PROMETHIUM CARBON

CARBON FOOTPRINT REPORT

FINANCIAL AND CALENDAR YEAR 2009

GOLD FIELDS

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EXECUTIVE SUMMARY

This report details the calculation of the 2009 carbon footprint for Gold Fields. This study quantifies and reports the greenhouse gas (GHG) emissions based on data received from Gold Fields, at an organizational level, in accordance with ISO 14064. The carbon footprint was calculated for the 2009 calendar and financial year (1 January 2008 – 31 December 2008). In accordance with international protocol, all GHG emissions are reported as tonne CO_2 equivalent.

This year's carbon footprint again consolidated the GHG emissions by the control approach; this included only activities over which Gold Fields has control. This makes for ease of comparison with the baseline carbon footprint (2007). Calculating the footprint on an equity basis is planned for the 2010 footprint, seeing that this year it proved to be difficult as certain of the companies in which Gold Fields has a minority stake have yet to complete their carbon footprint calculations.

Reporting of emissions was more comprehensive this year as it covered a wider range of Scope 3 emissions sources than previous reports (don in accordance with *The Greenhouse Gas Protocol Initiative – Scope 3 Accounting and Reporting Standard (January, 2010)*). Data collection from Gold Fields were also more complete than previous years, but there is still room for improvement for Scope 3 data collection and reporting, specifically for the Australian, Ghanaian, and Peruvian operations and upstream manufacturing in general.

The carbon footprint for C2009 was calculated to be 7.4 million tonnes CO_2-e (C2008: 6,087,525 tonnes CO_2-e). Gold production for the same year was 3,892,020 ounces. The carbon footprint per ounce of gold was determined to be 1.51 tonnes CO_2-e/ounce of gold (weighted emissions intensity only considering Scope 1 and 2 emissions; mine methane excluded) (C2008: 1.40 tonnes CO_2-e/ounce of gold produced).

The South African operations account for 91% of all Gold Fields Scope 1 & 2 emissions for calendar year 2009. These operations are the deepest underground mines of Gold Fields and contribute 52% to total company gold production.

Electricity is by far the greatest source of all Scope 1 and 2 emissions; it accounts for 80% of Scope 1 and 2 emissions.

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1. INTRODUCTION

This report consists of the calculation and evaluation of the GHG inventory around the sites under the operational control of Gold Fields. It is submitted in line with the proposal dated *January 2010* and various discussions between Promethium Carbon (Pty) Ltd. and Gold Fields (Pty.) Ltd.

The operational carbon footprint for both the 2009 financial year (1 July 2008 – 30 June 2009) ("F2009") and the 2009 calendar year ("C2009") are covered in this report. The calendar year carbon footprint provides a more recent picture of the carbon performance of the company and can be compared with carbon footprints of other companies. The financial year carbon footprint is calculated on data that is audited as part of the annual financial audit and is in line with the figures reported in the annual report.

The principles of the ISO standard were applied in this report (ISO 14064-1 - "*Specification with guidance at the organisational level for the quantification and reporting of greenhouse gas emissions and removals*"). Guidelines of the Greenhouse Gas Protocol (www.ghgprotocol.org) were also used.

Data was collected on direct emissions (scope 1), energy indirect emissions (scope 2) and other indirect (scope 3) emissions. Gold Fields supplied all the data used for calculations in this report.

Finally, data were evaluated and compared to the footprints of previous financial and calendar years of Gold Fields.

2. BOUNDARIES

The first step in the calculation of the carbon footprint is to set the boundaries. This is important as it determines which sources and sinks of the organisation must be included in the footprint calculation and which are to be excluded. A diagrammatical representation of the differences between organisational and operational boundaries is presented in Figure 1.

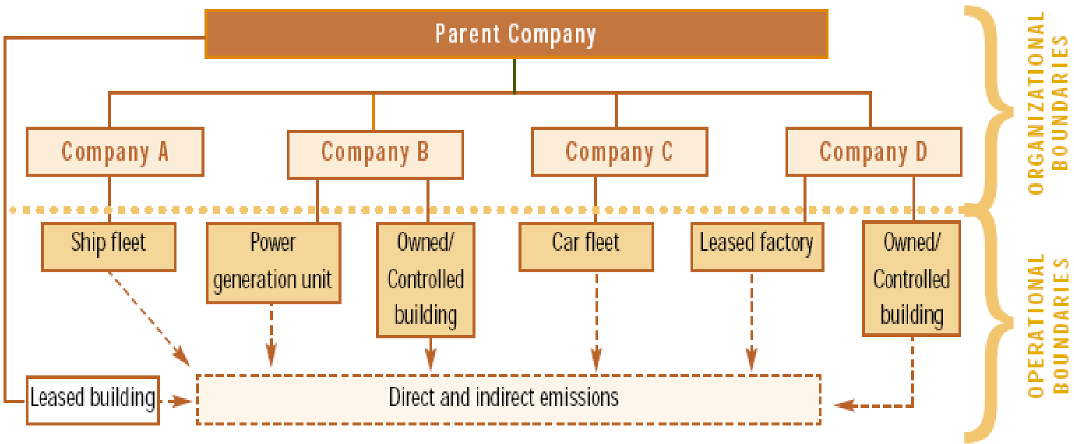


Figure 1: Reporting boundaries (from GHG reporting protocol, a corporate accounting and reporting standard, revised edition)

2.1 ORGANISATIONAL BOUNDARIES

The ISO 14064 standard allows the setting of organisational boundaries on either the control principle or the shareholding principle. Under the **control principle**, all emissions by entities and activities controlled by the organisation must be counted in, in full. Under the **equity share principle** emissions of the entities in which the organisation has a share must be counted proportional to the shareholding.

In accordance with the ISO standard, the organisational boundaries were drawn around all the business **operations controlled by Gold Fields** (see Table 1). This will make it possible to compare the 2009 footprint with the baseline carbon footprint.

Table 1: Gold Fields controlled business operations.

Operation	*Location*	*GPS Co-ordinates*	*Type of Mine*
Driefontein	South Africa	26°24'S 27°30'E	Underground

Kloof	South Africa	26°24’S 27°36’E	Underground
Beatrix	South Africa	28°15’S 26°47’E	Underground
South Deep	South Africa	26º 25’ S 27º 40’ E	Underground
Tarkwa	Ghana	5°15’ N 2°00’ W	Open pit
Damang	Ghana	5°11’N 1°57’W	Open pit
St Ives	Australia	31°12’S 121°40’E	Underground and open pit
Agnew	Australia	27°55`S 120°42`E	Underground and open pit
Cerro Corona	Peru	6°45`S 78°37`W	Open pit

Cerro Corona was excluded from the operational carbon footprint for F2009 as it was still under construction, but is included in the C2009 footprint reporting.

2.2 OPERATIONAL BOUNDARIES

In accordance with the GHG protocol, emissions are classified into three categories: direct GHG emissions (Scope 1), energy indirect GHG emissions (Scope 2); and other indirect GHG emissions (Scope 3).

