An analysis of approved Clean Development Mechanism (CDM) projects in South Africa[1]

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CDM: About[2]

The Clean Development Mechanism (CDM) is one of the flexibility mechanisms defined in the Kyoto Protocol that provides for emissions reduction projects which generate Certified Emission Reduction (CER) units which may be traded in emissions trading schemes.

The CDM is defined in Article 12 of the Protocol, and is intended to meet two objectives:

(1) To assist parties not included in Annex I (developed/industrialised nations[3]), in achieving sustainable development and in contributing to the ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC), which is to prevent dangerous climate change; and

(2) To assist parties included in Annex I in achieving compliance with their quantified emission limitation and reduction commitments (greenhouse gas (GHG) emission caps).

The CDM addresses the second objective by allowing the Annex I countries to meet part of their emission reduction commitments under the Kyoto Protocol by buying Certified Emission Reduction units from CDM emission reduction projects in developing countries. The projects and the issue of CERs are subject to approval to ensure that these emission reductions are real and 'additional.' The CDM is supervised by the CDM Executive Board (CDM EB) and is under the guidance of the Conference of the Parties (COP/MOP) of the United Nations Framework Convention on Climate Change (UNFCCC).

The CDM allows industrialised countries to buy CERs and to invest in emission reductions where it is cheapest globally. Between 2001, the first year CDM projects could be registered, and 7 September 2012, the CDM issued 1 billion CER units.

As of 1 June 2013, 57% of all CERS had been issued for projects based on destroying either HFC-23 (38%) or N2O (19%).

Carbon capture and storage (CCS) was included in the CDM carbon offsetting scheme in December 2011.

Criticism

However, a number of weaknesses of the CDM have been identified (World Bank, 2010). Several of these issues were addressed by the new Program of Activities (PoA) that moves to approving 'bundles' of projects instead of accrediting each project individually. In 2012, the report *Climate change, carbon markets and the CDM: A call to action* said governments urgently needed to address the future of the CDM.

It suggested the CDM was in danger of collapse because of the low price of carbon and the failure of governments to guarantee its existence into the future.

Key to the CDM is the concept of 'additionally', meaning that the project receiving funding via the CDM will result in reductions in greenhouse gas emissions that would not have otherwise been achieved.

[2] Sources: Wikipedia, CDM Investment guide, Carbon Trade Watch.
[3] Annex I parties are those countries that are listed in Annex I of the treaty, and are the industrialised countries. Non-Annex I parties are developing countries.

This has been a major criticism of CDM registered projects in South Africa. Carbon Trade Watch for example cites the example of a South African brick kiln faced with a business decision whether to replace its depleted energy supply with coal from a new mine, or build a difficult but cleaner natural gas pipeline to another country. They chose to build the pipeline with SASOL. SASOL claimed the difference in GHG emissions as a CDM credit, comparing emissions from the pipeline to the contemplated coal mine. During its approval process, the validators noted that changing the supply from coal to gas met the CDM's 'additionally' criteria and was the least cost-effective option. However, there were unofficial reports that the fuel change was going to take place anyway, although this was later denied by the company's press office, according to Carbon Trade Watch.

Similarly, according to Business Report ("Eskom told to charge companies fair rates", Business Report, 23 February 2010), in late February 2010, climate change activists and concerned individuals from around the globe voiced their objection to a proposed $3 billion loan that would fund two new coal-fired power plants in South Africa that would be operated by Eskom. The well-organised group, which includes Climate Justice Now, and the Federation for a Sustainable Environment, vowed to pressure country directors within the World Bank to vote against the loan in March 2010 and also said they would revive the World Bank 'bond boycott' that was launched last decade to end structural adjustment programmes and anti-environmental projects funded by the Bank.

Inger Andersen, World Bank's director for sustainable development in Africa, said the loan would support the "responsible use of coal as an interim resource for power generation, given lack of viable alternatives". The opposition groups countered, that if granted, the loan would destroy the image the World Bank is portraying of a climate-friendly financier. In order to power the new coal plants, over 40 new mines would have to be opened up in the region. The proposed plants would also increase utility rates to consumers. Large environmental groups such as the Sierra Club have signed a petition that opposes the loan.

However, some South African academics, led by Harold Winkler (2007) in particular, argue that because mining and manufacturing makes up the lion's share of energy usage in South Africa (and therefore carbon emissions), that the promotion of energy efficiency projects within these sectors, funded by the CDM, are major savings in terms of carbon emissions and are not therefore in violation of the concept of 'additionally'.

> *"Analysis of barriers, which is well understood by those dealing with energy efficiency, can be used to demonstrate additionally. A standard tool for demonstrating additionally is now available, as are baseline methodologies for both large and small-scale CDM projects. It should, therefore, be clear that energy efficiency projects are not* a priori *ruled out as non-additional. Each project has to demonstrate additionally, as for any other project type."* (Winkler, 2007).

Abstract

Objectives of the research:

- There are 54 CDM projects registered in South Africa, and a further 0 pending registration and 4 rejected.
- The assumption is that project funding from the CDM is contributing to the development of new and innovative carbon offset projects in South Africa and the world.
- The object of these projects is to align with the overall goals and objectives of the Kyoto Protocol 1997.

First, the paper will segment/categorise projects according to industry type (mining, chemicals manufacturing etc.), and determine the nature of their ownership, and Parent. This is important since many environmentalists have accused the minerals and energy complex in South Africa of 'green-washing' the CDM.

This brief paper will then tabulate and describe the projects which have received funding, and thereafter make conclusions as to the nature of the project activities to determine if 'additionally' criteria reasonably apply. Projects red flagged in terms of these criteria should warrant further research and investigation. In addition, projects contributing electricity to the national grid, funded by CDM resources, it is safe to assume, would be generating increased revenues for the project/parent company. In this regard, what is warranted is a further investigation of the potentially profit-led motives of several projects. The issue is further compounded by the intention of many projects to re-package these activities for sale as 'carbon credits' on the international carbon credit market, generating further profit.

Method

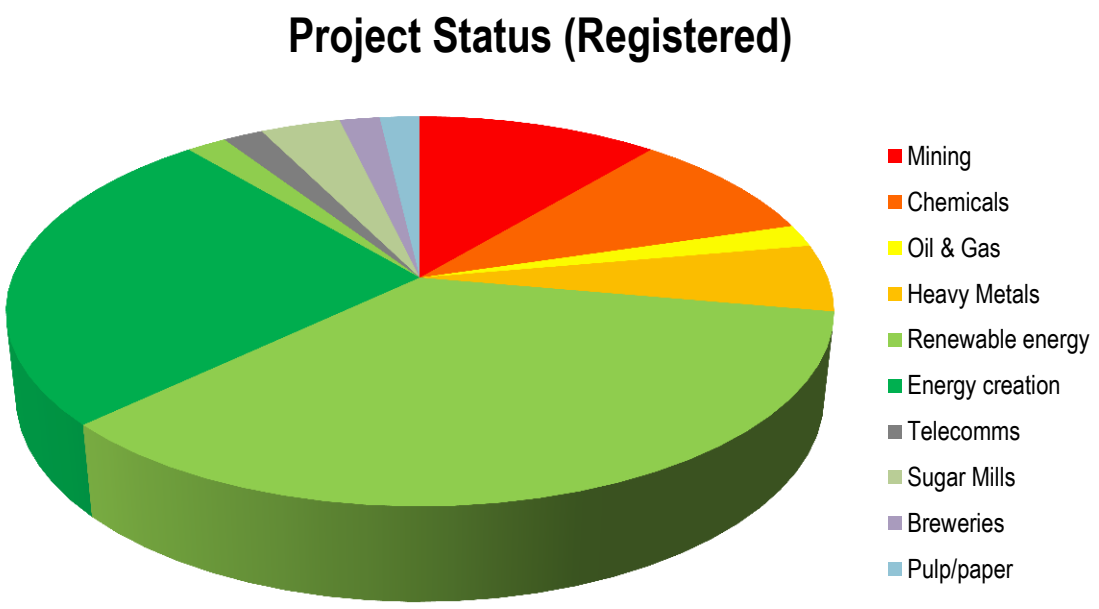
Approved projects currently listed on the CDM website (http://cdm.unfccc.int/) by country (South Africa) were analysed and their activities catalogued. These activities were then cross-referenced against the actual goals of the CDM to determine compliance.

Limitations

The scope of the paper is limited to a cursory analysis of the 54 registered projects under the CDM in South Africa. A more detailed analysis therefore is required of projects 'red flagged' in order to establish compliance with the overall objectives of the CDM, and whether, as is alleged, mechanisms would have/should have been put into place as a matter of 'best practice', and in line with South African Environmental Law on emissions reductions/compliance.

Projects by Industry (Parent)

CDM registered projects, by thematic activity of ***Parent*** company.



