

Clean Development Mechanism South Africa
Designated National Authority



energy

Department:
Energy
REPUBLIC OF SOUTH AFRICA

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Project Design Document (PDD)

Project reference number (office)	
Date received (office use only)	

NOTES ON COMPLETING THIS PROJECT DESIGN DOCUMENT

1. Please provide this PDD in both hard-copy

Part A: Project Proponent Details

Project Name	Compressed air energy efficiency at Harmony Gold Mining Company
Date of Submission of PDD	24/07/2012

Project Developer	
Name	<i>Harmony Gold Mining Company Limited</i>
Organizational Category	<i>Private Company</i>
Legal Status	<i>Limited company</i>
Street Address	Randfontein Office park Corner of Main Reef Road and Ward Avenue Randfontein Gauteng 1760 South Africa
Postal Address (if different from above)	

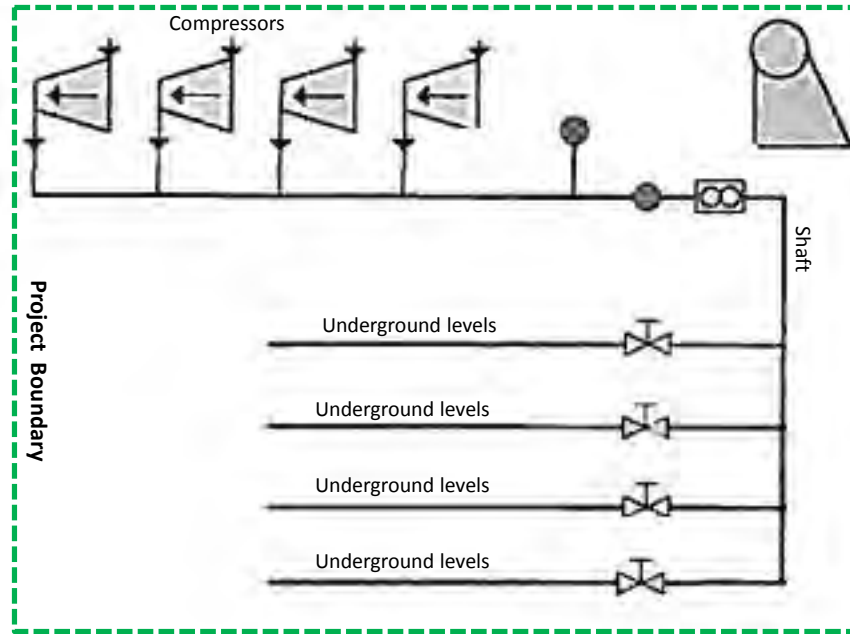
Website Address	http://www.harmony.co.za
Main Activities	<i>In South Africa, the company has ten underground and one open-pit mine and several other surface operations, exploiting goldbearing reefs of the Witwatersrand Basin.</i>
Summary of Financial Performance in last fiscal year	<i>In FY11, Harmony produced 1.30Moz* of gold (FY10: 1.43Moz*). The company employed 39 440 people, largely in South Africa, of whom 34 472 were full-time employees and 4 968 contractors</i> <i>At 30 June 2011, Harmony reported ore reserves of 41.6Moz (FY10: 48.1Moz) and mineral resources of 163.9Moz (FY10: 189.2Moz).</i>
Contact Person(s)	Mr Louis Botha
Telephone	Work: 011 696 7267 Cell: 084 586 0169
Fax	011 411 2143
Email Address	louis.botha@harmony.co.za
Project Partners	
Provide the following Information for all project partners (copy and paste relevant sections of the table if information is to be provided on more than one partner organisation)	
Name	Nedbank Limited
Nature of partner	<i>Bank</i>
Organizational Category	<i>Private Company</i>
Legal Status (if private company)	<i>Limited company</i>
Street Address	135 Rivonia Road Sandown Gauteng 2196 South Africa
Postal Address (if different to Street Address)	
Website Address	www.nedbankcapital.co.za
Main Activities	Nedbank Capital aims to provide clients with solutions that add value to their business. Their services include the full range of investment banking products and focused sector specialization.
Contact Person(s)	Mr Kevin Whitfield
Telephone	Work: +27 11 294 2268