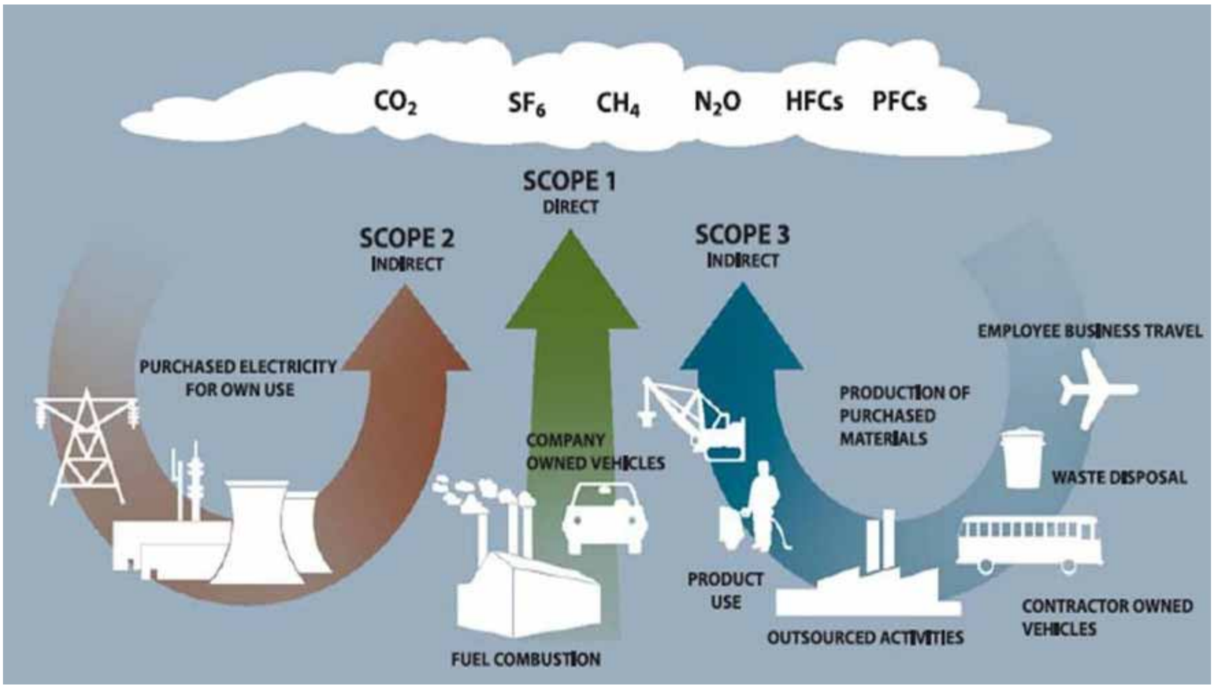


Figure 2: Overview of scopes and emissions across a value chain (The Greenhouse Gas Protocol Initiative – Scope 3 Accounting and Reporting Standard (January, 2010))

The operational boundary was drawn around each of the physical mining sites. Within these boundaries the emissions associated with the following activities are quantified and reported:

- Direct GHG emissions (Scope 1):
  - Fossil fuels consumption - diesel, petrol, LPG, and fuel coal;
  - Fugitive emissions - underground and borehole mine methane, and the use of blasting agents;

- Energy indirect GHG emissions (Scope 2):
  - Utilisation of grid electricity (the emission associated with the production and distribution of electricity from the national grid).

- Other indirect GHG emissions (Scope 3):
  - Extraction and production of purchased goods and services (Scope 1 & 2 emissions of direct suppliers – Tier 1);
  - Transportation and distribution within the company supply chain such as deliveries of raw materials and products;
  - Employee business travel;
  - Use of sold products;
  - Disposal of sold products at the end of their life;

– Employee commuting to and from work, as well as employee teleworking.

Sequestration potential associated with land under management and with wood supports used underground were excluded from both the baseline carbon footprint and this footprint.

Changes to operational boundaries entail the inclusion of borehole mine methane (Scope 1) and all Scope 3 emissions, except transportation within the company supply chain and employee business travel, which were included in previous carbon footprint calculations.

See Figure 3 for a better illustration of where all the emission sources fits in across the value chain, and which were included in this report. All emission source included are circled in red.

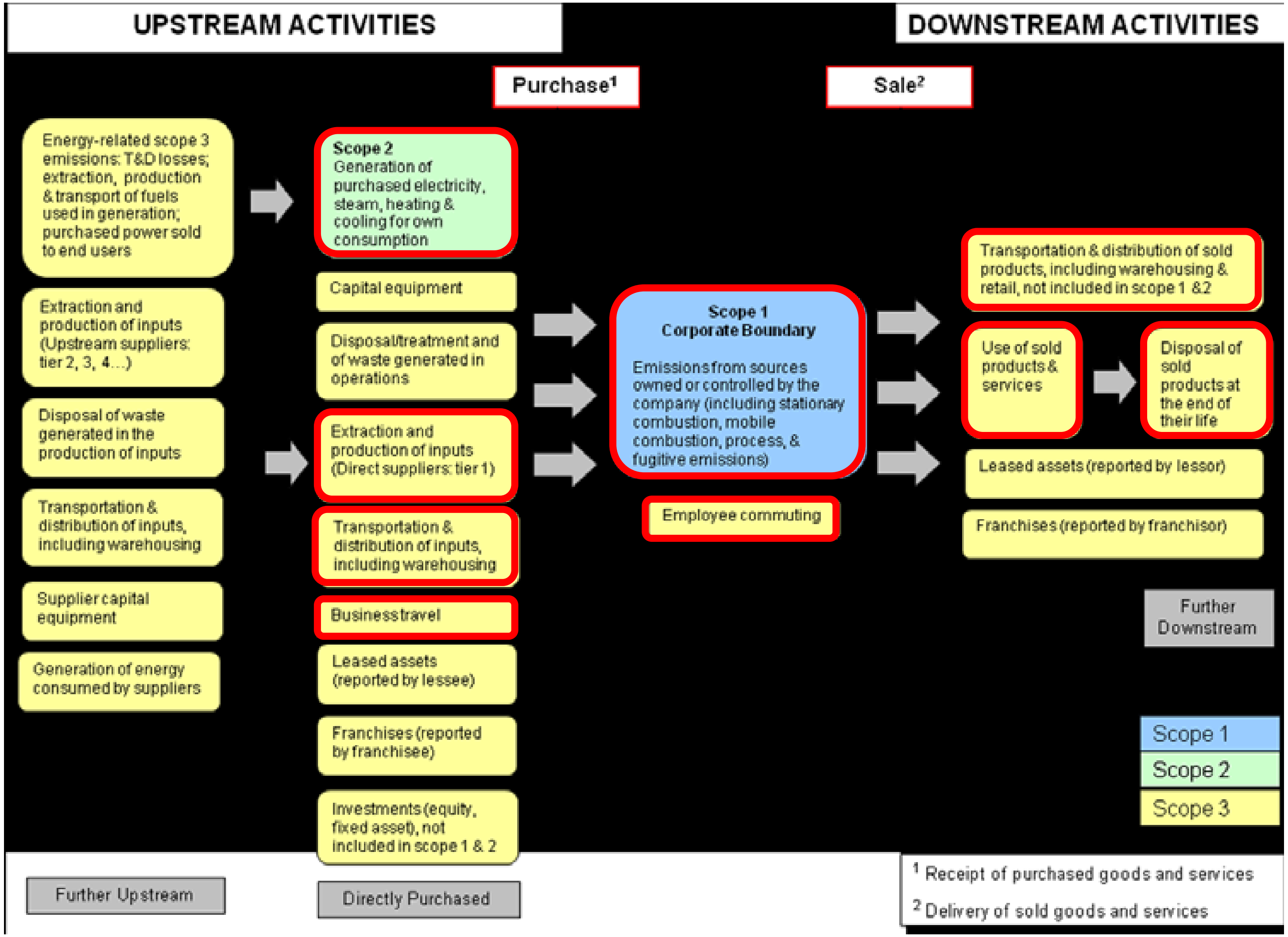


Figure 3: Emitting Activities and Scopes (The Greenhouse Gas Protocol Initiative – Scope 3 Accounting and Reporting Standard (January, 2010))

3. Quantification of GHG Emissions and Removals

The identification of most of the GHG sources was done based on discussions with Gold Fields. This was the first year for which the Scope 3 sources were identified and quantified in accordance with *The Greenhouse Gas Protocol Initiative – Scope 3 Accounting and Reporting Standard* (January, 2010). This made for more complete reporting of Gold Fields Scope 3 emissions, seeing that in previous years only business travel and travel associated with the company supply chain were included. The identified, categorized emission sources can be seen in section 2.2 ("Operational Boundaries") of this report.

