

Research Article

The Analysis of Clean Development Mechanism: A Tool for Emission Reduction

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ABSTRACT: *The Clean Development Mechanism (CDM) is one of the flexibility mechanisms incorporated in the Kyoto Protocol, designed for the industrialized countries, to earn emission credits by investing in greenhouse gas (GHG) emission reduction projects in developing countries. The major aim of this mechanism is to provide means for emission reductions and sustainable development in the host countries. However, whether the CDM is achieving this objective has been questionable. This paper has examined various issues related to CDM. It serves to encourage governments of developing countries to improve their institutional quality, formulate favourable policies, and strengthen their capacity through international exchanges of experience so as to be sure that their interest is protected in the global emission mitigation process.*

KEYWORDS: *Clean Development Mechanism; CO₂ Emissions; Developing Countries, Emission Reduction, Kyoto protocol.*

I INTRODUCTION

Over the past 20 years, how to tackle climate change and achieve sustainable development has become one of the most important challenges facing international community. As part of Kyoto response towards mitigation of global warming, the Clean Development Mechanism (CDM) was designed to create opportunities for synergies between cost-effective climate change mitigation and sustainable development. However, the question on whether the CDM is doing what it promises to do have given rise to much controversy.

Economists have advocated the use of incentive-based policies (IBPs) to address environmental problems for over three decades, [1]. This advocacy is primarily on grounds of Cost-effectiveness. In other words, IBPs are a more cost-effective means of achieving a given environmental quality than alternative approaches such as direct regulation of polluters. As a consequence of the flexibility mechanisms incorporated in the Kyoto Protocol, incentive based policies such as emissions trading and the clean development mechanism (CDM) are being widely discussed in the context of global warming abatement caused by greenhouse gases. Whether developing countries like Nigeria will ratify the Protocol or not and whether they will eventually take part in a global emissions trading system is something that will only become clear as time passes. It is clear, however, that in either case these countries will be affected by any global architecture for GHG abatement that emerges. It is therefore important that the issues surrounding the use of incentive-based approaches such as clean development

mechanism and emissions trading are clearly understood and their implications for developing countries spelt out. Some of the specific questions that arise are:

- Do developing countries stand to gain or lose if emissions trading become a reality even if they remain outside such an arrangement?
- What are the terms under which it would be advantageous for them to take part in such trading?
- Are there any other incentive-based approaches that they can/should adopt, either as part of an international collective effort which will be beneficial to them?

A key issue with respect to the emission trading is the initial allocation of permits and the potential gains from trade that could accrue to developing countries.

Essentially, IBPs work through the market system to influence the behaviour of economic agents such as firms and households, by creating economic incentives/disincentives, which in turn affect the pollution or other environmental impacts generated by these agents. For this reason IBPs are more commonly referred to as market-based instruments (MBIs). By contrast, the conventional approach to environmental regulation is through a set of “dos” and “don’ts” such as mandatory emission standards, equipment or process requirements. Thus, regulators attempt to determine both how much pollution is generated and also how it is abated. Occasionally these measures are combined with an outright ban or prohibition of activities that are deemed to be detrimental to the environment. This approach allows little flexibility to the agents being regulated in complying with the regulations. Hence it is referred to as “command and control” (CAC). The clean development mechanism (CDM) proposed under Article 12 of the Kyoto Protocol is the only policy that approximates an incentive-based approach during the ‘first’ commitment period 2008-2012. Beyond 2012, developing countries might participate in GHG abatement through emissions trading. This, of course, would depend on a number of factors such as whether developing countries will accept a cap on GHG emissions, how the permits were allocated, and so on. CDM is the only Kyoto flexibility mechanism that explicitly attempts to engage developing countries in international GHG abatement efforts. It is similar in nature to joint implementation (JI) except that JI takes place between developed (Annex B) countries, whereas CDM refers to cooperative agreements in which the host is a developing country [2]. Specifically, under CDM developed countries (or firms in those countries) fund GHG abatement projects in developing countries where abatement costs are much lower. In turn, the developed countries receive credits (“certified emission reductions” or CERs) that can be used to offset their emission reduction obligations. There are two issues relating to CDM that are important in this context. First, it should be noted that CDM will be implemented on a project-by-project basis-the basic rationale for undertaking a CDM project is the difference in marginal abatement costs (MACs) between the host country and the Annex 1 country. However, the key feature of a market which is a competitively determined price is missing under CDM.

II. THE CONCEPT OF CLEAN DEVELOPMENT MECHANISM (CDM).

The Clean Development Mechanism (CDM) is one of the so-called project-based flexible mechanisms under the Kyoto Protocol. The Kyoto Protocol and the modalities and procedures provide part of the legal framework for CDM. The CDM enables developed countries to purchase “Certified Emission Reductions” (CERs) that are

generated through project activities that reduce emissions or enhance carbon sinks in developing countries like Nigeria. Since the Kyoto protocol agreement, Clean Development Mechanism (CDM) has garnered large emphasis in terms of certified emission reductions (CER) not only amidst the global carbon market but in developing countries.

Initially, the CDM market was slow to develop, but market activity increased significantly in 2005 following the introduction of the European Linking Directive, which allowed the use of CERs as compliance units in the EU Emissions Trading System, and the entry into force of the Kyoto Protocol.

