World Business Council for Sustainable Development
Cement Sustainability Initiative

Strengthening the CDM:
A Cement Industry Perspective

24 November 2005

DRAFT for Discussion
December 2005

Executive Summary

Cement is an indispensable ingredient for development, providing the "glue" that holds together much of the world's infrastructure. Cement production is also a large source of greenhouse gases, accounting for approximately 5% of global man-made CO_2 emissions. The Cement Sustainability Initiative (CSI),[1] formed under the umbrella of the World Business Council for Sustainable Development, includes seventeen leading cement companies from fourteen countries collaborating to address critical issues related to global sustainability and their industry. First among these issues today is responsible management of CO_2 emissions.

The CSI views the Clean Development Mechanism (CDM) as a key element in responding to the climate change challenge, and is interested in encouraging its more widespread use. This paper summarizes our collective experience trying to use the current CDM process, identifies what we have found to be barriers to greater use, and offers suggestions for improvement.

Our hope is to provide practical improvements to what many in industry view as current shortcomings to the CDM process. CDM is a promising instrument but slow to gain use, we believe, because of complex rules, long procedures and the perceived lack of objective standards in the current approach to "additionality."

Several cement companies have made efforts to develop CDM projects, and to date, three specific methodologies have been approved: ACM003, ACM005, and AM0024. However, not a single project has yet been registered. Based on our experience of developing emissions reductions projects in the past few years, the CSI proposes the use of a benchmarking system for the CDM, based on the "benchmarked" emissions performance of the best performing facilities of our industry in a specific region. Emissions reduced below this benchmark level would automatically qualify as "additional." We believe this concept is well suited to the cement sector and is broadly applicable to many other industries.

Setting the exact level of the benchmark will be key to generating environmental benefits while at the same time encouraging the development of CDM projects.

We provide these comments to stimulate further constructive dialogue with stakeholders in order to move CDM into mainstream applications. We look forward to working with others in successfully addressing the challenges ahead.

1 Why the Cement Industry Is Important for the CDM

Cement is an indispensable ingredient for development, with approximately 2 billion tonnes produced worldwide in 2005. Much of this production now takes place in developing countries, driven by the rapid build up of infrastructure in China and India. The cement industry is also a large emitter of CO_2, with current emissions corresponding to about 5% of global, man-made CO_2 emissions. The Annex to this report provides more details on the industry and its sources of CO_2 emissions.

Options for Reducing CO_2 Emissions in the Cement Industry

Most CO_2 abatement opportunities in the cement industry can be realized through a combination of three approaches:

- **Thermal efficiency improvements**: Modern short cement kilns with preheaters / precalciners are substantially more energy-efficient than older technologies. The upgrading of existing kilns is possible, but involves large capital outlays.
- **Fuel switching**: Traditional fuels in the cement industry are coal, oil, and more recently petroleum coke (petcoke). CO_2 Emissions can be reduced by switching to fuels with lower carbon content or carbon-neutral components, such as waste-derived fuels including biomass residues.
- **Clinker substitution**: 90% of CO_2 emissions in the cement industry are associated with the intermediate product clinker. Clinker is ground with gypsum and other materials to produce cement. The clinker component of cement can be reduced by partial substitution with other hydraulic materials such as natural pozzolana, fly ash, or blast furnace slag, resulting in lower emissions for the same amount of marketed product.

The combined emissions reduction potential from the above measures is significant. However, realizing this emission reduction potential is limited by:

- Generally high capital costs to increase energy efficiency
- Local availability and prices of clinker substitutes and low-carbon fuels;
- Regulations restricting the use of clinker substitutes and low-carbon fuels.

Importance of Industry Participation in CDM

Industry participation in the CDM is widely acknowledged as essential to tackle climate change.

- to help meet the Kyoto targets efficiently through cost-effective emission reductions;
- to maximize sustainable development benefits associated with these reductions;
- to help ensure that upcoming investments in long-lived industrial assets are directed towards lower emission solutions.

Yet very few projects have been registered for the CDM to date. Despite considerable effort by the cement industry during the last five years, no cement-related project has yet reached final registration with the CDM Executive Board, (as discussed below) and only a few projects are known to be under consideration. Reasons for this slow progress relate to difficulties in using the current CDM rules.

2 CDM Experience and Lessons to Date

Several cement companies have made serious attempts to participate in the CDM to date. The table below summarizes three examples from three companies: HeidelbergCement, Holcim, and Lafarge. All three companies initiated steps towards CDM registration of individual projects more than three years ago. Yet none of the projects has reached registration yet, and one company (Holcim) has now stopped its CDM-related work because the opportunity for approval within a reasonable time appeared small, while resources were needed for other projects.