Some Brief Conclusions

- The bulk of registered projects are engaged with the creation of renewable energy sources and energy creation. (61%)
- However 14 projects have been flagged for more intensive research to determine whether they comply with the principles of 'additionally'.
- The mining, heavy metals, and chemicals industry are strongly represented in terms of the activities of the project Parent. (25%)

In effect, there is a host of legislation in place which mandates companies to reduce their emissions and refrain from affecting the public health (and that of the environment). The National Air Quality Act of 2004 is a document which clearly lays out the obligations of the state and polluters in this regard. For example, regarding mining operations the Act states that:

> ***Rehabilitation when mining operations cease***
>
> 33. *If it is determined that a mine, having regard to its known ore reserves, is likely to cease mining operations within a period of five years, the owner of that mine must promptly notify the Minister in writing–*
>
> (*a*) *of the likely cessation of those mining operations; and*
>
> (*b*) *of any plans that are in place or in contemplation for–*

(i) *the rehabilitation of the area where the mining operations were;*

(ii) *the prevention of pollution of the atmosphere by dust after those operations have stopped.*

Mines therefore have a legal obligation to comply; the Act makes it clear that this compliance is not voluntary. Therefore, it could be argued that the rehabilitation of mines (a number of approved CDM projects have this criteria listed) should be funded by the mining company itself, and the activities in this regard are therefore not 'additional' in nature.

Citing another example, the Tongaat Hulett Fuel Switching Project (42) aims to reduce unpleasant smells using CDM funding when in reality the Act is clear of its existing obligations here, as follows:

Control of offensive odours

35. (1) *The Minister or MEC may prescribe measures for the control of offensive odours.*

(2) *The occupier of any premises must take all reasonable steps to prevent the emission of any offensive odour caused by any activity on such premises.*

- In conclusion therefore, a superficial analysis of approved CDM projects actually points to the problematic (and flawed) nature of the mechanism.
- Projects which should be motivated purely by environmental considerations have become commercial opportunities.
- Cash invested by the CDM, combined with revenues from the sale of carbon credits (and the sale of energy back to the grid), have become big business.

Fundamentally, many of the activities in the 14 flagged projects, it could be argued, do not amount to additional measures aimed at carbon reduction and perhaps should have taken place as ***standard best practice***. The following case study illustrates the point:

MTN's CDM Funding[4]

Mobile Telephone Networks (Pty) Ltd (henceforth referred to as 'MTN') is multinational telecommunications group, with operations in 21 countries across Africa and the Middle East. MTN's head office is located in Johannesburg, South Africa. This head office was built in 2002 and, prior to the implementation of this project activity, was using grid electricity to meet its entire energy requirement. The head office is situated on a site which consists of a number of commercial buildings. These buildings include:

- Two office buildings (referred to as 'Phase 1' and 'Phase 2');
- A building housing a data centre;
- A building housing a test switch;
- A building housing a service yard; and
- A building housing a tri-generation plant (the project activity).

The head office has an existing heating and cooling system, and is supplied with electricity from South Africa's national grid.

Purpose of the project activity

The purpose of this project activity is to reduce the greenhouse gas emissions at MTN's commercial site, through the installation of an on-site, energy efficient, 2.126 MW tri-generation plant. This plant will see the simultaneous production of electricity, cooling, and heating from a single fuel source – methane-rich natural gas which is sourced from the Egoli gas pipeline. The three outputs from the tri-generation plant will be used for:

- Electricity – to meet part of the commercial site's electricity requirements. The electricity that is produced by the tri-generation plant will be fed into MTN's internal ring grid, which supplements electricity supply to the Phase 1 office building, the Phase 2 office building, data centre, test switch and service yard.
- Cooling – to meet part of the commercial site's cooling requirements. The chilled water that is produced by the tri-generation plant will be used to supplement the chilled water produced in the service yard for air conditioning in the Phase 1 office building, the Phase 2 office building and test switch.
- Heating – to meet part of the commercial site's heating requirements. The hot water that is produced by the trigeneration plant will be used for space heating in the test switch.

[4] CDM Clean Development Mechanism project design document form (CDM-SSC-PDD) Version 03 – in effect as of 22 December 2006.

Measures undertaken to reduce greenhouse gas emissions

The tri-generation plant will displace grid electricity. MTN's commercial site currently purchases its electricity from Eskom, South Africa's national electricity provider. The South African grid is predominantly coal-fired (coal accounts for more than 92% of the fuel used in South Africa's electricity generation) and therefore, heavily carbon-intensive. The reduction in electricity consumption from the grid will result in a reduction of greenhouse gas emissions, as well as some of the negative impacts of coal mining. These negative impacts include: the utilisation of scarce water resources; SO_2 emissions; and the impacts associated with the disposal of coal ash.

Contribution of the project activity to sustainable development

The project makes positive contributions to sustainable development. The South African Designated National Authority (DNA) evaluates sustainability in three categories: economic, environmental, and social. The contribution of the project towards sustainable development is discussed below in terms of these three categories:

Economic

There will be a transfer of technology from a developed country to a developing country. The internal combustion engines that are used to generate the electricity are sourced from *GE Jenbacher* in Austria (Annex-1 country) and will be imported to South Africa. There will be a transfer of knowledge as personnel responsible for the operation and maintenance of the engines will receive the necessary training.

South Africa's economic policy is defined in the document 'The New Growth Path', which is a broad framework that sets out a vision and identifies key areas where jobs can be created in the country. One of the key challenges identified in this document is a lack of skills which constraints economic growth;

Increasing the skill level of MTN employees (through training on this project activity) will increase the capability of South Africa's workforce, thereby promoting South Africa's economic growth. The project will also contribute to foreign reserve earnings for South Africa via the carbon credit sales revenue.

Environmental

This project supports South Africa's emission mitigation actions. According to a letter sent to the United Nations Framework Convention on Climate Change (UNFCCC) on 29 January 2010, South Africa committed to "taking nationally appropriate mitigation actions to enable a 34% deviation below the 'Business as Usual' emissions growth trajectory by 2020 and a 42% deviation below the 'Business as Usual' emissions growth trajectory by 2025". This project will see a reduction of greenhouse gas emissions in South Africa.

Social

South Africa's national electricity provider, Eskom, carried out planned electricity supply interruptions at the beginning of 2008. These interruptions were caused by the demand for electricity exceeding the supply of electricity. During the interruptions, grid electricity was not accessible. Therefore, the electricity saved as a result of the project will alleviate pressure from the national grid. The alleviation of pressure

from the national grid will reduce the probability of electricity supply interruptions and make the electricity available for development of other industries.

The historically low cost of electricity in South Africa means that carbon intensive electricity is cheaper than any other source of power. This has made it difficult for energy efficiency projects to compete with coal-based power. This project activity will provide MTN with a framework on which to overcome this.

Points to consider:

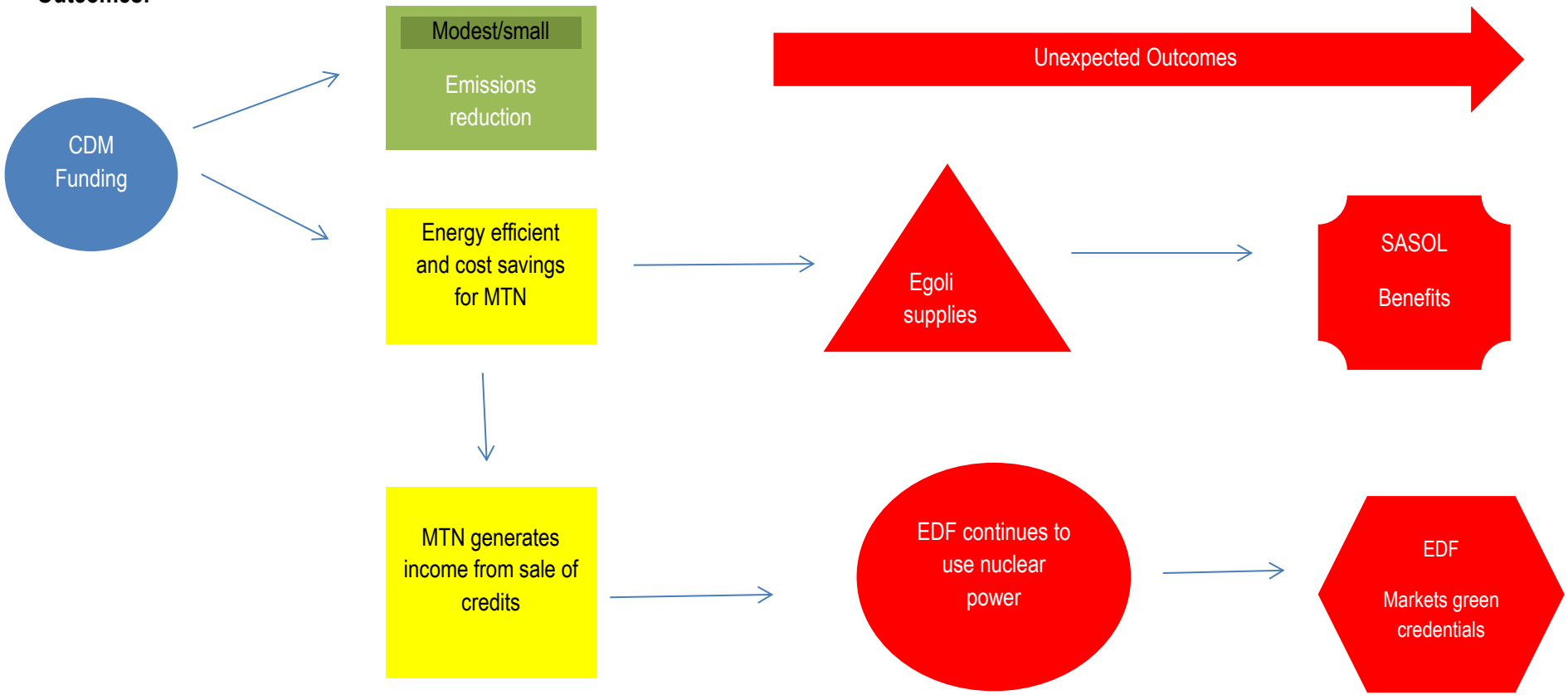
1. MTN makes a weak case for the project on economic grounds. It is inconceivable that benefits lauded as 'skills transfer' will significantly cascade to a wider stakeholder group. Equally, the idea that the project will lead to a stimulation of economic growth in South Africa is a huge and unsubstantiated nexus.
2. The idea that the installation of state of the art energy efficient measures in one MTN office can be justified in terms of significant savings to the national grid is equally bold. A modest/small saving of 8,617 tons of carbon from the project is expected.
3. In the 2013 financial year, MTN South Africa reported post-tax profits of more than ZAR41 million. It seems implausible that the company could not have self- funded the project.
4. The project document does not mention savings to MTN from the sale of carbon credits, and electricity costs. Moreover, it does not mention that the productivity of its own staff would be enhanced since the company was no longer subject to load-shedding.
5. The project cites EDF as a host partner. EDF is one of the largest electricity providers in Europe (22%), mainly through nuclear power. EDF will purchase the carbon credits from MTN. The company has been involved in law suits against Greenpeace and other environmental activist groups, as well as corporate espionage and spying.[5]
6. According to the project document, the natural gas used to supply the tri-generation plant used to power MTN's offices, will be supplied by Egoli Gas which runs a pipeline from Secunda to offshore gas reserves in the waters of Mozambique. Ironically enough, Egoli Gas acquires its natural gas from integrated energy and chemical company Sasol. Sasol is considered as one of the most polluting companies in South Africa and the world, and was convicted for price fixing in both in South Africa and Europe, according to media reports. Sasol settled these claims.