3.1 Quantification of GHG Emissions

The main greenhouse gases are carbon dioxide, methane and nitrous oxide. Carbon dioxide is associated with electricity and fuel consumption. Methane is emitted from gold mines when the mining intersects geological faults. Nitrous oxide is formed in small quantities from the combustion of diesel and petrol. As per international protocol, all the greenhouse gases (GHGs) are converted to carbon dioxide using global warming potentials. GHG reporting is done as CO_2 equivalent.

All calculations were done based on GHG activity data multiplied by an appropriate GHG emission factor. Unless stated otherwise, all emission factors were obtained from the International Panel on Climate Change (IPCC). This approach makes it easier to compare the carbon footprint calculated in this report with the baseline footprint.

Electricity consumption is based on electricity invoices. Hence, emissions associated with electricity, the largest emission source, are considered to be accurate. Verification of the overall footprint was provided by Pricewaterhouse Coopers; they concluded that based on their limited assurance procedures, the Gold Fields carbon footprint for 2009 is not materially misstated.

Mine methane are a very large contributor to the direct emissions of Gold Fields, but is only measured at the Beatrix mine. The other South African Operations have small volumes of mine methane. However, this has not been measured this year due to the variability in the methane flow and the technical difficulty of obtaining a measurement. Mine methane can greatly change the carbon footprint for future years if it is to be measured and included for all mines. Mine methane is also very unpredictable, and there is no correlation between gold production and methane release, therefore mine methane can vary from one year to the next.

The emissions associated with direct suppliers (Tier 1) was calculated by either allocating the actual suppliers' emissions (if it could be obtained) to its purchased products based on mass, or by using general industry production energy intensity or emission data, and allocating it to the purchased products based on mass.

Transportation and distribution of purchased and sold products were calculated using actual distances travelled for road, rail, and air freight. Where road actual travel distances were unavailable, an average of 100 km was used. The size of truck used for road transport were not always available, therefore international average emissions for a 17 tonne truck were used as an approximation. Fuel for transport of the gold concentrate produced in South Africa is included in this study. The South African gold is delivered by helicopter to Rand Refinery Ltd, which is a partially owned subsidiary of Gold Fields, for further processing. Although, the gold concentrate produced in Australia, Peru, and Ghana is also transported to refineries, this has not been included in the 2009 carbon footprint due to the unavailability of data. Final distribution of products, via air freight, to the county where it will be used is included based on worldwide production figures (see Figures 4 and 5). All company waste are transported by company-owned vehicles and included in the Scope 1 emissions for diesel consumption.

Emissions from business road and air travel were calculated form distances travelled by hired cars, claimed kilometres, and booked flights by Gold Fields employees. Road travel emissions are a function of the type of vehicle, fuel efficiency and distances travelled. Only travelling distance was obtained from Gold Fields. As the other factors were not available or measured per vehicle used by Gold Fields employees, international average emissions for a medium-sized petrol car were used as an approximation (10 km per litre). Emissions associated with business travel are based on IPCC default values and averages.

For emissions associated with the use of the sold products, very little information was available. It was assumed that all gold will go through the refining and smelting process at least twice (recycled once in its lifetime). Therefore the energy intensity of refining and smelting was taken and used with the appropriate grid emission factor to calculate the emissions associated with the use of the product. It is assumed that this will be the biggest emission source in the use phase of the product seeing that 89.1% of annual worldwide gold production is used for jewellery or investment purposes.

Very little gold go to waste, therefore the emissions associated with disposal of the sold products at the end their life are minimal. Gold used in jewellery and other investments are almost 100% recycled, while its use in electronics, dentistry, and other industrial applications have an 80% recycle rate. No methane from the decomposition of organic waste in Gold Fields landfill sites was included.

Exact figures for employees making use of private travel for commuting to and from work were not obtained. Therefore it was assumed that 20% of all employees travel an average distance of 40 km per day using private transport. All other employees take company busses to the operations. Diesel used by these busses is accounted for in Scope 1 emissions.

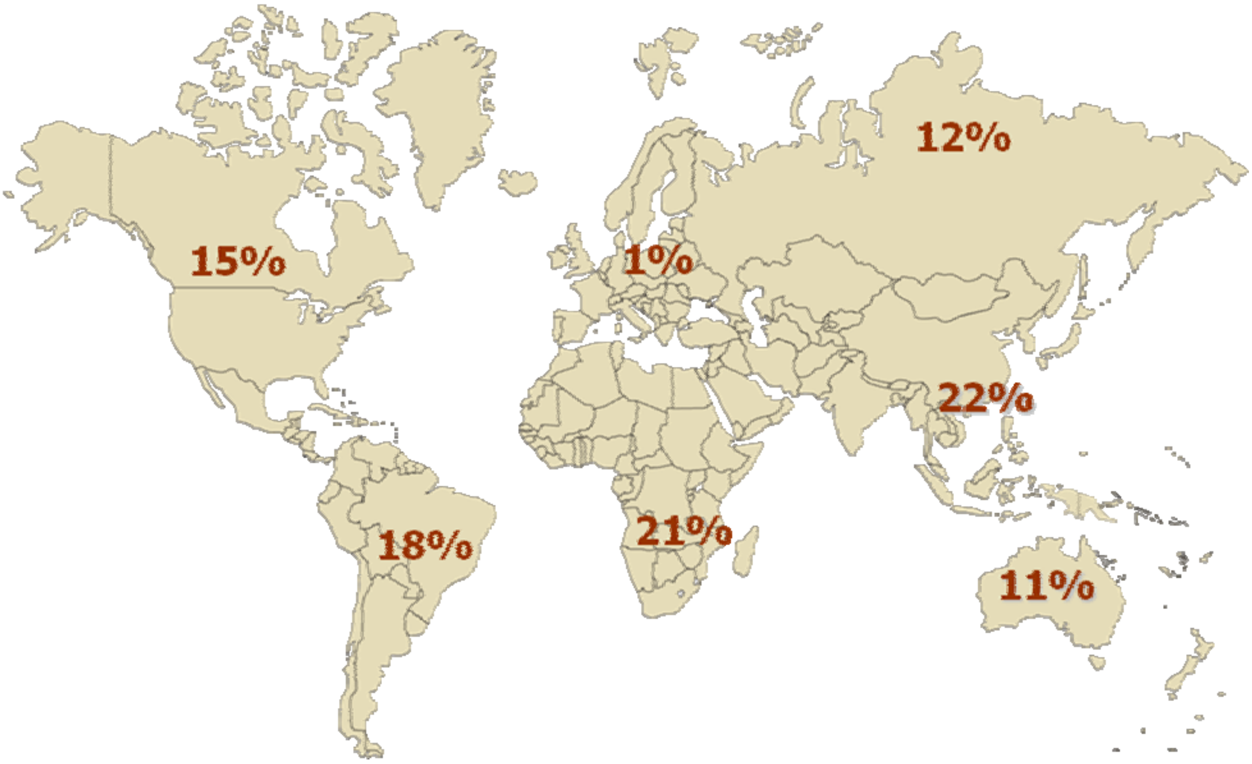


Figure 4: Mined gold in 2005 (GFMS Limited, Gold Survey 2006).