	HeidelbergCement	**Holcim**	**Lafarge**
Project type:	- Clinker substitution (blending) - Alternative kiln fuels	Kiln upgrade to increase: - Energy efficiency - Clinker substitution - Use of alternative fuels	Biomass as kiln fuel
Country:	Indonesia	Costa Rica	Malaysia
CDM work initiated:	2002	2001	2000
Methodology:	Developed methodologies which were ultimately integrated in the consolidated methodologies for blending (approved in September 2005), and alternative kiln fuels (approved in May 2005)	Developed methodology, later abandoned	Developed methodology which was approved, then integrated in the consolidated methodology for alternative kiln fuels (approved in May 2005)
CDM status:	Project to be submitted for CDM registration	CDM-related work was stopped in 2004	Project to be submitted for CDM registration

Table 1: Examples of cement companies' engagement in CDM

The experience of these cement companies has been that current CDM process does not allow the cement industry to realize its emission reduction potentials in a timely and efficient way.

In line with the Marrakech Accords, the CSI fully supports the requirement that CDM projects should go beyond simple business-as-usual. However, the CSI has concerns regarding the efficiency, practicality and fairness of the current interpretation of "additionality" (art. 43, Marrakech Accords), required by the Consolidated Additionality Tool of the Executive Board. In that respect, the CSI fully supports the proposals put forward by the International Emissions Trading Association (IETA) in its recent position papers, *"Strengthening the CDM"*[2] *and "IETA position on additionality."*

In particular, the CSI considers that financial additionality (Step 2 of the Consolidated Tool) is very often not an adequate indicator in capital-intensive industries, because many factors are involved (beyond financial concerns) in normal project decision-making (cost, timing, resource use, environmental impacts, infrastructure needs, etc.) On the other hand, barrier analysis (Step 3 of the Consolidated Tool) is difficult to implement because both the barriers and the CDM impact are not quantifiable. Using barriers therefore often implies a high level of subjectivity.

The CSI believes that focus can be put more productively on defining an objective CO_2 emissions performance baseline (a benchmark) rather than on proving the *intent* of the project (current subjective approach). Projects which perform better than the benchmark would automatically generate emission credits. Those that did not perform better might generate credits, but <u>only</u> upon a project specific additionality test. This proposal aims for a CDM that provides predictable and effective incentives for emissions reductions and is discussed more fully below.

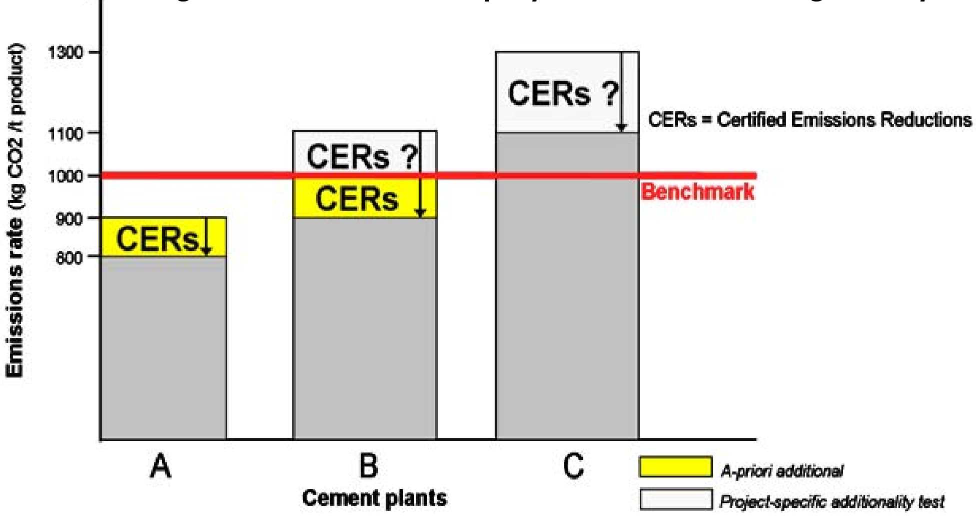
3 Towards a System of Benchmarks for the Cement Industry

In the cement industry, a benchmark emission levels could be defined, for example, in kg CO_2 per tonne of cement or clinker, and could vary between regions. As an example, the benchmark could be set at the average emissions rate of the top 20% performers in a region, weighted by production. For example, if the top 20% had average emissions of 1000 kg CO_2 per tonne of product, then this would become the benchmark value, assuming (for simplicity) equal production from all companies. The benchmarks would then serve two distinct purposes:

- **A-priori additionality**:
  Any project beating the benchmark would automatically qualify as additional, without any project-specific additionality test; and
- **Baseline emissions level**: The benchmark would serve as the baseline against which emission reductions achieved by the project would be calculated.