That the project would be considered in terms of 'saving the environment', reducing the impacts of climate change, and contributing to the economic growth of South Africa is overinflated. While the project complies with the 'additionally' criteria, credits from the project will be bought by EDF, a controversial electricity supplier in Europe through its heavy reliance on nuclear power. EDF has been flagged by several environmental groups, including Greenpeace, for its promotion of nuclear and gas-fired power stations in France and the UK. Indirectly, both Egoli Gas and Sasol will benefit from the project.

Conclusion: Therefore funding ostensibly meant to reduce emissions in reality benefits several large corporates, including MTN, Egoli Gas, EDF, and Sasol.

[5] Greenpeace.

Outcomes:


Modest/small
Emissions reduction
Unexpected Outcomes
CDM Funding
Energy efficient and cost savings for MTN
Egoli supplies
SASOL
Benefits
MTN generates income from sale of credits
EDF continues to use nuclear power
EDF
Markets green credentials

Projects Rejected by the CDM: South Africa

Date Registered	Project Title	Host Parties	Other Parties	Project Methodology	CO_2 Reductions in Metric Tons	Description of Parent Project / Company	Industry (Parent)
Rejected	**Body Coal and Clamp Kiln Fuel Switch at Allbrick, South Africa**	South Africa		The project involves a fuel switch from coal to charcoal both in the clamp kilns and as the body fuel in the bricks. The charcoal is produced using wood waste from local sawmills. This wood waste is classified as renewable biomass.	5,604	Allbrick Manufacturing and Marketing (Pty) Ltd	Brick making
Rejected	**Fuel Switch at Corobrik's Driefontein Brick Factory in South Africa**	South Africa		Installation of a fuel switch powered by natural gas, not coal.	37,131	Corobrik SA	Brick making
Rejected	**New England Landfill Gas to Energy Project**	South Africa	United Kingdom	Collect and utilise gas from landfill site.	51,052	Ener-G Systems Mzunduzi Pty Ltd	Energy creation from landfill gas
Rejected	**Market Coke Waste Heat Recovery Project**	South Africa		The purpose of the project activity is to utilise waste heat recovered from the coke oven flue gas (waste gas, off-gas) after tertiary combustion, produced as part of the coking pyrolysis process in the project facility to produce electricity.	414,032	Exxaro Resources Limited (Exxaro)	Heavy minerals and coal/ mining

Project Analysis: South Africa (Registered / Approved)

	Date Regist.	Project Title	Host Parties	Other Parties	Project Methodology	CO_2 Reduc-tion in Metric Tons	Description of Parent Project / Company	Industry (Parent)	Red Flagged	Comments
1	19 Oct 2007	**Transalloys Manganese Alloy Smelter Energy Efficiency Project** An industrial energy efficiency project that will reduce the electricity consumption in the production of silicomanganese (SiMn) alloy (a key component in steel making) at its Witbank facility in South Africa.	South Africa	Switzerland United Kingdom	Each ton of manganese alloy produced in the current submerged electric arc furnaces requires approximately 5MWh of grid-fed electricity. The project is to retrofit current furnaces with new design of electric arc furnaces, electrode assemblies, and control and peripheral systems. This will reduce the specific electricity consumption of alloy production by some 10 to 20% to between 4.5-4MWh per tonne of alloy produced.	55,044	Transalloys division of Highveld Steel and Vanadium Corporation Ltd	Heavy metals production	x	Unclear as to whether enhancing the energy efficiency of the facility should have happened anyway? Are CDM funds being used to reduce overheads and increase profits?

2	5 Nov 2007	**Project for the catalytic reduction of N_2O emissions with a secondary catalyst inside the ammonia reactor of the No. 9 nitric acid plant at African Explosives Ltd ("AEL"), South Africa**	South Africa	Switzerland United Kingdom	Significantly reduce current levels of N_2O emissions from the production of nitric acid at Plant No.9 in Modderfontein.	116,779	African Explosives Ltd	Mining (explosives contractor – mining sector)	**x**	The company should be compelled to reduce these emissions anyway under South African Law. Seems like CDM funding is being used for an activity which should be mandated anyway.
3	24 Jun 2013	**IFM Integrated Clean Energy Project**	South Africa	Netherlands	The purpose of the proposed project activity is to utilise waste furnace off-gas as a source of energy to generate clean electricity and contribute to lower greenhouse gas emissions by replacing fossil fuel-based	143,852	International Ferro Metals SA (Pty) Ltd (IFM)	Mining (chromite)		

					electricity from the South African national grid.					
4	6 Mar 2006	**Lawley Fuel Switch Project**	South Africa	Netherlands	The project entails the conversion from coal to natural gas of the thermal fuel used in clay brick baking kilns at Lawley Brick Factory, an existing brick factory wholly owned by Corobrik (Pty) Ltd, South Africa. The fuel switch project is developed, financed and implemented by Corobrik.	19,159	Corobrik SA	Brick making		
5	10 Oct 2012	**Red Cap Kouga Wind Farm** Red Cap Kouga Wind Farm (Pty) Ltd is developing the Kouga Wind Farm (hereinafter the "project") in Oyster Bay, South Africa. The project will comprise the installation of 32	South Africa	Netherlands	The project will use wind power to generate renewable electricity, which will be delivered to the national electricity grid of South Africa. The renewable electricity produced by the project will avoid CO2 emissions from electricity	264,307	Red Cap Kouga Wind Farm (Pty) Ltd	Renewable energy / wind farm		

		Nordex N90 2500 HS wind turbines, each turbine of 2.5MW with a total installed capacity of 80MW. This site will be able to generate 290,500 MWh per year, using a P50 capacity.			generation in fossil fuelled power plants. Prior to the start of the implementation of the project activity, no power generation had occurred at the project site: this is a Greenfield project activity.					
6	22 Oct 2012	**De Aar Grid Connected 10 MW Solar Park, South Africa**	South Africa		Construction and operation of a solar park near De Aar in the Northern Cape. Surplus energy to be supplied for the national grid.	18,115	Mulilo Renewable Energy Solar PV De Aar (Pty) Ltd	Renewable energy (solar power and panels)		
7	11 Dec 2012	**North West, KwaZulu-Natal & Eastern Cape CFL Replacement Project (2) in South Africa** The objective of the project activity is to boost the energy efficiency of South Africa's	South Africa	France	The project activity aims to distribute up to 572,036 CFLs to households in the following provinces: • Eastern Cape • KwaZulu-Natal • North West By providing CFLs free of charge to each household via direct installation (all possible CFLs	21,527	Eskom	Renewable energy		