	Cell: +27 82 901 5846
Fax	+27 11 295 2268
Email Address	kevinwh@nedbankcapital.co.za
Contractual Arrangements	
Contractual arrangements between various entities involved	<i>Supporting the development of the project and owner of the future CERs.</i>

Part B: Project Overview (Technical Summary, Location and Schedule)

Technical Summary of the project	
Objective of the Project	<i>The purpose of the project is to reduce greenhouse gas emissions through the implementation of energy efficiency measures in the compressed air system.</i>
Project Description	
<p><i>This project is a standalone CDM project. Harmony Gold Mining Company ("Harmony") operates a number of deep level gold mines in South Africa. Compressed air is used extensively in these mines. The main applications are pneumatic drilling, pneumatic operation of loaders, instrumentation, refuge bay ventilation and air agitation. A significant portion of mine electricity consumption is used for compressed air generation.</i></p> <p><i>The project involves the installation of surface and underground compressed air control valve units and hydraulic equipment together with a REMS3-OAN control system. This will make it possible to monitor, optimise and automatically control mine compressed air demand. Improved automated control of compressed air demand will reduce the amount of compressed air required from the compressors on each individual shaft. This will enable saving measures on the compressors such as vane control, compressor idling and switching-off of compressors. This will in turn result in reduced electricity consumption by the compressors.</i></p> <p><i>The project activity involves a set of measures to improve energy efficiency in air demand at Harmony Gold Mining Company. Those measures are to be installed in five mine sites (Bambanani, Evander, Masimong, Tshepong and Phakisa) at five separate geographic sites. The project boundary is defined as five network systems, one for each site.</i></p>	

Technical Summary of the project



Project Constraints
No

Technology to be employed

The proposed project system will improve the efficiency of the compressed air system by monitoring, integrating, simulating, optimising and controlling elements of the supply and demand of compressed air. The project will also access the compressed air SCADA system to retrieve compressor statuses, pressures, flows, valves statuses, etc.

Greenhouse Gases Targeted

CO₂

Emission reductions

Indicate the expected emission reductions that will occur due to the project.

49 974 tonnes CO₂ equivalent per year

Baseline & Additionality Assessment

The baseline of each of the sites on which the project is implemented is equal to the historic average electricity consumption for that specific site.

Additionality Assessment: In mining companies of similar size and ownership structure, barriers to implementation prevented the implementation of similar projects. These technologies are also very expensive to implement and maintain especially when it is new technologies replacing existing equipment. It takes a long

Technical Summary of the project	
	<i>time to implement and expand these technologies. Our investigations on various sites, including those of other mining houses, have shown these options not to be viable for the majority of mines.</i>
Monitoring	<p><i>The following data sources will be used in monitoring the project:</i></p> <ul style="list-style-type: none"> • Eskom • Operations & Maintenance contractor • Harmony <p><i>A centralised database will be used to store and archive the data from the different sources. The data from the meters installed at the shaft/compressor houses will be crosschecked with sales invoices from Eskom.</i></p>
Type of project/activities	<i>Identify which type of activity is involved in this project - and for each, provide brief details</i>
a. Energy Supply	<i>Not applicable</i>
b. Energy Demand	<p><i>Improvement of energy efficiency of existing compressors.</i></p> <p><i>The proposed project system will improve the efficiency of the compressed air system by monitoring, integrating, simulating, optimising and controlling elements of the supply and demand of compressed air.</i></p>
c. Industrial Process	<i>Not applicable</i>
d. Transport	<i>Not applicable</i>
e. Waste Management	<i>Not applicable</i>
f. Forestry/ land use	<i>Not applicable</i>
g. Other	<i>Not applicable</i>
Project Boundary	
<p>The project boundary is the physical, geographical site of the industrial or mining and mineral production facility(ies), processes or equipment that are affected by the project activity.</p> <p>The project activity involves a set of measures to improve energy efficiency in air demand at Harmony Gold Mining Company. Those measures are to be installed in five mine sites (Bambanani, Evander, Masimong, Tshepong and Phakisa) at five separate geographic sites. The project boundary is defined as five network systems, one for each site.</p>	
Indicate Emissions outside the Project Boundary	<i>Not applicable</i>

Location of the Project	
Province	<ol style="list-style-type: none"> 1. Free State Province, 2. Mpumalanga.