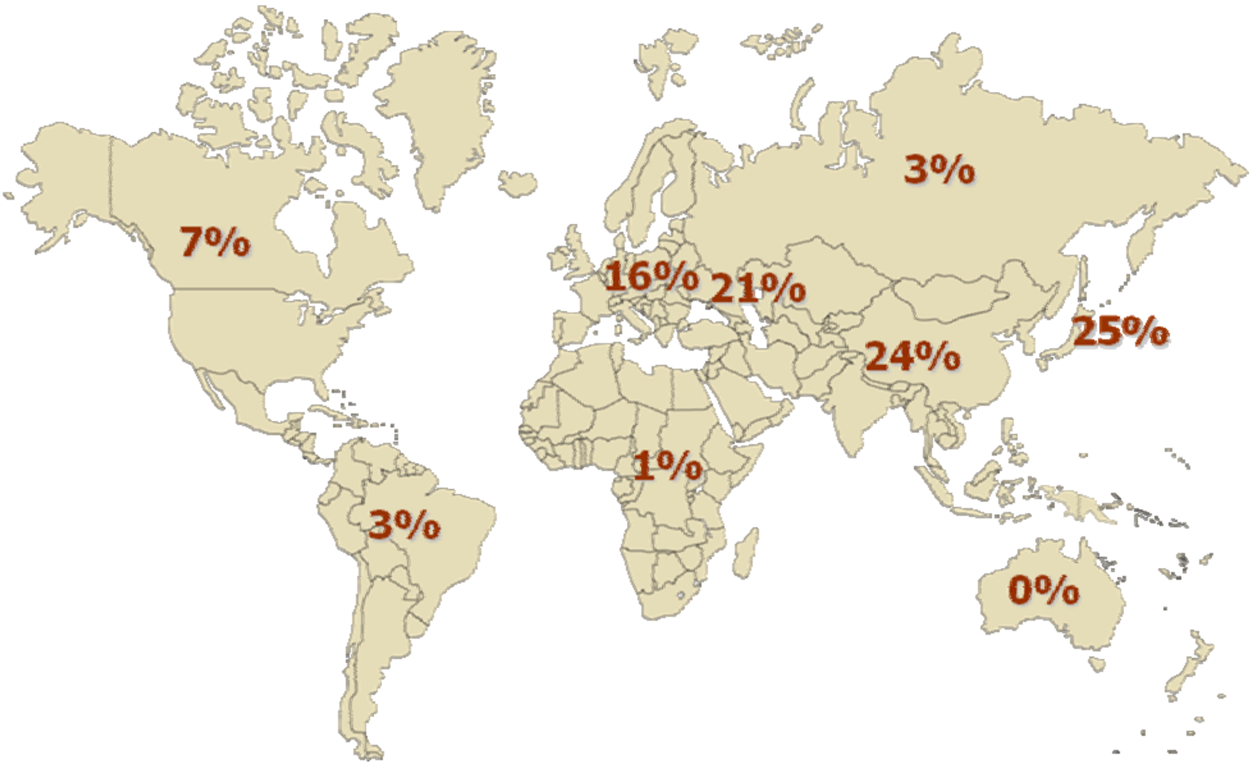


Figure 5: Fabricated demand in 2005 (GFMS Limited, Gold Survey 2006).

3.2 Quantification of GHG Removal

Quantification of the annual GHG removal potential of the vegetation on areas owned by Gold Fields was not included in this study. Excluding the carbon dioxide absorbed in the vegetation is a conservative approach.

3.3 Emission Factors and Other Constants

Table 2: Emission factors and other constants used for quantifying GHGs.

Fuel/Material	***Emission Factor***		***Reference***
	Number	*Unit*	
Diesel	0.0741	metric tonnes CO_2-e per GJ	IPCC 2006 Guidelines
Petrol	0.0693	metric tonnes CO_2-e per GJ	IPCC 2006 Guidelines
LPG	0.0613	metric tonnes CO_2-e per GJ	IPCC 2006 Guidelines
Coal	0.0961	metric tonnes CO_2-e per GJ	IPCC 2006 Guidelines
Fugitive Mine Methane	23	metric tonnes CO_2-e per metric tonne	IPCC 2001 Third Assessment Report
Blasting Agents	0.17	metric tonnes CO_2-e per metric tonne	National Greenhouse Accounts Factors, Jan 2008, www.climatechange.gov.au

South African Electricity Grid	1.03	metric tonnes CO_2-e per MWh	Eskom Annual Report 2009
Ghanaian Electricity Grid	0.15	metric tonnes CO_2-e per MWh	U.S. Department of Energy, http://www.eia.doe.gov/oiaf/1605/pdf/Appendix%20F_r071023.pdf
Australian (North) Electricity Grid	0.585	metric tonnes CO_2-e per MWh	BHP Billiton, personal communication
Australian (South) Electricity Grid	0.575	metric tonnes CO_2-e per MWh	BHP Billiton, personal communication
Peruvian Electricity Grid	0.148	metric tonnes CO_2-e per MWh	U.S. Department of Energy, http://www.eia.doe.gov/oiaf/1605/pdf/Appendix%20F_r071023.pdf
Jet Kerosene	2.55	kg CO_2-e per litre	IPCC 2006 Guidelines
Diesel (production)	0.37	metric tonnes CO_2-e per metric tonne	Shell CDP 2009
Petrol (production)	0.37	metric tonnes CO_2-e per metric tonne	Shell CDP 2009
LPG (production)	0.0046	metric tonnes CO_2-e per metric tonne	Sasol CDP 2009
Coal (production)	0.0181	metric tonnes CO_2-e per metric tonne	Exxaro CDP 2010
Timber (harvested)	0.0219	metric tonnes CO_2-e per m^3	Greenhouse Gas Emissions from Forestry Operations: A Life Cycle Assessment, http://jeq.scijournals.org/cgi/reprint/35/4/1439
Blasting Agents (production)	3.23	metric tonnes CO_2-e per metric tonne	Carbon footprint reduction in blasting, http://miningandblasting.wordpress.com/
Lime (production)	7.013	GJ per metric tonne	International Building Lime Symposium, http://www.nationallime.org/IBLS05Papers/Kenefick.pdf
Cement (production)	4.4	GJ per metric tonne	International Energy Agency 2007, http://www.global-greenhouse-warming.com/cement-CO2-emissions.html
Caustic Soda (production)	16.56	GJ per metric tonne	University of California, http://www.energystar.gov/ia/business/industry/industrial_LBNL-44314.pdf
Water Purification and Supply	0.643	MWh per Ml	Rand Water Annual Report, 2009
Truck Freight	0.187	kg CO_2-e per metric tonne km	DEFRA,

			http://www.defra.gov.uk/environment/business/envrp/pdf/passenger-transport.pdf
Passenger Flight (<425 km)	0.18	kg CO_2-e per km	GHG Protocol Initiative, http://www.eci.ox.ac.uk/research/energy/downloads/jardine09-carboninflights.pdf
Passenger Flight (<1600 km)	0.13	kg CO_2-e per km	GHG Protocol Initiative, http://www.eci.ox.ac.uk/research/energy/downloads/jardine09-carboninflights.pdf
Passenger Flight (>1600 km)	0.11	kg CO_2-e per km	GHG Protocol Initiative, http://www.eci.ox.ac.uk/research/energy/downloads/jardine09-carboninflights.pdf
Cargo flight (approx 10,000km)	0.6	kg CO_2-e per metric tonne km	DEFRA, http://www.defra.gov.uk/environment/business/envrp/pdf/passenger-transport.pdf
Cargo flight (approx 1000km)	1.32	kg CO_2-e per metric tonne km	DEFRA, http://www.defra.gov.uk/environment/business/envrp/pdf/passenger-transport.pdf
Gold Refining and Smelting	41.74	GJ per metric tonne	National Resources Canada, http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/tableshandbook2/agg_00_6_e_7.cfm?attr=0
Disposal emission factor	0.0367	metric tonnes CO_2-e per metric tonne	EPA 2002, www.epa.gov/climatechange/wycd/waste/downloads/greengas.pdf

4. Results: Greenhouse Gas Inventory Evaluation

4.1 *Scope I - Direct GHG Emissions*

Direct onsite greenhouse gas emissions (Scope 1) are due to on-site fossil fuel consumption and fugitive emissions associated with explosive consumption and the release of methane due to mining activities.