		residential lighting stock by distributing compact fluorescent lamps (CFLs) free of charge to households across South Africa.			in the household) or by exchange (up to 6 CFLs), the project will abate greenhouse gas emissions, significantly reduce national electricity demand and stress on energy infrastructure, and save individual households. money on their electricity bills.					
8	31 Dec 2012	**SA Calcium Carbide Furnace Waste Gas to Electricity CDM Project**	South Africa		SA Calcium Carbide (SACC) (Pty) Ltd in Newcastle. South Africa is to develop an electricity generation project utilising furnace waste gas that has been flared since the construction of the industrial facility. Because of the high CO concentration, the waste gas	34,777	SA Calcium Carbide (SACC) (Pty) Ltd	Chemicals (SACC produces calcium carbide (CaC_2), a basic raw material for acetylene gas production)	**x**	

					produced in the closed submerged electric arc furnace has to be flared (combusted) for safety reasons before it goes into the atmosphere. The electricity generated on site will displace a net of 43,371MWh per year of the electricity imported from the South African national grid if all four gensets are running at design-rated capacity and if sufficient gas is produced in the furnace so that the gensets can run at design capacity for 7,157 hours a year.					
9	30 Apr 2012	**Omnia N_2O Abatement Project II**	South Africa		The aim of the project activity is to reduce N_2O emissions in the tail gas by installing a tertiary catalyst after the absorption	348,138	Omnia Group (Pty) Ltd.	Chemicals / fertilizer manufacturer	**x**	

					unit. It is expected that the N_2O abatement catalyst reduces 98% of the N_2O against the standardised baseline emissions factor. The project would generate an estimated 3,481,376 t CO_2 emission reductions during a 10-year crediting period.					
10	15 Nov 2012	**Dundee Biogas Power (Pty) Ltd**	South Africa		The purpose of the project is to install anaerobic digestion (AD) based manure treatment system with methane recovery equipment. The biogas produced will be applied as fuel for electricity generation. Surplus of biogas will be destroyed by flaring or combustion. The electricity generated by the proposed	25,431	Dundee Biogas Power (Pty) Ltd	Energy creation (biogas)		

					project activity will be used onsite and/or distributed via the national Eskom electricity grid					
11	26 Oct 2012	**Bokpoort CSP (Concentrating Solar Power) Project, South Africa**	South Africa		The purpose of the proposed project activity is to reduce greenhouse gas emissions by installing a Greenfield grid-connected parabolic trough concentrated solar thermal power (CSP) plant. This type of technology is clean, safe, sound and environmentally friendly in comparison to conventional sources of fossil fuel power generation in South Africa.	205,532	This project will be developed by a consortium of three entities: ACWA Power Africa Holdings (Pty) Ltd ACWA Power Solafrica Bokpoort CSP Power Plant (Pty) Solafrica Thermal Energy (Pty) Ltd ("Solafrica")	Renewable energy (solar power)		
12	18 Dec 2012	**Use of waste gas at Namakwa Sands in South Africa**	South Africa		The purpose of the project is to reduce greenhouse gas emissions by utilising waste gas	84,432	Exxaro Resources Ltd owned Exxaro TSA Sands (Pty) Ltd	Mining / minerals		

		The Exxaro Resources Ltd owned Exxaro TSA Sands (Pty) Ltd smelter (referred to from this point on as Namakwa Sands) is a heavy minerals mining and beneficiation business located in South Africa. This business encompasses mining, mineral concentration, separation, and smelting operations. The smelting operation commenced in 1994 near the town of Saldanha Bay. The smelting operation consists of two closed, DC-arc furnaces.			from a smelter operation. The waste gas will be used for the generation of electricity. The reduction of mined ilmenite requires the presence of a carbon-rich reductant. Typical reductants that are used by smelting operations are anthracite, char and/or coke.					

13	15 Dec 2006	**Durban Landfill-Gas-to-electricity project – Mariannhill and La Mercy Landfills**	South Africa	Canada Netherlands Finland France Sweden Germany United Kingdom Japan Norway	The project, when originally registered, consisted of an enhanced collection of landfill gas at two landfill sites of the municipality of Durban, the use of the recovered gas to produce electricity and flaring of the excess gas. The electricity produced is fed into the South African grid system.	68,833	Durban Solid Waste (DSW) – eThekwini municipality	Energy creation from methane gas in landfill		
14	28 Dec 2012	**Tongaat Hulett Sugar Refinery Steam Optimisation Project**	South Africa		The proposed project activity is a steam optimisation project centred on a step change in the sugar crystallisation process that allows for the use of waste heat vapour in the evaporation process as an alternative energy source to the primary steam currently used	96,803	Tongaat Hulett Sugar South Africa Limited	Sugar mills		

					within this process. This will significantly reduce the steam demand in the white sugar refining process. This waste heat recovery was previously not possible due to the strict temperature requirements of the evaporative crystalliser pans.					
15	24 Dec 2012	**Cookhouse Wind Farm in South Africa**	South Africa		The proposed project activity is an initiative to export renewable electricity produced by Cookhouse to the national grid, which is currently mostly derived from coal. The wind power generated from the project site will be replacing electricity from the national grid.	338,043	African Clean Energy Developments (ACED)	Renewable energy (wind power)		
16	26 Mar 2009	**Durban Landfill-Gas Bisasar Road**	South Africa		The project consists in an enhanced collection of landfill gas at the Bisasar	342,705	Durban Solid Waste (DSW) – eThekwini municipality	Energy creation (from methane gas		

					Road landfill site of the municipality of eThekwini and the use of the recovered gas to produce electricity. The produced electricity will be fed into the municipal grid and replace electricity that the municipal electric company is currently buying from other suppliers.			in landfill)		
17	13 Dec 2012	**Kathu Grid Connected 100 MW Solar Park, South Africa**	South Africa		The project development envisages the construction and operation of a solar park with an output capacity of up to and including 100MW. The solar park will be equipped with a cluster of photovoltaic (PV) panel arrays, and the associated infrastructure. Produced electricity	238,080	Renewable Energy Investment of South Africa (Pty) Ltd (REISA)	Renewable energy (solar energy)		

					will be supplied to the Eskom electricity network.					
18	24 Aug 2009	**Alton Landfill Gas to Energy Project**	South Africa	United Kingdom of Great Britain and Northern Ireland	The objective of the project is to collect and destruct/utilise the LFG generated at the closed Alton landfill. The purpose of LFG flaring is to dispose of the flammable constituents, particularly methane, safely and to control odour nuisance, health risks and adverse environmental impacts. Hence this will involve investing in a highly efficient gas collection system as well as flaring equipment.	25,893	ENER*G Systems uMhlathuze (Pty) Ltd	Energy creation (from methane gas in landfill)		
19	20 May 2007	**Mondi Richards Bay Biomass Project**	South Africa		The project activity includes the collection of biomass residues from plantations and nearby	184,633	Mondi	Energy creation (biomass into energy replacing coal)		

					chipping facilities, transported to Mondi Business Paper Richards Bay (hereafter referred to as Mondi), cleaned (for example removal of metal objects and sand), shredded and fired as fuel in a co-fired boiler, replacing coal. The proposed project activity is designed to increase the use of self-generated bark and enable the introduction of third party generated biomass residues as feed into a co-fired boiler for the generation of steam.					
20	24 Dec 2012	**Coega IDZ Windfarm**	South Africa	Belgium	The purpose of the project is to use the wind's kinetic energy to generate electrical power in South Africa.	107,803	BHP Billiton/ Electrawinds Africa and Indian Ocean Islands (Pty) Ltd/ Nelson Mandela Bay	Renewable energy (wind power)		

							Municipality			
21	26 Oct 2010	**Ekurhuleni Landfill Gas Recovery Project – South Africa**	South Africa	Spain	The technology to be employed by the project activity is the installation of vertical wells and horizontal collectors to extract the landfill gas, which will then be flared. In phase 2 of the project, electricity generation will occur via the installation of reciprocating engines specifically engineered to operate using landfill gas.	282,349	Ekurhuleni Municipality	Energy creation (from methane gas in landfill)		
22	25 May 2007	**Sasol Nitrous Oxide Abatement Project** Nitrous Oxide (N_2O) is an undesired by-product gas from the manufacture of nitric acid. Nitrous oxide is formed during	South Africa	Switzerland Germany United Kingdom	The project activity involves the installation of a secondary catalyst to abate N_2O inside the reactor once it is formed.	960,322	Sasol	Chemicals / petroleum	**x**	From an air pollution and public health perspective the installation of the catalyst should be standard practice?