Nearest city/large town	<ol style="list-style-type: none"> 1. Welkom, 2. Evander, 3. Virginia, 4. Odendaalsrus.
Brief description of the location of the project site	<i>The project will be implemented at Harmony's mine shafts. The installations of control valve units are both on the surface and underground.</i>

Project Schedule/Timetable	
Earliest Project Start Date	<i>11/2010</i>
When is the expected first year of CER delivery	<i>2013</i>
Project Lifetime	<i>10 Years</i>
Project End Date	<i>12/2023</i>
Crediting Period	<i>10 years</i>
Current Status or phase of the project	<i>Actions already commenced.</i> <i>The project is being implemented.</i>
DNA Approval	<i>No</i>
Approval by other bodies	<i>No</i>

Part C: Performance Against the DNA's Sustainable Development Criteria

South Africa has identified the following sustainable development criteria and indicators against which each CDM project will be assessed. Please provide your interpretation of how this project will address each of these **criteria and indicators** where they are relevant to the project. If the space provided is not sufficient please append additional information as required.

NOTE: For all indicators which are of relevance to the project show how the performance of the project against these indicators can be objectively monitored and measured on an ongoing basis.

<p>1. Economic: Does the project contribute to national economic development?</p> <p>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. Promoting energy efficiency in South Africa will reduce the pressure on the current energy infrastructure, thereby making important contributions to the country's economic sustainability.</p> <p>There will be a transfer of knowledge from the countries supplying the energy efficient technology to South Africa, and the project will contribute to foreign reserve earnings for South Africa via carbon credit sales revenue.</p>	
<p>2. Social: Does the project contribute to social development in South Africa?</p> <p>The project created jobs during the implementation phase. In addition the implementation of the project improved the working conditions of the people operating the mine.</p>	
<p>3. Environmental: Does the project conform to the National Environmental Management Act principles of sustainable development?</p> <p>Please provide brief comment for each of these below.</p>	
<p>i) That the disturbance of ecosystems and loss of biological diversity are avoided, or where they cannot be avoided, are minimised and remedied</p>	<p><i>There is no disturbance of ecosystems and loss of biological diversity in this project.</i></p>
<p>ii) That pollution and degradation of the environment are avoided, or where they cannot be altogether avoided, are minimised and remedied</p>	<p>There are no pollution and degradation of the environment in this project.</p>
<p>iii) That the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied</p>	<p>There will be no disturbance of landscapes and sites that constitute the nation's cultural heritage in this project.</p>
<p>iv) That waste is avoided, or where it cannot be altogether avoided, minimised and reused or recycled where possible and otherwise disposed of in a responsible manner</p>	<p>There is no significant waste in this project.</p>
<p>v) That the use and exploitation of non-</p>	<p>There is no significant use of non-renewables in this project.</p>

<p>renewable resources is responsible and equitable, and takes into account the consequences of the depletion of the resource</p>	
<p>vi) That the development, use and exploitation of renewable resources is responsible and equitable, and takes into account the consequences of the depletion of the resource.</p>	<p>The project will reduce electricity consumption from a predominantly coal-fired grid.</p>
<p>vii) That a risk averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions</p>	<p>A reputable electrical engineering firm is being used for project implementation.</p>
<p>vii) That negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied</p>	<p><i>The impacts on the environment are improved by implementing this project.</i></p>
<p>Other comments Please provide any other comments on how this project contributes to sustainable development in South Africa (optional)</p>	

Indicators in Support of the Project Approval Criteria

	Category	Indicator	Comment
Environmental	Impact on local environmental quality	<ul style="list-style-type: none"> • Impact of the project on air quality • Impact of the project on water pollution • Impact of the project on the generation or disposal of solid waste • Any other positive or negative environmental impacts of the project (such as impacts on noise, safety, visual impacts, or traffic) 	<ul style="list-style-type: none"> • The project will improve air quality by reducing greenhouse gas emissions. • There will be negligible water pollution associated with this project • There will be no generation of solid waste, or disposal thereof in this project • The overall impact of this project on the local environmental quality is positive.
	Change in usage of natural resources	<ul style="list-style-type: none"> • Impact of the project on community access to natural resources • Impact of the project on the sustainability of use of water, minerals or other non renewable natural resources • Impact of the project on the efficiency of resource utilisation 	<ul style="list-style-type: none"> • The project will reduce coal usage in South Africa and the subsequent effects of coal mining.
	Impacts on biodiversity and ecosystems	<ul style="list-style-type: none"> • Changes in local or regional biodiversity arising from the project 	<ul style="list-style-type: none"> • This project has no influence on the local or regional biodiversity.