Table 3: Scope 1 emissions for F2007 – C2009 (tonne CO_2-e)

Operation	*F2007*	*C2007*	*F2008*	*C2008*	*F2009*	*C2009*
Beatrix	908,483	908,439	907,954	907,689	902,093	945,103
Beatrix (excl. mine methane)	38,847	38,802	38,318	38,053	35,768	44,869
Driefontein	7,696	7,595	7,530	7,111	7,392	6,974
Kloof	7,469	7,455	9,162	8,223	7,056	6,192
South Deep	3,039	3,039	6,271	6,271	6,341	8,460
Tarkwa	143,976	170,050	178,631	182,576	180,574	179,397
Damang	90,747	97,548	73,373	55,754	48,439	43,491
St Ives	63,279	69,647	81,248	94,241	100,483	95,358
Agnew	29,269	19,591	12,552	13,231	12,638	12,717
Cerro Corona	-	-	-	-	0	11,072
Total	**1,253,958**	**1,283,364**	**1,276,721**	**1,275,096**	**1,265,017**	**1,308,764**

Beatrix has by far the largest direct emissions of all the operations, responsible for 72% of the total Scope 1 emissions for the 2009 calendar year. This is due to the mine methane, which is only reported for Beatrix, and comprises 95% of all the Beatrix direct emissions.

Mine methane is found in geological faults in the Witwatersrand and Free State Mines. The origin of this mine methane is unknown; it could be bacterial, hydrothermal, abiogenic or a mixture of all of these. Therefore, gold mine methane differs from coal mine methane. Coal mine methane is released as coal is mined and is a function of the amount of coal mined. Gold mine methane is released only when a geological fault containing methane is encountered in the mining process. This makes the flowrate of methane difficult to predict and control.

Current practice is to dilute the mine methane to acceptable levels with air and vent it to the atmosphere. Beatrix mine is in the process of collecting the mine methane in concentrated form and piping it up the main shaft. Once on surface, this methane will be used to generate electricity for the mine. The flowrate of methane is difficult to predict; provision has been made for a flare to be installed to combust excess methane.

Apart from the main shaft mine methane, there are 5 boreholes where methane is escaping and for which the flowrates are measured. For F2009 and C2009 calculations, the borehole methane is included in the mine methane calculations. This was not done in the reporting of previous years, therefore the figures for F2007-C2008 are restated in this report.

Mine methane emissions constitute 69% of the total direct emissions for Gold Fields for the 2009 calendar year, and seeing that mine methane is only reported for Beatrix, it distorts the picture for comparing different sites. For ease of comparison, the total direct emissions for Beatrix are reported excluding mine methane to give an indication of the emissions from purchased fossil fuels.

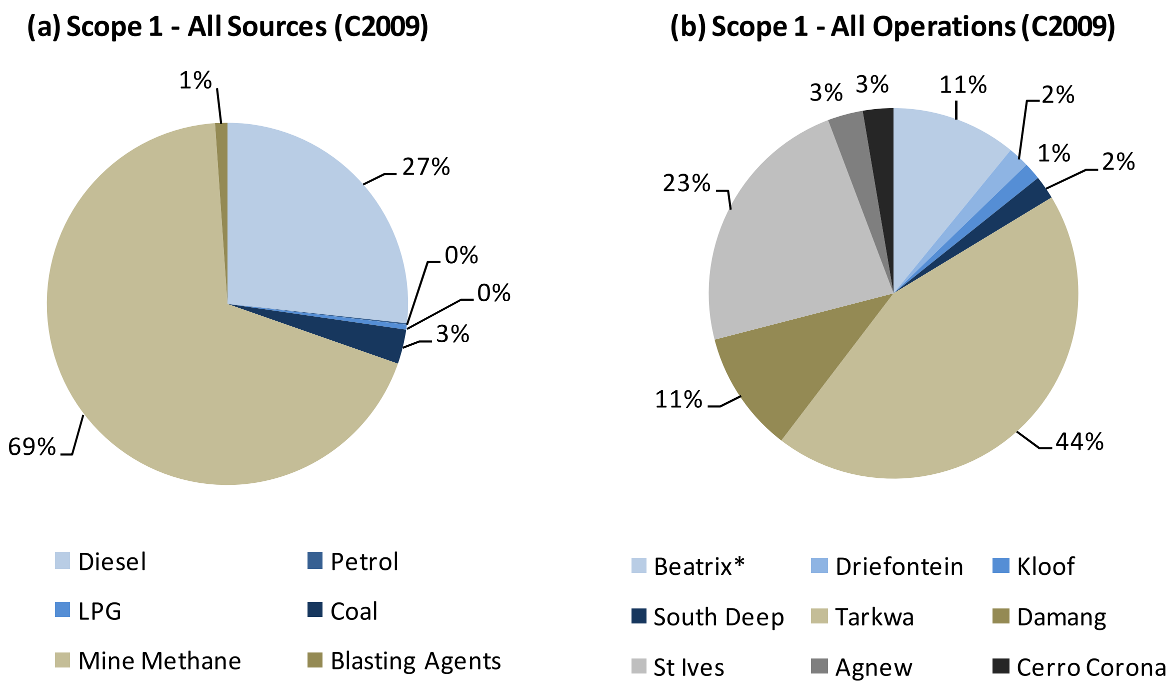


Figure 6: Scope 1 (a) Emissions by all source; (b) Emissions of all operations (*excluding mine methane)

The Beatrix direct emissions reduced from 945,383 to 45,148 tonnes CO_2-e upon the exclusion of the mine methane in the 2009 calendar year. This makes Tarkwa (44%), St Ives (23%) and Damang (11%) the largest contributors to the direct emissions. Second to mine methane, diesel is the largest emission source. Tarkwa and Damang are both opencast mines and are therefore heavy on diesel consumption. St Ives is both an underground and opencast mine.

4.2 Scope 2 - Energy Indirect GHG Emissions

The Gold Fields operations in South Africa use Eskom Electricity from the national grid. The South African National Grid is coal-based, therefore the emission factor per MWh of electricity consumed is very high. The emission factor used to calculate emissions associated with electricity consumption in South Africa is 1.03 tonne CO_2-e/MWh.

In Australia, the two Gold Fields sites receive electricity from gas turbine generators operated on natural gas by BHP Billiton. St Ives is fed from the Southern System, whilst Angew is fed from the Northern System. The emission factors used for the Southern and Northern Systems are 0.575 tonnes CO_2-e/MWh and 0.585 tons CO_2-e/MWh respectively.

Ghanaian generators have an installed capacity of more than 1,650 MW. About 1,100 MW is hydroelectric and 550 MW is thermal capacity burning light crude oil. Owing to the large component of renewable energy, the grid emission factor for Ghana is 0.15 tonnes CO_2-e/MWh in accordance with the "Voluntary Reporting of Greenhouse Gases" by the U.S. Department of Energy (2007).

Also from the latter source, the Peruvian grid emission factor is 0.148 tonnes CO_2-e/MWh. Even though installed capacity in Peru is evenly divided between hydro and conventional thermal, 88 percent of Peru's total electricity supply is generated by hydroelectric facilities, with thermal plants providing supply only during peak usage or when natural conditions dampen hydroelectric output.