		the catalytic oxidation of ammonia. Over a suitable catalyst, a maximum 98% (typically 92-96%) of the fed ammonia is converted to nitric oxide (NO). The remainder participates in undesirable side reactions that lead to the production of nitrous oxide, among other compounds. Waste N_2O from nitric acid production is typically released into the atmosphere, as it does not have any economic value or toxicity at typical emission levels. N_2O is an important								

		greenhouse gas which has a high Global Warming Potential (GWP) of 310.								
23	27 Aug 2005	**Kuyasa low-cost urban housing energy upgrade project, Khayelitsha (Cape Town; South Africa)**	South Africa		This project activity is aimed as an intervention in an existing low-income housing development with households in Kuyasa, Khayelitsha, as well as in future housing developments (100 ha) in this area. The project activity aims to improve the thermal performance of the existing and future housing units, improve lighting and water heating efficiency. This will result in reduced current and future electricity consumption per household, significant avoided CO_2 emissions per	6,580	The City of Cape Town	Energy efficiency		

					unit.					
24	14 Nov 2012	**Hopefield Wind Energy Facility in South Africa**	South Africa		The purpose of the project activity is to generate power from wind energy in the Western Cape, South Africa. The electricity will be sold to Eskom, the national electricity utility, in order to increase the reserve margin, diversify the grid generation mix and reduce greenhouse gas emissions.	171,535	Umoya Energy (Pty) Ltd	Renewable energy (commercial wind farm)		
25	10 Oct 2012	**Gauteng, Free State, Mpumalanga, Limpopo & Northern Cape CFL Replacement Project (1) in South Africa**	South Africa	France	The objective of the project activity is to boost the energy efficiency of South Africa's residential lighting stock by distributing compact fluorescent lamps (CFLs) free of charge to households across South Africa. The project activity aims to distribute up	22,733	Eskom	Energy efficient lighting		

					to 607,559 CFLs to households in the following provinces: • Gauteng • Free State • Limpopo • Mpumalanga • Northern Cape					
26	31 Dec 2012	**Amakhala Emoyeni Grid Connected 138.6MW Wind Farm, Phase 1, South Africa**	South Africa		The project envisages the construction and operation of a wind farm with installed capacity of 138.6MW3. The wind farm will be comprised of 66 Suzlon wind turbines with the capacity of 2.1MW each and the associated infrastructure. Produced electricity will be supplied to the Eskom electricity network.	370,665	Eskom	Renewable energy (wind farm)		
27	15 Jul 2013	**Hernic's Electricity Generation from Waste Gas**	South Africa		The proposed project activity is an initiative to recover combustible waste	152,290	Hernic Ferrochrome (Pty) Ltd.	Mining	**x**	It is unclear how this project is motivated

		Project			gas from four existing closed Ferrochrome furnaces at Hernic.					by anything more than a desire for profit.
28	12 Dec 2012	**Samancor Chrome Middelburg Electricity from Waste Gas**	South Africa		The proposed project activity is an initiative to recover waste energy in the form of flared waste gas from two existing ferrochrome closed furnaces at MFC. The envisaged project will use the combustible waste gas in an estimated twenty gas engines with a guaranteed maximum continuous rating (MCR) of 1.698 MW2 each. The project will generate an expected total of 34MW of electricity if all engines are operating simultaneously at full load. The electricity will be used by MFC to displace electricity	189,720	Samancor	Heavy metals / chrome production		

					purchased from the national grid, which is managed by Eskom.					
29	13 Dec 2012	**West Coast 1 Wind Farm in South Africa** The proposed project activity is an initiative to export renewable electricity produced by West Coast 1 to the national grid, which is currently mostly derived from coal. The wind power generated from the project site will be replacing electricity from the national grid, consequently avoiding CO_2 emissions from fossil fuelled power plants connected to the grid.	South Africa		The project activity proposed is a green field project. It is proposed for a cluster of up to 47 wind turbines (described as a wind energy facility) of 2MW each, to be constructed over a broader study area approximately 2,300 hectares in extent. This facility will have a maximum capacity of 94MW. The expected annual power output is 293.4GWh1.	266,260	Moyeng Energy (Pty) Ltd	Renewable energy (wind projects)		

30	29 Dec 2012	**Trigeneration at Mobile Telephone Networks (MTN), 14th Avenue Commercial Site South Africa**	South Africa	France	The purpose of this project activity is to reduce the greenhouse gas emissions at MTN's commercial site, through the installation of an on-site, energy efficient, 2.126MW tri-generation plant. This plant will see the simultaneous production of electricity, cooling, and heating from a single fuel source - methane-rich natural gas which is sourced from the Egoli gas pipeline. The tri-generation plant will displace grid electricity. MTN's commercial site currently purchases its electricity from Eskom.	8,617	MTN	Telecommunications	**x**	It could be argued that MTN should already be employing energy efficient principles at its facilities. That they plan to use CDM funding for this project and then sell the electricity generated back to the grid seems flawed.
31	31 Dec 2012	**TWE Golden Valley Wind Power Project**	South Africa		The purpose of the TWE Golden Valley Wind Power Project is the construction	443,093	Terra Wind Energy Pty	Renewable energy (wind farm)		

					of a 147.6MW wind power plant in the Eastern Cape.					
32	10 Jun 2011	**The Capture and Utilisation of Methane at the GFI Mining South Africa owned Beatrix Mine in South Africa** The purpose of the TWE Golden Valley Wind Power Project is the construction of a 147.6MW wind power plant in the Eastern Cape province of South Africa.	South Africa	Switzerland	The proposed project will destroy both the underground mine methane and the non-mine methane released from the boreholes. The destruction of this methane will result in the elimination of methane released directly into the atmosphere. Since methane has 21 times the global warming potential of carbon dioxide, the project will result in a reduction of GHG emissions.	249,409	GFI (Goldfields) Mining	Mining / minerals extraction		
33	12 Feb 2007	**Tugela Mill Fuel Switching Project**	South Africa	United Kingdom of Great Britain and Northern Ireland	The project activity will involve the conversion of a boiler to enable co-firing of biomass (bark), with coal and gas at the Tugela Mill pulp and	55,912	Sappi Kraft Pty / Ecosecurities Capital Ltd	Paper / pulp		

					paper mill. Sappi will use the waste bark for steam generation in a biomass thermal energy boiler.					
34	23 Nov 2012	**Dassieklip Wind Energy Facility in South Africa**	South Africa	Switzerland	The proposed project activity is an initiative to export renewable electricity produced by Dassieklip to the national grid, which is currently mostly derived from coal. The wind power generated from the project site will be replacing electricity from the national grid.	67,397	BioTherm Energy in association with Group Five, Iberdrola and Sinovel.	Renewable energy (wind farms / construction)		
35	27 Dec 2012	**Distributed Energy Generation's Waste Heat to Power Project at XAWO**	South Africa		The proposed project activity is an initiative to recover waste heat in a non-combustible waste gas from six existing semi-closed type ferrochrome furnaces at XAWO. The envisaged project will divert	261,891	Distributed Energy Generation (Pty) Ltd (DEG)	Energy creation	**x**	Seems like a commercial venture?

					the waste heat to an Organic Rankine Cycle (ORC) facility, which will convert low-grade heat into usable electrical energy, with a maximum rated output capacity (MRC) of 40.5MW2. The project will generate an expected net total of 293,600MWh of electricity per annum. The electricity will be used by XAWO to replace electricity purchased from Eskom.					
36	24 May 2012	**Nelson Mandela Bay Metropolitan's Landfill Gas Project**	South Africa	Finland	Capture of methane gas from landfill and use to generate electricity.	109,473	Nelson Mandela Metro	Energy creation		
37	29 Sep 2006	**PetroSA Biogas to Energy Project** PetroSA (The Petroleum Oil	South Africa	Germany	The present project can be summed up very simply as using the waste gas presently flared to generate	29,933	PetroSA/ MethCap SPV1 (Pty) Ltd	Oil and gas	**x**	PetroSA is the clear beneficiary here and it is not clear why this

		and Gas Corporation of South Africa) is a state-owned corporation that has since 1987 operated a gas to liquids plant at Duinzicht, some 12 kilometres from the town of Mossel Bay on the south coast of South Africa. The production process at Duinzicht leads to waste process water that since the inception of the plant has been dealt with by way of anaerobic digestion. The anaerobic digestion is continuous and a critical process for the operation of the PetroSA plant. In the			electricity to be used onsite by PetroSA. The corporation will henceforth need to purchase less electricity from the national grid.					activity should not be done as standard practice anyway.

		anaerobic digestion process biogas ***is*** naturally generated**.**								
38	12 Nov 2012	**Joburg Landfill Gas to Energy Project**	South Africa	United Kingdom of Great Britain and Northern Ireland	The objective of the project is to collect and destroy/utilise the LFG generated at the Johannesburg landfill sites.	542,495	ENER-G Systems Joburg (Pty) Ltd. (private entity)	Energy creation		
39	03 May 2007	**Omnia Fertilizer Limited Nitrous Oxide (N_2O) Reduction Project**	South Africa	Netherlands United Kingdom of Great Britain and Northern Ireland	The project activity will reduce the N_2O emissions from the Omnia Fertilizer Limited Sasolburg, South Africa nitric acid plant by up to 98% by installing an N_2O catalytic reduction facility in the tail gas section of the process downstream of the absorption column.	473,338	Omnia Fertilizer Limited	Chemicals / fertilizer production	**x**	It could be argued that this activity should be done anyway in the interests of compliance with air pollution and public health legislation.
40	8 Oct 2009	**Bethlehem Hydroelectric Project**	South Africa	Netherlands	The purpose of the project activity is to generate hydroelectricity, which will be distributed onto the South African grid.	32,688	Bethlehem Hydro (Pty) Ltd Statkraft Markets BV	Energy creation (hydro-electricity generation)		