Indicators in Support of the Project Approval Criteria		
Category	Indicator	Comment
Economic	<ul style="list-style-type: none"> • Impact of the project on foreign exchange requirements • Impact of the project on existing economic activity in the area • Impact of the project on the cost of energy • Impact of the project on foreign direct investment 	<ul style="list-style-type: none"> • The project will contribute to foreign reserve earnings for South Africa via the carbon credit sales revenue.
	<ul style="list-style-type: none"> • Positive or negative implications for the transfer of technology to South Africa arising from the project • Impacts of the project on local skills development • Demonstration and replication potential of the project 	<ul style="list-style-type: none"> • The project is replicable. A separate PoA is being developed to make replicating possible.

Indicators in Support of the Project Approval Criteria		
Category	Indicator	Comment

Indicators in Support of the Project Approval Criteria

	Category	Indicator	Comment
Social	Alignment with national provincial and local development priorities	<ul style="list-style-type: none"> • How the project is aligned with provincial and national government objectives • How the project is aligned with local developmental objectives • Impact of the project on the provision of, or access to, basic services to the area • Impact of the project on the relocation of communities if applicable • Contribution of the project to a any specific sectoral objectives (for example, renewable energy targets) 	<ul style="list-style-type: none"> • The project decreases the use of grid electricity and thus reduces greenhouse gas emissions. This will help reach the target the South African government committed to; the reduction of the country's emissions by 34% from business as usual.
	Social equity and poverty alleviation	<ul style="list-style-type: none"> • Impact of the project on employment levels? (specify the number of jobs created/lost; the duration of time employed, distribution of employment opportunities, types of employment, categories of employment changes in terms of skill levels and gender and racial equity) • Impact of the project on community social structures • Impact of the project on social heritage • Impact of the project on the provision of social amenities to the community in which the project is situated • Contribution of the project to the development of previously underdeveloped areas or specially designated development nodes 	<p>The project will create jobs in the implementation and monitoring phases of the project.</p>

Indicators in Support of the Project Approval Criteria

Category	Indicator	Comment
General	General Project Acceptability <ul style="list-style-type: none"><li>• Are the distribution of project benefits deemed to be reasonable and fair?	<ul style="list-style-type: none"><li>• This is a green initiative by business and the distribution of benefits is deemed to be fair and reasonable.

Part D: Finance

Project Costs	
Development Costs (R's)	Not currently available
Installed Costs (R's)	Not currently available
Other Costs (R's)	Not currently available
Total Project Costs (R's)	Not currently available
Sources of Finance	
Equity	<i>Name of Organisation(s) and amount (R's) contributed by each</i> Not currently available
Debt (long term)	<i>Name of organization(s) and amount (R's) for each</i> Not currently available
Debt (short term)	<i>Name of organization(s) and amount (R's) for each</i> Not currently available
Amount not identified (R's)	<i>Amount (R's) and a brief summary of the needs and any outstanding issues (1 paragraph or less)</i> Not currently available
Total CDM Contribution sought	<i>Amount (R's) and a brief summary of the needs and any outstanding issues (1 paragraph or less)</i> Not currently available
Expected Price of CER in case of a contract to purchase for: A period of 7 years A period of 10 years A period of 14 years (2x7 years)	Not currently available
Indicate the projected Internal Rate of Return for the project with and without CER revenues.	<i>Note: Please indicate assumed price of CER as used in your calculation</i> Not currently available

<p>Constraints on tradability of carbon credits</p>	<p><i>Have any commercial arrangements been made that may impact the tradability of the carbon emission reductions? If yes, please define. Note. Examples would be subjection to a mortgage, government tax etc.</i></p> <p><i>None</i></p>
<p>Preliminary discussions with potential purchasers</p>	<p><i>Have you had any preliminary discussions with any potential purchasers of the carbon credits (CERs) If yes, please give brief details.</i></p> <p><i>Confidential</i></p>