Emission reductions, which did not beat the benchmark, would not qualify for CDM if the benchmark were used as a strict eligibility threshold. Some people might consider this unfair to some producers or some projects. For example a project with made a significant emissions reduction, but which still ended with emissions above the benchmark, would not qualify in the scheme as described. . To help capture these legitimate reductions, project-specific additionality tests could be used to evaluate a proposed project which fell outside of the benchmark approach. This concept is illustrated in Figure 1 below for three plants as examples. In these examples, the benchmark assumed to be 1,000 kg of CO_2 per tonne of product.

Figure 1: Illustration of proposed benchmarking concept



	kg/ton	kg/ton	kg/ton
Benchmark level	1000	1000	1000
Actual emissions	900	1100	1300
Emissions reduction	100	200	200
Emissions after projects	800	900	1100
CERs a-priori additional	100	100	-
CERs project-specific additionality test	-	≤100	≤200

A. For plant A that is already emitting below the benchmark value, an emission reduction project will immediately result in generation of CERs following the a-priori additionality instrument.

B. For plant B that has current emissions above benchmark value, the portion of the emission reduction that is below benchmark level (in yellow) will result in generation of CERs according to the a-priori additionality instrument. The portion of the emission reduction above the benchmark (in white) might also generate CERs but would be subject to the existing additionality tests.

C. The emissions of plant C are above the benchmark level, both before and after the project has been realized. The emissions reductions achieved may be recognized as CERs when the existing additionality tests have been successfully completed.

How to define the Benchmarks?

The stringency of benchmarks – i.e. their level relative to current emissions performance – will be crucial to guarantee real environmental progress, effectiveness and fairness.

- **Environmental progress** requires stringent (low emission level) benchmarks. The higher a benchmark emissions level, the higher the risk will be that business as usual emission reductions will be credited under the scheme.
- **Effectiveness and (perceived) fairness:** Conversely, if the benchmark emissions level is set too low, few emission reduction projects would qualify and generate emission credits. This CDM option would not be used.

In the Details

We have outlined a general concept of using benchmark performance to determine if projects do or do not automatically generate emission reduction credits. Many details remain to be identified and agreed before such a system could be put into practice. These include boundary issues (both time and geography), process issues (benchmarks for the whole process or parts of it), confidentiality issues, and others.

4 The Way Forward

The CSI wishes to begin a substantive dialogue on benchmarking with stakeholders, including UNFCCC bodies, government authorities, academia, technology suppliers, and environmental organizations. Ensuring the environmental integrity of a benchmarking approach through public involvement is crucial to make the process credible and broadly accepted. Next steps should include the following:

- An in-depth analysis of the benchmarking concept for the cement industry, to develop recommendations for detailed rules and procedures, as well as possible benchmark values.
- A structured, constructive dialogue with interested stakeholders to strengthen the analysis
- A presentation to the CDM Executive Board
- Decisions by CoP / MoP and the CDM Executive Board as required to make benchmarks with a-priori additionality eligible within the CDM framework;
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[1] See www.wbcsdcement.org for background information.

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[2] IETA (2005), *Strengthening the CDM: Position Paper for COP 11 and COP/MOP 1*. www.ieta.org

Annex

The cement industry is a significant producer of the main greenhouse gas, carbon dioxide (CO_2). Its current emissions are approximately 1.4 billion tonnes annually, corresponding to about 5% of global CO_2 emissions.[1] Many of these occur in developing countries where rapid growth brings demand for cement buildings and infrastructure (see chart below). These emissions come from three sources:

- **Process CO_2 emissions** result from the calcination of limestone, the main constituent of cement. Calcination of limestone is achieved through pyroprocessing. It is necessary to produce the intermediate product clinker.
- **Combustion CO_2 emissions** result from fuels consumed for pyroprocessing of the raw materials. The production of clinker requires high temperatures (1,450 °C) with long residence times of the raw material in the kiln.
- **Indirect CO_2 emissions** result from production of purchased electricity as well as from transport of materials. Some cement companies produce their own electricity on-site and this is included in their combustion emissions.

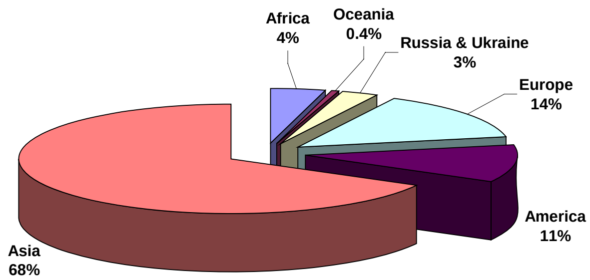

Figure A1: Breakdown of global cement production (2003)