					The project involves the development and operation of 7.0MW of hydro generation capacity within the boundaries of the Dihlabeng Local Municipality (Free State Province, South Africa). The project will generate 37 GWH per annum.					
41	27 Apr 2007	**EnviroServ Chloorkop Landfill Gas Recovery Project.**	South Africa	Japan	The objective of the project is to extract landfill gas at the site and combust the landfill gas by flaring. Landfill gas consists of approximately 50% methane, which has a global warming potential 21 times greater than CO_2. Through the destruction of methane, the emissions of greenhouse gas are reduced.	188,390	EnviroServ	Energy creation (landfill gas extraction)		

42	25 Dec 2010	**Fuel switch project on the Gluten 20 dryer of Tongaat Hulett Starch Pty (Ltd) Germiston Mill**	South Africa		The purpose of the project is to reduce greenhouse gas emissions and unpleasant off-gas smells in a product dryer of Tongaat Hulett Starch (Pty) Ltd by switching fuel from coal to natural gas. Natural gas has a lower greenhouse gas emission factor than coal.	5,807	Tongaat Hulett Starch (Pty)	Sugar mills	**x**	It seems that this measure should be taken in any event if the plant is emitting unpleasant off-gas smells.
43	14 Nov 2012	**Karoo Renewable Energy Facility (Nobelsfontein Wind)**	South Africa	United Kingdom of Great Britain and Northern Ireland	The primary objective of the project is to generate electricity from wind, a renewable energy source, and to provide power to the South African national grid.	856,477	South African Renewable Green Energy Pty Ltd	Renewable energy		
44	12 Dec 2012	**Samancor Chrome Witbank Electricity from Waste Gas**	South Africa		The proposed project activity is an initiative to recover waste energy in the form of flared waste gas from two existing closed ferrochrome	141,894	Samancor	Heavy metals – ferrochrome manufacture	x	Seems like Samancor is the real winner here and that the recovery of waste gas for

					furnaces at FMT. The envisaged project will use the combustible waste gas in fourteen gas engines. The electricity will be used by FMT to displace electricity purchased from the national grid, which is managed by the national utility, Eskom.					commercial purposes seems logical.
45	14 Nov 2012	**Karoo Renewable Energy Facility (Nobelsfontein Solar PV)**	South Africa	United Kingdom of Great Britain and Northern Ireland	The primary objective of the project is to generate electricity from solar resources, a renewable energy source, and to provide power to the South African national grid.	92,164	South African Renewable Green Energy Pty Ltd	Renewable energy		
46	5 Dec 2012	**Prieska Grid Connected 20MW Solar Park, South Africa**	South Africa		The proposed "Prieska Grid Connected 20MW Solar Park, South Africa" project is a greenfield renewable energy power plant. The	38,314	Mulilo Renewable Energy (Pty) Ltd	Renewable energy		

					aim of the project is to supply solar-generated electricity to the grid.					
47	5 Nov 2012	**Neusberg Grid Connected Hydroelectric Power Plant, South Africa**	South Africa		The project envisages the construction and operation of a run-of-river hydroelectric power plant with an installed capacity of 12.57MW. Energy will be sold to Eskom.	66,826	Kakamas Hydro Electric Power (Pty) Ltd (private entity)	Energy creation (hydroelectric power)		
48	29 Sep 2006	**Rosslyn Brewery Fuel-Switching Project**	South Africa		The project activity primarily aims at reducing GHG emissions through fuel switching. The project consists of investment to replace the use of coal by natural gas, funded through the sale of carbon credits in the context of the Clean Development Mechanism (CDM) of the Kyoto Protocol.	100,941	South African Breweries Ltd	Breweries	x	It is not clear why this activity should not be conducted as standard best practice.

					South African Breweries Ltd. leads this fuel-switching project, which involves the replacement of equipment at the boiler room of Rosslyn Brewery plant.					
49	18 Jul 2008	**Kanhym Farm manure to energy project** Kanhym is the biggest pig farm in South Africa, home at any given time to more than 45,000 pigs. In addition to the piggery, the farm has various other agricultural divisions including maize farming operation and a mill where maize is milled.	South Africa	Netherlands	Capture methane gas from sewage from the pig farm.	32,660	BioTherm SPV1 (Pty) Ltd/ NRG Investments (Pty) Ltd	Renewable energy		
50	13 Dec 2012	**Rheboksfontein Wind Energy**	South Africa		The project will use wind power to	313,635	Moyeng Energy (Pty) Ltd (private	Renewable energy: Wind		

		Facility			generate renewable electricity, which will be delivered to the national electricity grid of South Africa.		entity) Micawber 895 (Pty) Ltd	energy plants		
51	08 Feb 2008	**N_2O abatement project at nitric acid plant No. 11 at African Explosives Ltd. (AEL), South Africa**	South Africa	Switzerland United Kingdom of Great Britain and Northern Ireland	Reduction in CO_2 emissions from the production of nitric acid at the Modderfontein plant.	265,460	AEL	Chemicals		
52	20 Dec 2012	**Lomati Biomass Power Generation Project in Mpumalanga Province**	South Africa	Ireland	A greenfield grid-connected biomass cogeneration power plant is proposed at Barberton town, Umjindi municipality, Mpumalanga province.	64,712	Lomati Energy (Pty) Ltd	Renewable energy		
53	27 Dec 2012	**Grahamstown Invasive Biomass Power Project**	South Africa	United Kingdom of Great Britain and Northern Ireland	The project activity will reduce the GHG emission by use of renewable (biomass) source for electricity generation in place of fossil fuels.	25,297	Nollen Group Bunge Emissions Holdings SARL	Renewable energy / agribusiness		
54	28 Dec 2012	**Installation of energy efficient ventilation fans**	South Africa		The purpose of this project is to reduce greenhouse gas	22,232	Goldfields	Mining	**x**	Why is energy efficiency

		at South Deep and Beatrix Gold Mines in South Africa			emissions through the implementation of an energy efficient project at the South Deep and Beatrix gold mines.					not standard practice and self-funded?

Clean Development Fund (CDM): Status of Registered / Approved Projects

Research Window: 15 August – 25 September 2014

Explanation of fields

Date Registered: Date project was registered by the CDM, and ***therefore***, approved.

Project Title: Project title as outlined in the CDM project document.

Reference Number: Unique reference number given to each approved project in the CDM registry.

Project Crediting Period: According to the project document the dates between which the project is permitted to issue offset credits.

Project Status (within research window): By colour code

- Project registered but current status unknown / uncertain due to lack of updated monitoring reports and available public information (Red)
- Project completed and issuing CERs or on track / in-progress (Green)
- Project completed and then cancelled (Orange)
- Project successfully completed and then cancelled after issuance of offsets (Blue)

CO_2 Reduction (Proposed): Saving in official project document. (Carbon in metric tons.)

CO_2 Reduction Units (Actual): Emissions units credited, equivalent to one metric ton of carbon saved. Accumulated credits since completion.

Comments: Any relevant observations.

 **RED FLAGS**: Projects for which further research is recommended. Anomalies / inconsistencies have been established which require warrant further examination/explanation.

SOURCE FOR DATA: CDM Registry

Figure 1: Spreadsheet, status of approved CDM projects, South Africa

	Date Regist.	Project Title	CDM Project Ref No.	Date of Proposed Crediting Period	Project Status within Research Window	CO_2 Reduction in Metric Tons (Proposed)	CO_2 Reduction Units Available (Actual)	Description of Parent	Comments
1	19 Oct 2007	**Transalloys Manganese Alloy Smelter Energy Efficiency Project**	1027	01 Oct 04 – 30 Sep 14 (Fixed)	Completed in March 2011.	55,044	**82,934**	Transalloys division of Highveld Steel and Vanadium Corporation Ltd	Reduction units / targets exceeded.
2	5 Nov 2007	**Project for the catalytic reduction of N_2O emissions with a secondary catalyst inside the ammonia reactor of the No. 9 nitric acid plant at African Explosives Ltd ("AEL"), South Africa**	1171	2013	Completed in January 2013 but cancelled after successful offset completion.	116,779	**284,433**	African Explosives Ltd	Reduction units / targets exceeded. Offset completed. **Purpose**: Project Developer Forum PDF offsets entire carbon footprint of delegates to UNFCCC Climate Conference in Doha COP18/CMP8 **Beneficiary**: The delegates of UNFCCC Climate Conference in Doha COP18/CMP8 and all species on this planet.

3	24 Jun 2013	**IFM Integrated Clean Energy Project**	6669	01 Sep 13 – 31 Aug 23 (Fixed)	Status unknown/ uncertain.	143,852	**None**	International Ferro Metals SA (Pty) Ltd (IFM)	No updated information available.
4	6 Mar 2006	**Lawley Fuel Switch Project**	0177	01 Jan 05 – 31 Dec 14 (Fixed)	Completed June 2008.	19,159	**50,403**	Corobrik SA	Reduction units / targets exceeded.
5	10 Oct 2012	**Red Cap Kouga Wind Farm**	7638	06 Apr 14 – 05 Apr 24 (Fixed)	Status unknown/ uncertain.	264,307	**None**	Red Cap Kouga Wind Farm (Pty) Ltd	No updated information available since December 2012.
6	22 Oct 2012	**De Aar Grid Connected 10 MW Solar Park, South Africa**	7607	01 Oct 13 – 30 Sep 20 (Renewable)	Status unknown/ uncertain.	18,115	**None**	Mulilo Renewable Energy Solar PV De Aar (Pty) Ltd	Park allegedly under construction.
7	11 Dec 2012	**North West, KwaZulu-Natal & Eastern Cape CFL Replacement Project (2) in South Africa**	7356	11 Dec 12 – 10 Dec 22 (Fixed)	Status unknown/ uncertain.	21,527	**None**	Eskom	No updated information available.
8	31 Dec 2012	**SA Calcium Carbide Furnace Waste Gas to Electricity CDM Project**	8928	01 Mar 13 – 28 Feb 23 (Fixed)	Status unknown/ uncertain.	34,777		SA Calcium Carbide (SACC) (Pty) Ltd	No updated information available since December 2012.