III. IMPLICATIONS OF CLEAN DEVELOPMENT MECHANISM

As a global effort to respond to climate change and protect the environment, the Kyoto Protocol was introduced in 1997, coming into force on 16 February 2005.¹ The CDM is an innovative cooperative mechanism under the Kyoto Protocol, aiming to achieve the dual aims of sustainable development and emission reductions. It is the only Kyoto mechanism that involves developing countries in the climate change negotiations. The CDM is expected to stimulate foreign direct investment and speed up the transfer and deployment of low and zero carbon technologies from developed countries to developing countries. The study by [3] show that CDM projects in a country can act as a significant stimulus to low-carbon development. It is also anticipated to arouse business interest and engagement from the private sector into the issue of climate change mitigation through environmentally friendly investment, and ultimately help direct the host countries onto a lower carbon trajectory. According to [4], the emission reductions due to CDM projects in the host countries should be “additional to any that would occur in the absence of the certified project activity”. However, there has been much controversy in terms of whether CDM has achieved its dual objectives. The existing research on whether the CDM projects are effective in achieving emission reductions objective is made up of one group of research supporting positive impacts while another group of research indicating negative impacts. Some forward-looking research, for example [5], finds that CDM projects could cause the widespread adoption of less GHGs-intensive technologies in non-Annex I countries, which would have positive implications for emission reductions in the non-Annex I countries. With a multi-sector and multi-region intertemporal computing general equilibrium model, [6] finds that, under realistic assumptions on CDM activity, CDM can significantly reduce carbon leakage by the reduced emissions trading permit prices, which lower the abatement cost in Annex I countries. However, [7] show that CDM has not been very successful in achieving its emission reductions objective based on survey, interview and systematic evaluation of 93 CDM projects. [8] review the actual experience of global CDM market and find that “much of the current CDM market does not reflect actual reductions in emissions”.

IV. ANALYSIS OF CLEAN DEVELOPMENT MECHANISM

The volume of project-based emission reductions traded (i.e., contracts for future emission reductions from CDM and the project activities) was approximately 5 metric tons (Mt) carbon dioxide equivalent (CO₂e) in 2001 and had risen to 106 MtCO₂e by 2004[9]. In 2004, CDM accounted for 97 MtCO₂e trade, from 2004 to 2005 trade volumes of CDM emission reductions more than tripled from 97 to 346 MtCO₂e. The CDM portfolio is

growing rapidly with over 1300 CDM projects in the pipeline in December 2006 and expected average annual emission reductions for the 2008-2012 periods amounting to over 0.3 MtCO₂e. The average annual emission reductions would thereby approach 2.6% of the 1990 emissions of Kyoto Protocol Parties included in the protocol

If assessed in terms of the number of credits generated, CDM project activities currently under development are concentrated in two sectors: electricity generation (Predominantly renewable electricity projects), 24%, and non-CO₂ gases, 54%. Among project activities addressing non-CO₂ gases, decomposition of N₂O from industrial processes represents 21% of CERs generated followed by landfill gas (LFG) recovery, 13%, decomposition of so-called F-gases, 10%, and other methane (CH₄) reductions, 10% [10]

The “baseline” of a CDM project activity is “the scenario that reasonably represents the anthropogenic emissions by sources of greenhouse gases (GHG) that would occur in the absence of the proposed project activity”. [10 Op.cit] Furthermore, a baseline “shall cover emissions from all gases, sectors and source categories listed in the Kyoto Protocol, within the project boundary” A project’s eventual emission reductions are determined by taking the difference between the baseline and the actual GHG emissions of the project. In essence, this difference should be a representation of the project’s “real” GHG emission impact. A “baseline methodology” is the approach taken to identify the baseline scenario and quantify the emissions in this scenario and in scenario with the proposed project and estimate a project’s emissions reductions.

Approval of baseline methodologies is the responsibility of the CDM Executive Board (CDM-EB) acting under the authority and guidance of the meeting of the Parties to the Kyoto Protocol (COP/MOP). Once methodologies are approved, they serve as precedents for coming projects; which make them powerful as they may govern not one but several projects, having understood the CDM scenario, countries will now embark on emission trading.

For this trading towards emissions reduction to be effective, there must be an exchange rate in terms of money and quantity of emission to be traded upon.

V. CLEAN DEVELOPMENT MECHANISM AND EMISSION REDUCTION

Crediting mechanisms like the CDM could play three important roles in reducing the amount of future climate change [11] such roles are;

- To improve the cost-effectiveness of GHG mitigation policies in developed countries.
- It will help to reduce "leakage" (carbon leakage) of emissions from developed to developing countries. Leakage is where mitigation actions in one country or economic sector result in another country's or sector's emissions increasing, e.g., through relocation of polluting industries from Annex I to non-Annex I countries [12]
- To Boost transfers of clean, less polluting technologies to developing countries. These roles make CDM an interesting issue.
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VI. CONCLUSION

If the idea behind Clean Development Mechanism is well understood by countries particularly the developing countries like Nigeria, it will help their governments to formulate favourable policies, and strengthen their capacity through international exchanges of experience or international networking for beneficial information on other countries' CDM programs, since they are not known to be heavy emitter, they can as well be sure that their interest is protected in global economic development.

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