Table 4: Scope 2 emissions for F2007 – C2009 (tonne CO_2-e)

Operation	***F2007***	***C2007***	***F2008***	***C2008***	***F2009***	***C2009***
Beatrix	863,460	887,076	889,657	854,724	873,458	856,940
Driefontein	1,904,075	1,877,273	1,726,917	1,619,938	1,718,565	1,726,566
Kloof	1,883,957	1,789,676	1,751,495	1,676,459	1,693,375	1,752,524
South Deep	489,000	489,000	456,718	456,718	526,697	550,663
Tarkwa	30,042	32,331	32,146	32,607	37,540	45,786
Damang	13,141	11,987	13,444	15,277	15,781	16,341
St Ives	110,543	109,355	110,037	117,893	108,617	102,725
Agnew	30,111	30,072	31,812	32,500	30,774	30,273
Cerro Corona	-	-	-	-	0	11,692
Total	**5,324,329**	**5,226,770**	**5,012,226**	**4,806,116**	**5,004,807**	**5,093,510**

The South African operations have the largest energy indirect GHG emissions of all the international operations. This is due to the high energy intensity of underground mines (as result of ventilation and water pumping) compounded with a high South African grid emission factor.

Driefontein and Kloof are the two operations with the largest energy indirect GHG emissions; together accounting for 68% of the total Scope 2 emissions. They are also the deepest mines operated by Gold Fields with Driefontein and Kloof at approximately 3,300 and 3,347 meters below the surface, respectively.

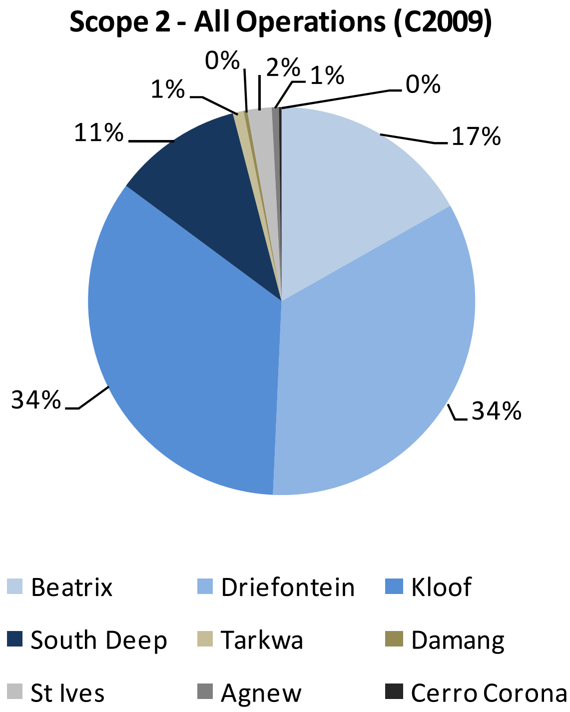


Figure 7: Scope 2 emissions of all operations

4.3 SCOPE 1 & 2 GHG EMISSIONS COMPARISON

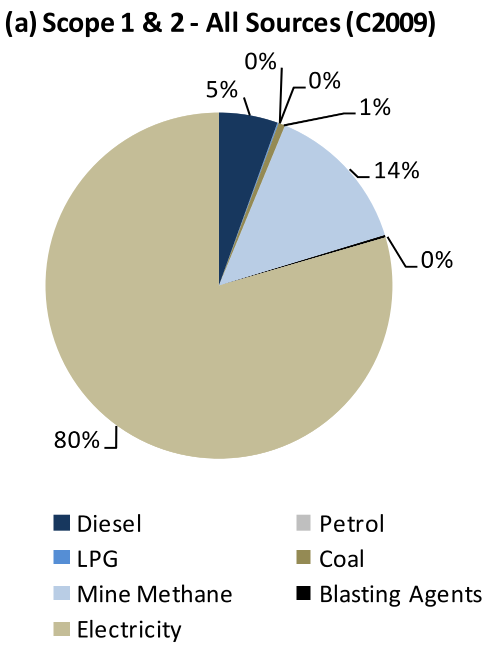
Scope 1 and 2 emissions are usually more under the control of a company than Scope 3 emissions. The fuels burned, types of explosives used, and electricity consumed can normally be controlled and attempts could be made to reduce it.

Beatrix is the operation with the largest Scope 1 and 2 emissions of all within Gold Fields. This is owing to the large volume of mine methane that is released per year. The second largest contributors to the group's carbon footprint are Driefontein and Kloof, which are both deep-level South African Mines.

Driefontein and Kloof are responsible for 54% of the 2009 calendar year Scope 1 and 2 emissions. However, they are also the largest gold producing mines within the group; contributing 37% towards gold production in C2009.

The South African operations account for 91% of all Gold Fields Scope 1 & 2 emissions for C2009.

Electricity is by far the greatest source of all Scope 1 and 2 emissions; it accounts for 80% of the emissions. Mine methane (14%) is second, followed by diesel (5%).



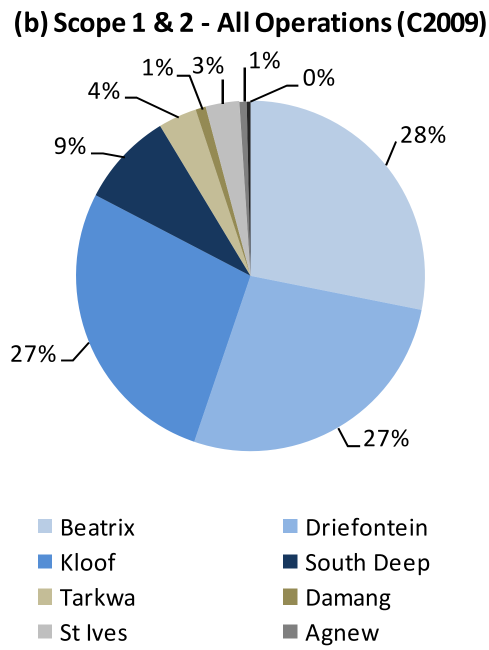


Figure 8: Scope 1 & 2 (a) Emissions by all sources; (b) Emissions of all operations

Table 5: Scope 1 & 2 emissions for F2007 – C2009 (tonne CO_2-e)

Operation	*F2007*	*C2007*	*F2008*	*C2008*	*F2009*	*C2009*
Beatrix	1,771,943	1,795,515	1,797,611	1,762,413	1,775,551	1,802,322
Beatrix (excl. mine methane)	902,307	925,878	927,975	892,777	909,225	901,809
Driefontein	1,911,771	1,884,867	1,734,447	1,627,049	1,725,957	1,733,539
Kloof	1,891,426	1,797,131	1,760,657	1,684,682	1,700,432	1,758,716
South Deep	492,039	492,039	462,990	462,990	533,038	559,123
Tarkwa	174,019	202,381	210,777	215,183	218,114	225,182
Damang	103,888	109,535	86,818	71,030	64,220	59,833
St Ives	173,822	179,001	191,286	212,134	209,100	198,083
Agnew	59,380	49,663	44,364	45,730	43,411	42,989
Cerro Corona	-	-	-	-	-	22,765
Total	**6,578,288**	**6,510,132**	**6,288,950**	**6,081,211**	**6,269,823**	**6,402,274**

Comparing only the total emissions of different years does not carry much substance without also looking at production figures. A better analysis and explanation of changes in emissions can be made by calculating and comparing emission intensities.

The emissions per ounce of gold depend heavily on the grade of the ore, the strip ratio and whether it is mined underground or open-cast. With a lower ore grade, more ore will need to be moved and more energy used to produce the same amount of gold. A high strip ratio means that more rock must be moved to access the ore body; thus more energy is used for moving the rock, yet gold is not produced.