9	30 Apr 2012 	**Omnia N_2O Abatement Project II**	6083	30 Apr 12 – 29 Apr 22 (Fixed)	Status unknown/ uncertain.	348,138		Omnia Group (Pty) Ltd	Crediting period meant to begin in 2012 and final monitoring report was in 2014; however I cannot find any record of CERs being officially issued.
10	15 Nov 2012	**Dundee Biogas Power (Pty) Ltd**	8047	01 Jun 14 – 31 May 24 (Fixed)	In progress.	25,431		Dundee Biogas Power (Pty) Ltd	The project is expected to be implemented in two phases, with the first phase operational in 2014 and with the second phase operational in 2016. Each phase is likely to be 50% of the total capacity.
11	26 Oct 2012	**Bokpoort CSP (Concentrating Solar Power) Project, South Africa**	7841	01 Jul 15 – 30 Jun 25 (Fixed)	Status unknown/ uncertain.	205,532		This project will be developed by a consortium of three entities: ACWA Power Africa Holdings (Pty) Ltd ACWA Power Solafrica Bokpoort CSP	Project approved but no update on progress after October 2012.

								Power Plant (Pty) Solafrica Thermal Energy (Pty) Ltd ("Solafrica")	
12	18 Dec 2012 	**Use of waste gas at Namakwa Sands in South Africa**	5884		Status unknown/ uncertain.	84,432		Exxaro Resources Ltd owned Exxaro TSA Sands (Pty) Ltd	Project has ***disappeared*** off the CDM database.
13	15 Dec 2006 	**Durban Landfill-Gas-to-electricity project – Mariannhill and La Mercy Landfills**	0545		Completed March 2013 but later cancelled.	68,833	**181,146**	Durban Solid Waste (DSW) – eThekwini municipality	Reduction units / targets exceeded but Government of Canada has withdrawn from the Kyoto Protocol and requested IBRD as Trustee of the Prototype Carbon Fund to cancel all emissions reductions resulting from its participation in the Fund. This poses the question: has the money been refunded and why did the GOC withdraw? (No reason given.)

14	28 Dec 2012	**Tongaat Hulett Sugar Refinery Steam Optimisation Project**	9187	01 Oct 14 – 30 Sep 24 (Fixed)	Status unknown/ uncertain.	96,803		Tongaat Hulett Sugar South Africa Limited	Budget approval imminent in January 2013 but no further information.
15	24 Dec 2012 	**Cookhouse Wind Farm in South Africa**	8289	01 Jun 14 – 31 May 24 (Fixed)	Status unknown/ uncertain.	338,043		African Clean Energy Developments (ACED)	Report prepared on the project appears to accuse the project of corrupt credentials as follows: This project is a fabricated and fake CDM project and must be rejected by the DOE right away. DOE should not support this kind of projects otherwise CDM EB should suspend this DOE for at least one year. Submitted by: zhong zhou li
16	26 Mar 2009	**Durban Landfill-Gas Bisasar Road**	1921		Completed January 2012.	342,705	**815,344**	Durban Solid Waste (DSW) – eThekwini municipality	Reduction units / targets exceeded.
17	13 Dec 2012 	**Kathu Grid Connected 100 MW Solar Park, South Africa**	7531		Status unknown/ uncertain.	238,080		Renewable Energy Investment of South Africa (Pty) Ltd (REISA)	Bizarrely when the project reference number is entered, the project name and country appear to have changed too: Methane Recovery and Power

									generation at the Kupferberg Landfill in Namibia.
18	24 Aug 2009 	**Alton Landfill Gas to Energy Project**	2549		Status unknown/ uncertain.	25,893		ENER*G Systems uMhlathuze (Pty) Ltd	Project has disappeared off the website.
19	20 May 2007 	**Mondi Richards Bay Biomass Project**	0966	01 Oct 05 – 30 Sep 15 (Fixed)	Status unknown/ uncertain.	184,633		Mondi	No info available after 2007 apart from a letter posted to the website arguing that the CERs for this project have been incorrectly calculated as of 2010. Since no CERS have been issued officially and the crediting period terminates in 2015, perhaps we should consider this defunct.
20	24 Dec 2012 	**Coega IDZ Windfarm**	8954	01 Aug 13 – 31 Jul 20 (Renewable)	Status unknown/ uncertain.	107,803		BHP Billiton/ Electrawinds Africa and Indian Ocean Islands (Pty) Ltd/ Nelson Mandela Bay Municipality	According to the project document, in 2010 the first wind turbine was connected to the grid and commercial production started, however no CERs have been published by 2014.

21	26 Oct 2010	**Ekurhuleni Landfill Gas Recovery Project – South Africa**	3677	26 Oct 10 – 25 Oct 17 (Renewable)	Status unknown/ uncertain.	282,349		Ekurhuleni Municipality	Construction on the project began in 2007, but after 2012 no further updates available.
22	25 May 2007	**Sasol Nitrous Oxide Abatement Project**	0961		Completed May 2012.	960,322	**1,989,484**	Sasol	Reduction units / targets exceeded.
23	27 Aug 2005	**Kuyasa low-cost urban housing energy upgrade project, Khayelitsha (Cape Town; South Africa)**	0079	01 Sep 05 – 31 Aug 12 (Renewable)	Status unknown/ uncertain.	6,580		The City of Cape Town	No further information publically available after November 2010 monitoring report.
24	14 Nov 2012	**Hopefield Wind Energy Facility in South Africa**	7816	01 Apr 14 – 31 Mar 24 (Fixed)	Status unknown/ uncertain.	171,535		Umoya Energy (Pty) Ltd	No further information or updates available.
25	10 Oct 2012 	**Gauteng, Free State, Mpumalanga, Limpopo & Northern Cape CFL Replacement Project (1) in South Africa**	7478	10 Oct 12 – 09 Oct 22 (Fixed)	Status unknown/ uncertain.	22,733		Eskom	Project is due to be completed in 2012. According to the project document however no CERs have been registered and no further public updates available.

26	31 Dec 2012	**Amakhala Emoyeni Grid Connected 138.6MW Wind Farm, Phase 1, South Africa**	7576	01 Oct 16 – 30 Sep 26 (Fixed)	In progress.	370,665		Eskom	As of 2013 there was a change in the PDD of the project which required additional technical approval. This was received in 2014 and the project will now go ahead.
27	15 Jul 2013 	**Hernic's Electricity Generation from Waste Gas Project**	8956	01 Apr 14 – 31 Mar 24 (Fixed)	Status unknown/ uncertain.	152,290		Hernic Ferrochrome (Pty) Ltd.	PDD only completed in August 2013. No further update available. However in the PD, it states that construction of the project is expected to start at the earliest in January 2013. One wonders why construction would begin before the project document was complete and approved.
28	12 Dec 2012	**Samancor Chrome Middelburg Electricity from Waste Gas**	8525	01 Nov 14 – 31 Oct 24 (Fixed)	In progress.	189,720		Samancor	Expected start date of the project activity: 15 December 2012. Expected date that the crediting period will start (end of commissioning period): 1 November 2014.

29	13 Dec 2012	**West Coast 1 Wind Farm in South Africa**	8404	01 Jan 15 – 31 Dec 24 (Fixed)	Status unknown/ uncertain.	266,260		Moyeng Energy (Pty) Ltd	Project was to be initiated in June 2012, but no further update available.
30	29 Dec 2012	**Trigeneration at Mobile Telephone Networks (MTN), 14th Avenue Commercial Site South Africa**	9412	01 Jan 13 – 31 Dec 22 (Fixed)	Status unknown/ uncertain.	8,617		MTN	No update available.
31	31 Dec 2012	**TWE Golden Valley Wind Power Project**	8951	31 Jul 15 – 30 Jul 22 (Renewable)	Status unknown/ uncertain.	443,093		Terra Wind Energy Pty	The plant was meant to begin contributing to the grid in March 2012 but no further update available and no CERs issued.
32	10 Jun 2011 	**The Capture and Utilisation of Methane at the GFI Mining South Africa owned Beatrix Mine in South Africa**	4728	01 Jul 11 – 30 Jun 18 (Renewable)	Status unknown/ uncertain.	249,409		GFI (Goldfields) Mining	Project is claiming emission reductions as follows: The total emission reductions achieved during this monitoring period (01/07/2011 – 31/03/2012) are 41,305 t CO_2e. However no CERs are officially registered.

