWp output based on a daily output of eight hours of sun per day and would supplement the energy requirements of the UN Precinct during the hosting of COP17/CMP7. The project included the installation of a demonstration solar tracker in the Central Transport Hub and was used to run a nearby street light for the COP17/CMP7 demonstration.

4.4.2 Durban ICC Street Lighting Project

The Durban ICC street lighting project was part of a joint initiative by Phillips, Eskom, the DEA and the eThekweni Municipality to enhance the street lighting surrounding the ICC. The objective of the project was to replace the existing standard lighting technology with advanced energy efficient road and street luminaires. The retrofitting process involved replacing 149 existing halide lamps with Light Emitting Diodes (LED) lamps that could deliver the same or better quality of light and withstand the coastal environment. The retrofit has offered energy savings of 47.4 MWh per year, a 27% energy savings, as well as an estimated carbon reduction of 48.5 tCO₂ per annum.

4.4.3 Climate Change Response Expo

Several initiatives were put in place to reduce the amount of energy consumed by the Expo from the grid. These included energy efficient lighting throughout the Expo, the use of solar water heaters and the deployment of biodiesel back-up generators. Green design was also a significant feature and a highlight was a Wild Banana Leaf canopy that aimed to reduce the need for air-conditioning. For more information, refer to Chapter 3.

4.4.4 Solar Water Heaters at Clinics

This project was designed to supply, install and maintain 69 solar water heaters in a selection of rural clinics in KwaZulu-Natal. This would provide an affordable and sustainable supply of hot water through a renewable source to these facilities as part of a larger programme to promote solar power in the KwaZulu-Natal province. Three solar water heaters were installed before COP17/CMP7 and were viewed during COP17/CMP7 as part of a side-event that addressed the concept of sustainable energy access for rural communities. The project, which is a legacy of COP17/CMP7, not only ensured a reasonable supply of climate-friendly heated water in social facilities but also provides skills transfer to officials responsible for maintenance at the clinics. The project was funded by GEF and implemented by UNIDO in partnership with DEA.

4.4.5 Cato Manor Green Street

This project retrofitted thirty households in Cato Manor and energy savings were achieved through the installation of energy efficient



Figure 24: Hazelmere Solar Farm

Compact Fluorescent Lightbulbs (CFL) light bulbs; insulated ceiling boards; Light-Emitting Diodes (LED) street lights and heat-insulation cookers known as Wonderbags. For more information, refer to section 6.1.

4.4.6 Sustainable Energy Access for All Initiative

Thirty households in proximity to the Groutville clinic were recipients of renewable energy and energy efficient technologies. Phillips, one of the project sponsors, donated energy efficient cook stoves together with the solar powered torches, lanterns and energy efficient indoor lighting. Two schools received solar water heaters and energy efficient perimeter lighting. For more information, refer to section 6.2.

4.4.7 Non-motorised Transportation

As part of the implementation of the first phase of eThekweni's Non-Motorised Transport Plan, nine bicycle routes were developed prior to COP17/CMP7. A bicycle rental system was established to record incoming and outgoing bicycles. This initiative has not been included in the carbon savings calculations but it is acknowledged that the use of bicycles, even for leisure purposes, assists in the avoidance of carbon emissions associated with motorised transport. For more information, please refer to section 7.4.

4.5 Carbon Sequestration

4.5.1 Nongoma Biodiversity Conservation Programme

Nongoma Biodiversity Conservation Programme entailed the planting of approximately 35,000 trees in and around the Enyokeni Royal Palace. For more information, refer to section 5.4.4.

4.5.2 KZN Integrated Greening Programme

This programme is aimed at the reforestation of particular parts of KwaZulu-Natal and in the process creating jobs for unemployed community members in the growing, planting and maintenance of seedlings. In 2011, the Greening Programme employed 8,400 community facilitators and 25,200 greenpreneurs. Approximately 116,400 trees were planted, 232,800 propagated, and 23,800ha secured for carbon farmers. For more information, refer to section 5.4.5.

4.6 Carbon Offset

One official voluntary carbon offset programme was developed for the event referred to as the Durban CEBA initiative. It was selected and managed by eThekweni Municipality as outlined below.

4.6.1 Durban CEBA Initiative

In the hosting of COP17/CMP7, the Municipality took responsibility for minimising carbon emissions wherever possible and, where minimisation was not possible, to offset the remaining local footprint. In terms of the offset strategy, the Municipality embarked on the development of its own climate adaptation and mitigation project, the Durban CEBA initiative. It is ongoing and being implemented in partnership with local communities, the KwaZulu-Natal Office of the Premier, business and non-governmental agencies. The initiative has been developed in response to the need for vulnerable, impoverished communities in African cities to be active participants in the rapid transformation of their cities towards increased resilience and adaptive capacity to climate change.

Since the Durban CEBA served as South Africa's official COP17/CMP7 Voluntary Offset project, delegates and non-delegates were able to contribute to this initiative by purchasing 'CEBA credits' to offset the environmental impact associated with their attendance at COP17/CMP7. 5,801 credits were purchased during the COP17/CMP7 period, significant portions being purchased by the Bonitas

Medical Fund and by DEA. The uptake by delegates and visitors to Durban was limited.

For more information on the project, please refer to section 5.4.2.

4.6.2 SA Delegation carbon offset

South Africa's official National Government delegation to COP17/CMP7 included various government ministers, officials, politicians, support staff and other aides, estimated at 550 people before the event. Based on this estimation, it was anticipated that the South African delegation would generate approximately 240 tonnesCO₂e, which was offset through supporting the Durban CEBA Initiative and buying CEBA credits. A total of 550 CEBA credits were bought at R100 per credit and this was paid to the Wildlands Trust, the organisation managing the CEBA credits.

Chapter four focused on the carbon avoidance, reduction, sequestration and offset initiatives undertaken in ensuring the commitment made in the Host Country Agreement. The hosting of large, high profile events will inevitably lead to the creation of carbon emissions. South Africa undertook to host a low-carbon event, a commitment it approached in a systematic way with the establishment of the event's carbon footprint. This was accompanied by various initiatives to avoid, reduce and sequester carbon as well as offset carbon emissions created as a result of hosting the event. The integrated carbon footprint, excluding the local footprint, established that 36,736.05 tCO₂ was emitted and 460,295.1 tCO₂ was saved through the various initiatives implemented (excluding 10 and 20 year savings). This demonstrates that South Africa, as the host country, exceeded its commitment to host a low carbon event.