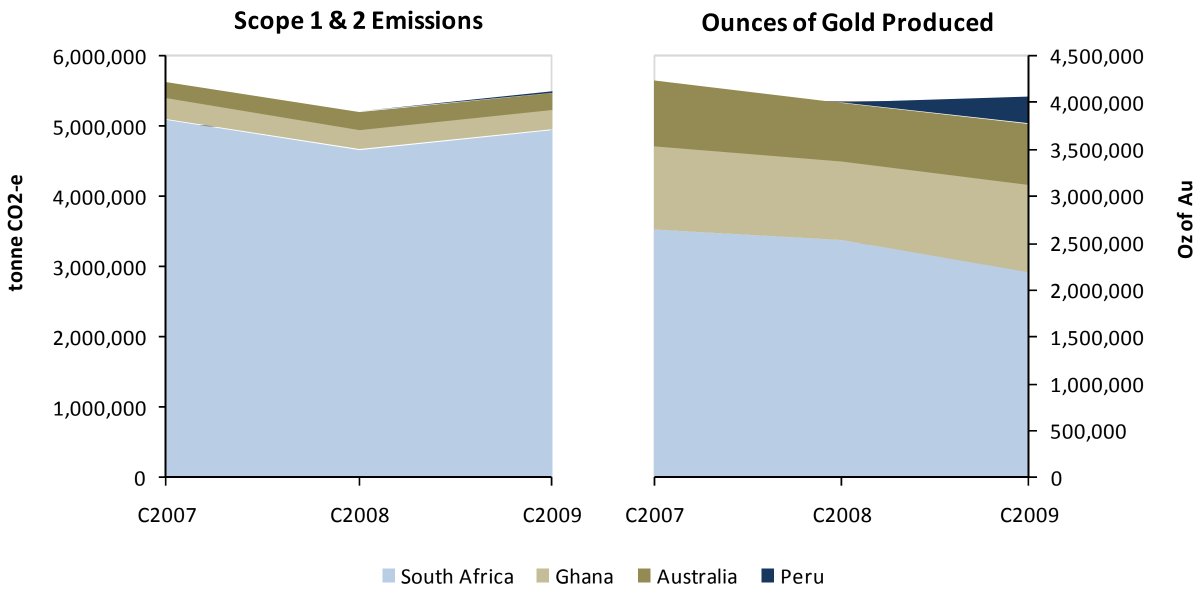


Figure 9: Regional Scope 1 and 2 emissions and gold production.

As in previous reports, emission intensities are calculated on the basis of tonne CO_2-e per ounce of gold produced. Weighted emission intensities were also calculated for C2009 to standardise the intensities by taking into account the change in ore grade and average mining depth. This gives a better representation of the Gold Fields operational emission intensities and change thereof.

By dividing the ounces of gold produced by the amount of ore milled, an ore grade is obtained for a specific operation. The inverse of the ratio of two sequential years' ore grades, as well as the ratio of two sequential years' average mining depths, are then multiplied by the original emission intensity (on the basis of tonne CO_2-e per ounce of gold produced), to obtain the weighted emission intensity.

Table 6: Emissions Intensities for C2008 and C2009.

Operation	Emission Intensity (tonne CO_2-e/ounce gold)			Weighted Emission Intensity		
	C2008	C2009	% Change	C2008	C2009	% Change
Beatrix	3.94	4.74	20.38	3.94	4.04	2.62
Beatrix (excl. mine methane)	1.99	2.37	18.94	1.99	2.02	1.38
Driefontein	1.79	2.20	22.89	1.79	1.85	3.59
Kloof	2.32	2.74	18.27	2.32	2.55	10.19
South Deep	2.56	2.62	2.17	2.56	1.90	-25.91
Tarkwa	0.33	0.32	-4.24	0.33	0.37	10.44
Damang	0.37	0.28	-24.27	0.37	0.29	-21.59
St Ives	0.51	0.45	-11.99	0.51	0.49	-3.78
Agnew	0.22	0.21	-4.58	0.22	0.26	16.70
Cerro Corona	-	0.08				
Total	**1.40**	**1.41**	**1.21**	**1.40**	**1.51**	**8.06**

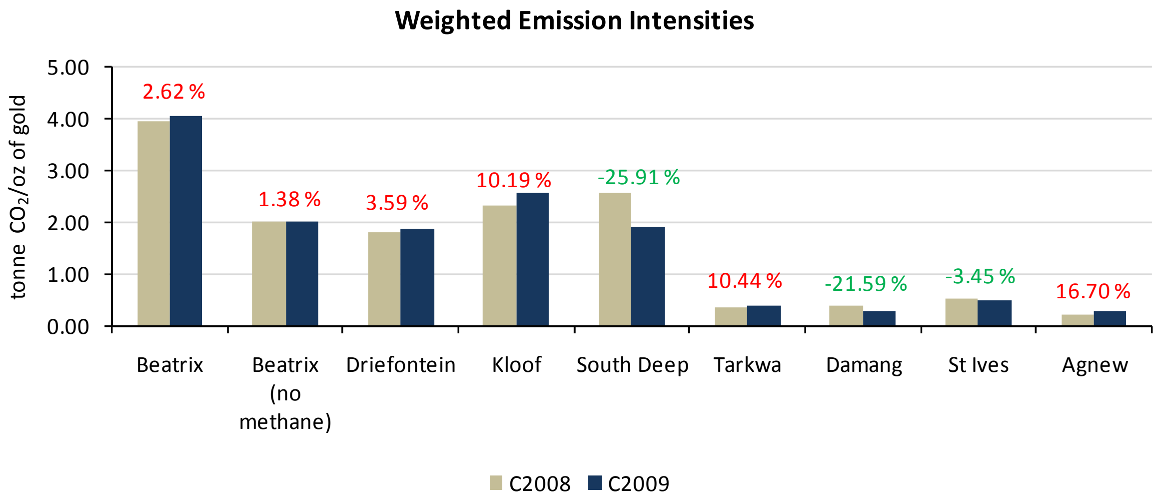


Figure 10: Illustration of change in weighted emission intensities.

Unless otherwise stated, weighted emission intensities for C008 and C2009 will be discussed.

Beatrix increased by 1.38% from 1.99 tCO_2/oz in 2008 to 2.02 tCO_2/oz in 2009. This target excludes the mine methane emissions as these emissions distort the operation results and makes it difficult to measure progress. If the mine methane is included, the emission intensity increased by 2.62% due to a reduction of 15% in the gold output from the mine. The implementation of the Beatrix methane capture CDM project will significantly reduce the mine methane emissions.

Driefontein increased by 3.59% from 1.79 tCO_2/oz in 2008 to 1.85 tCO_2/oz in 2009. The increase is mostly due to deeper mining, which requires more energy.

Kloof increased by 10.19% from 2.32 tCO_2/oz in 2008 to 2.55 tCO_2/oz in 2009. Despite an in increase in ore grade and decrease in mining depth, the footprint increased. Reporting is distorted by the accelerated infrastructure replacement program which increased emissions and lowered gold production.

Driefontein, Kloof and Beatrix together represents 46.6% of gold production. The ounces of gold produced per ton ore milled dropped at these three operations. This had the effect of producing less gold for the same energy consumption. In these operations, there is a base load electricity consumption required for water pumping and ventilation, which is independent of the amount of gold produced.

South Deep decreased by 25.91% from 2.56 tCO_2/oz in 2008 to 1.90 tCO_2/oz in 2009. The dramatic decrease in emission intensity at South Deep is due to the ramp-up of production. Increased production is mechanised and therefore sensitive to diesel consumption; hence the increase in total Scope 1 and 2 emissions for this operation.

Tarkwa increased by 10.44% from 0.33 tCO_2/oz in 2008 to 0.37 tCO_2/oz in 2009. Gold Fields has been in the process of upgrading the Carbon in Leach (CIL) plant to a gold extraction plant, which causes a decline in gold production, yet ore movement remains constant as we continue to stockpile ore in anticipation of the plant upgrade being completed.

Damang reduced by 21.59% from 0.37 tCO_2/oz on 2008 to 0.29 tCO_2/oz in 2009. The footprint per ounce of gold decreased for Damang along with the diesel and explosives consumption. Damang has completed a lot of its waste stripping and is now focusing on the ore body. Thus less diesel and less explosives are required in order to move the waste and expose the ore body.