33	12 Feb 2007	**Tugela Mill Fuel Switching Project**	0795	16 Jan 08 – 15 Jan 15 (Renewable) Changed from: 12 Feb 07 – 11 Feb 14	Completed April 2011 but project cancelled.	55,912	**104,938**	Sappi Kraft Pty / Ecosecurities Capital Ltd	Voluntary cancellation on behalf of the British Foreign Commonwealth Office.
34	23 Nov 2012	**Dassieklip Wind Energy Facility in South Africa**	8107	01 Aug 13 – 31 Jul 23 (Fixed)	Status unknown/ uncertain.	67,397		BioTherm Energy in association with Group Five, Iberdrola and Sinovel.	Letter sent to the South African designated authority requesting approval for the project but no updates thereafter. In 2013 a request was made to add Standard Bank to the list of project participants.
35	27 Dec 2012	**Distributed Energy Generation's Waste Heat to Power Project at XAWO**	8967	01 Jan 16 – 31 Dec 25 (Fixed)	Status unknown/ uncertain.	261,891		Distributed Energy Generation (Pty) Ltd (DEG)	No update available.
36	24 May 2012	**Nelson Mandela Bay Metropolitan's Landfill Gas Project**	5692	24 May 12 – 23 May 22 (Fixed)	Status unknown/ uncertain.	109,473		Nelson Mandela Metro	Project was meant to begin generating credits in 2012 but no update available.

37	29 Sep 2006	**PetroSA Biogas to Energy Project**	0446	01 Oct 07 – 30 Sep 17 (Fixed) Changed from: 29 Sep 06 – 28 Sep 16	Completed October 2009.	29,933	**32,730**	PetroSA/ MethCap SPV1 (Pty) Ltd	Reduction units / targets exceeded. Last monitoring report issued in 2009.
38	12 Nov 2012	**Joburg Landfill Gas to Energy Project**	6797	12 Nov 12 – 11 Nov 19 (Renewable)	Project on hold.	542,495		ENER-G Systems Joburg (Pty) Ltd. (private entity)	2013 monitoring report states that the project is currently on-hold while a buyer is sought for the gas produced from extracting methane from the landfill sites.
39	03 May 2007	**Omnia Fertilizer Limited Nitrous Oxide (N_2O) Reduction Project**	0752		Completed in November 2011.	473,338	**1,901,275**	Omnia Fertilizer Limited	Reduction units / targets exceeded.
40	8 Oct 2009	**Bethlehem Hydroelectric Project**	2692	08 Oct 09 – 07 Oct 16 (Renewable)	Status unknown/ uncertain.	32,688		Bethlehem Hydro (Pty) Ltd Statkraft Markets BV	No updates available.
41	27 Apr 2007	**EnviroServ Chloorkop Landfill Gas Recovery Project.**	0925	19 Jan 08 – 18 Jan 15 (Renewable) Changed from: 01 Jul 07 – 30 Jun 14	Completed October 2009.	188,390	**633,696**	EnviroServ	Reduction units / targets exceeded.

42	25 Dec 2010	**Fuel switch project on the Gluten 20 dryer of Tongaat Hulett Starch Pty (Ltd) Germiston Mill**	3398	01 May 10 – 30 Apr 17 (Renewable)	In progress.	5,807		Tongaat Hulett Starch (Pty)	17 Oct 13 – Approved Effective approval date: 15 Oct 13
43	14 Nov 2012	**Karoo Renewable Energy Facility (Nobelsfontein Wind)**	8087	01 Aug 14 – 31 Jul 24 (Fixed)	Status unknown/ uncertain	856,477		South African Renewable Green Energy Pty Ltd	No updates since 2012.
44	12 Dec 2012	**Samancor Chrome Witbank Electricity from Waste Gas**	8566	01 Nov 14 – 31 Oct 24 (Fixed)	Status unknown/ uncertain.	141,894		Samancor	Expected date that the crediting period will start (end of commissioning period): 1 November 2014. Unsure whether this is on track since this estimate was quoted in a 2012 report.
45	14 Nov 2012	**Karoo Renewable Energy Facility (Nobelsfontein Solar PV)**	8148	01 Jan 15 – 31 Dec 24 (Fixed)	Status unknown/ uncertain.	92,164		South African Renewable Green Energy Pty Ltd	No updates since 2012.
46	5 Dec 2012	**Prieska Grid Connected 20MW Solar Park, South Africa**	7492	01 Nov 13 – 31 Oct 23 (Fixed)	Status unknown/ uncertain.	38,314		Mulilo Renewable Energy (Pty) Ltd	The date on which the EPC (Engineering, Procurement and Construction) contract was signed for this project is 5 November

									2012, at which point construction and installation works have also started. The solar park will be constructed in two 10MW phases and the Commercial Operation Date (COD) is expected to be 1 November 2013. No further update available.
47	5 Nov 2012	**Neusberg Grid Connected Hydroelectric Power Plant, South Africa**	7536	08 Oct 14 – 07 Oct 21 (Renewable)	Status unknown/ uncertain.	66,826		Kakamas Hydro Electric Power (Pty) Ltd (private entity)	According to the 2012 PD, the project will be operational by October 2014, however no recent updates available.
48	29 Sep 2006 	**Rosslyn Brewery Fuel-Switching Project**	0358	01 Jun 07 – 31 May 14 (Renewable) Changed from: 01 Jun 06 – 31 May 13	Status unknown/ uncertain.	100,941		South African Breweries Ltd	Project approved in 2004, and crediting period ended in 2013 without any update or CERs registered.
49	18 Jul 2008 	**Kanhym Farm manure to energy project**	1665	18 Jul 08 – 17 Jul 15 (Renewable)	Status unknown/ uncertain.	32,660		BioTherm SPV1 (Pty) Ltd / NRG Investments (Pty) Ltd	No update available. The PD states that the project will start in 2007 yet no CERs registered.

50	13 Dec 2012	**Rheboksfontein Wind Energy Facility**	8346	01 Jul 15 – 30 Jun 25 (Fixed)	Status unknown/ uncertain.	313,635		Moyeng Energy (Pty) Ltd (private entity) Micawber 895 (Pty) Ltd	The project starting date is 22 June 2013, one month and two weeks after the bid date. There is no further update available.
51	08 Feb 2008	**N_2O abatement project at nitric acid plant No. 11 at African Explosives Ltd. (AEL), South Africa**	1364	08 Feb 08 – 07 Feb 18 (Fixed)	Completed February 2012.	265,460	**1,041,434**	AEL	Reduction units / targets exceeded. Undergoing information and reporting check.
52	20 Dec 2012	**Lomati Biomass Power Generation Project in Mpumalanga Province**	7476	01 Jan 15 – 31 Dec 24 (Fixed)	Status unknown/ uncertain.	64,712		Lomati Energy (Pty) Ltd	No information available since 2012.
53	27 Dec 2012	**Grahamstown Invasive Biomass Power Project**	8372	01 Jan 13 – 31 Dec 22 (Fixed)	Status unknown/ uncertain.	25,297		Nollen Group Bunge Emissions Holdings SARL	No information available since 2012.
54	28 Dec 2012	**Installation of energy efficient ventilation fans at South Deep and Beatrix Gold Mines in South Africa**	9238	01 Jan 13 - 31 Dec 22 (Fixed)	Status unknown/ uncertain.	22,232		Goldfields	No information available since 2012.

Conclusion:

- Of all the projects registered (approved) on the CDM registry, only a fraction (8) have been completed successfully and have registered CERs (certified emission reduction certificates);
- Several others (5) are marked as '**In Progress'** since to date satisfactory information exists which suggests that they are progressing (but not yet complete) as per the project design document (PDD);
- Two projects (No. 13 and 33) have been ***cancelled*** by the British Commonwealth and Government of Canada. No reason is published;
- One further project (No. 2) was completed and offsets were used against a specific event, the project is therefore terminated;
- The vast majority of projects (38) researched are listed as **'Status unknown / uncertain'**, since information on progress remains unclear;
- There are within this group several anomalies too which have been **red flagged**;
- The reasons for flags include alleged corruption, incomplete information, name changes without reason, or the simple disappearance of a registered project from the CDM database without trace (were funds re-reimbursed?) etc. These projects should be researched further;
- In addition, several projects (No. 20, for example) have used CDM funding to begin projects which could be described as commercial (profit making) in nature, however, despite the assistance of the CDM funding, and even after several years, no CERs have been published;
- This lends additional weight to previous concerns that CDM funds are **a)** supporting the commercial 'enhancement' of projects, and **b)** not complying to the demands of 'additionally' (in that they probably should have/would have happened anyway). Many projects have expansive crediting periods often ending in 2022 – 2025. This means that the projects may not have to register credits for some time yet and therefore investment funds issued by the CDM may not bear fruit for many years;
- Most projects do not have regular monitoring reports registered on the website which calls into questions issues of transparency and public interest;
- Questions remain as to **a)** The status of investment funds for projects which have been cancelled, **b)** The accountability of CDM funded projects to the public, **c)** Transparency of funds spent and, **d)** Progress of the projects against the project design.

Figure 2: Status of approved projects – South Africa, September 2014