St Ives reduced by 3.78% from 0.51 tCO_2/oz in 2008 to 0.49 tCO_2/oz in 2009. The St Ives footprint has decreased for the same reasons as Damang. Gold production has also increased.

Agnew increased by 16.7% from 0.22 tCO_2/oz in 2008 to 0.26 tCO_2/oz in 2009. The emissions only slightly decreased, together with a decrease in gold production. The increase in weighted emissions intensity is due to an increase in the ore grade; hence the increase in ore grade was not accompanied by a decrease in emissions.

4.4 Scope 3 - Other Indirect Emissions

A more complete Scope 3 study was done this year which resulted in more sources and higher values for emissions. For this reason the Scope 3 emissions will not be compared with previous years' footprints.

Scope 3 emissions are sometimes difficult to assign to a specific operation, or even a region, therefore, the reporting method for different sources may vary.

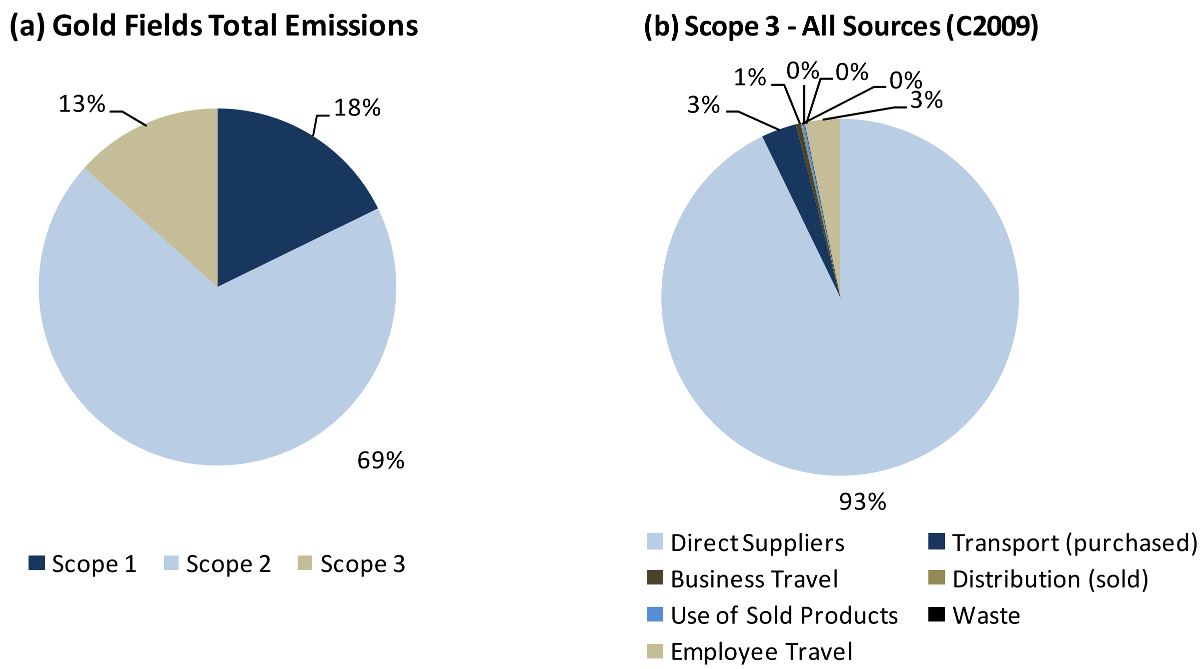


Figure 11: (a) Overall Gold Fields GHG emissions by category; (b) Scope 3 emissions by source.

From Figure 9 it is seen that current quantification of Scope 3 emissions account for 13% of the overall Gold Fields GHG emissions. Emissions of Direct Suppliers (93%) are the largest Scope 3 source, followed by the transportation of purchased goods (3%). Emissions of Direct Suppliers include diesel, petrol, LPG, coal, timber, blasting agents, lime, cement, caustic soda, and purchased water.

Seeing that this is the first year that emissions for direct suppliers are reported, the total Scope 3 emissions, and in turn the overall GHG emissions of Gold Fields, are much larger than previous years (see Figure 10).

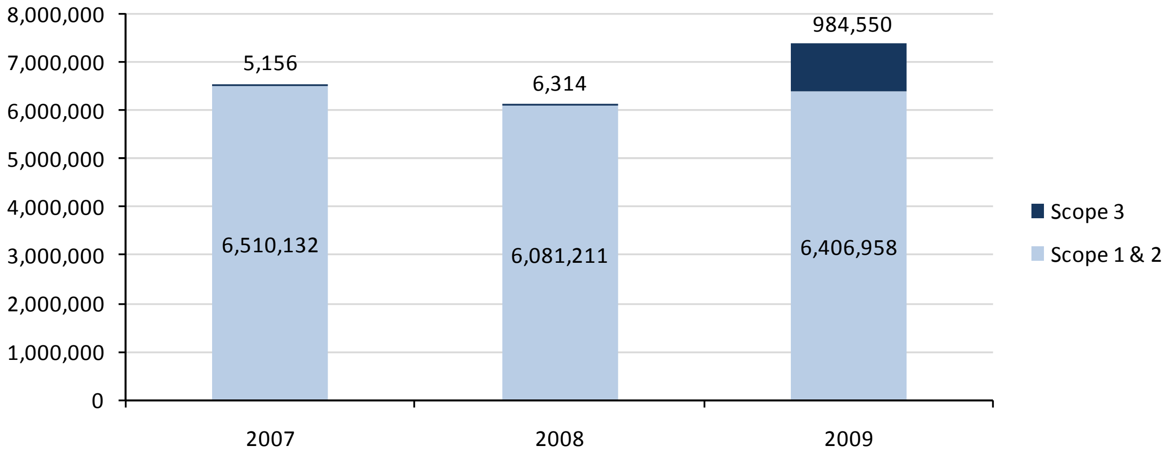


Figure 12: Total GHG emission of Gold Fields for C2007-C2009 (including mine methane).

5. Conclusions

A carbon survey was conducted in accordance with ISO 14064. The resultant overall carbon footprint of Gold Fields for the 2009 calendar year is 7,396,535 tonnes CO_2-e (C2008: 6,087,525 tonnes CO_2-e) and 1.51 tonnes CO_2-e/ounce of gold (weighted emissions intensity; mine methane excluded) (C2008: 1.40 tonnes CO_2-e/ounce of gold).

The large increase in the total GHG emissions can be attributed to more complete reporting and the inclusion of more emissions sources, specifically for Scope 3 emissions. The increase in overall emission intensity is mostly due to a drop in ounces gold produced per ton ore milled at Driefontein, Kloof, and Beatrix. There is a base load electricity consumption required for water pumping and ventilation, which is independent of the amount of gold produced. The latter operations together represent 46.6% of gold production in Gold Fields.

We believe that this assessment and future carbon audits will complement the image of Gold Fields and will provide a sound basis for participating in the Carbon Disclosure Project, identifying reduction opportunities and creating awareness of the impacts of climate change.

Gold Fields could improve the GHG information management by:

- A system to update the carbon footprint on a 6 monthly basis to avoid the confusion created by reporting on the calendar year and not the financial year.
- Periodic internal audits and verification of GHG data and possibility of integrating the footprint with the GRI system.
- Further development of the program to report the carbon footprint on an equity-basis.
- Identification and review of the responsibility and authority of those responsible for GHG inventory development.
- Measurements of mine methane present at all underground operations.
- More accurate information on number of trips and distance per trip for raw material and product deliveries.
- More information on business travel of international operations. Some of the international operations do not have a system in place for collecting this information.
- Company surveys can be conducted to more accurately report on employee commuting.
- Quantification of the vegetative component of the carbon footprint.