

Policy and Projects: Reduction of Carbon Emissions in the Manufacturing Industry in South Asia

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Abstract

This study investigates manufacturing industry carbon reduction policy based on sustainable development criteria for Clean Development Mechanism (CDM); one of the three Emissions Trading System (ETS) mechanisms. Based on the manufacturing industry CDM projects undertaken in the South Asian countries, it also explores the growth of Certified Emission Reduction (CERs) in relation with Estimated Emission Reduction (EERs) for the period between 2006 and 2011. The study finds that the majority (90%) of the CDM projects in South Asian countries are based in India. The registered projects are mostly concentrated on fuel switch or energy efficiency of which less than half (44%) belong to the Cement industry and about 24% belong to Brick manufacturing industry. The study also finds an unstable trend of CERs (116% on an average) and weak correlation (30%) against EERs followed by low CERs (17%) and negative correlations about 33% against cumulative EERs. This study recommends specific targets for the post 2012 period both for EERs and CERs for the manufacturing industry in deciding carbon emissions targets to achieve maximum credits from emissions trading.

Keywords: Sustainable Development Criteria, Emissions Trading System, CDM project, Estimated Emission Reductions (EERs), Certified Emission Reductions(CERs).

1. Introduction

The official reasoning for the Kyoto Protocol as established in the United Nations Framework Convention on Climate Change (UNFCCC) is the following: *The Kyoto Protocol shares the ultimate objective of the Convention to stabilize atmospheric concentrations of Greenhouse Gases (GHGs) at a level that will prevent dangerous interference with the climate system.* The Protocol is an optimistic way to reduce the GHGs though it is uncertain if it will realize its real benefits. Thus, till now, the Kyoto Protocol has achieved little in terms of global emissions reductions (Carbone, 2009). Though, this limited success, however, should be quantified because the reduction commitment is not quantified by developing countries (Pronove, 2002). So, the quantified economy-wide emission reduction target for the post 2012 period is one of the important mandates (UNFCCC Synthesis Report, 2012, Article 7(b)). On the other hand, the signatory (Annex B) countries started resuming various projects through the mechanisms such as a Carbon Market, Clean Development Mechanism and Joint Initiatives. Since the South Asia carbon market is the second largest carbon market (World Bank, 2009), international private sector and sovereign buyers of carbon credits are present in the region, namely Bangladesh, India, Nepal, Pakistan and Sri Lanka. After ratifying the Kyoto Protocol, developing countries also established an institutional framework and formulated policy with action plans. Projects are being developed and launched through proper process (CDM; mechanism to earn carbon credits from developing countries) with Estimated Emission Reduction (EERs) and started realizing the Certified Emissions Reduction (CERs) since 2006 (UNFCCC project cycle search).

The current study is a consequence of three previous projects; the first one is about forecasting energy consumption, the second is the measurement of energy efficiency, and third one is resulting carbon emissions from available sources of energy. All of the studies deal with manufacturing industry sectors in five South Asian countries (mentioned earlier) whereas the current effort is focused on the policy to reduce carbon emissions and the analysis of CERs of manufacturing projects. The policy and the projects are the outcome of signing UNFCCC and ratifying the Kyoto Protocol having responsibility to reduce GHGs emissions causing global warming.

1.1 Rationale of this Study

The first commitment period of the Kyoto Protocol is at its eleventh hour (in 2012). Hence, it is time to find out the achievement of various Protocol-oriented initiatives thus far. The study would tell us whether the target of

reducing emissions by 5% against 1990 level is far enough ahead. 'On the other hand, Parties have decided that there will be a second commitment period under the Kyoto Protocol, starting on 1 January 2013 and ending on 31 December 2017 or 31 December 2020. As a mechanism under the Kyoto Protocol, the CDM will continue through that second commitment period (FAQ CDM: UNFCCC, 2012)'. This indicates the significance of such analysis for action plans, possible modification of strategy, and reasons to continue obtaining carbon credits by investment through CDM and realization of CERs.

1.2 Literature Review

There are several studies based on carbon emission trading available in the literature. International trade and environmental pollution regarding the carbon emissions are assessed in a study by Islam et al. (2012). This study indicates a strong positive relationship between international trade and carbon (CO_2) emissions from various manufacturing sectors. Bailey (1993) studied the relation of foreign direct investment and environmental protection. Some other trade and policy related studies include Copeland & Taylor (1995), and Sumedha & Ravishankar (2000). Overall, these studies have dealt with political system, technical change (clean technology), energy and its use, trade system, income effects, environmental quality having significant impact upon the environment. The political system and policy are so important in reducing industrial emissions. Without altered policies, pollution from fossil fuel generation of electric power will rise ten fold in the next forty years, from vehicles more than fivefold, and from industrial emissions and waste also more than fivefold as demand for industrial goods multiplies (Dean 1992). As well, cooperative policy or pair policy is effective in carbon emissions trading between developing and developed partners (Carbone et al., 2009). However, environmental regulations and commodity market of Climate Exchange are also studied by Sandersen et al. (2008); the comparative performance of CDM and JI is discussed. On the other hand, the study by Barbera & McConnel (1990) focused on the regulations upon industry productivity. A wide range of options are identified to reduce the carbon dioxide emission in a study of Hendrils et al. (2004). The study is based only on the Cement Industry. In addition, the decision making process focusing on the development of projects under the Kyoto Protocol's CDM and JI initiatives is available in the work of Conlon (2012). Likewise, the strongly related aspects of approval of greenhouse gas emissions reduction projects in developing countries is studied in Flues et al. (2008). However, the aspect of policy and Certified Emission Reduction (CERs) for the manufacturing industry in South Asia is absent in the literature.

1.3 Data and Methodology

The CDM 'Project Cycle Search' compiled data has been taken from United Nations Framework Convention on Climate Change; UNFCCC website as of September 2012. The search result is based on Manufacturing Industries in South Asia namely Bangladesh, India, Nepal, Pakistan and Sri Lanka sorted by Registration date available from the year 2006. Withdrawn and Rejected projects are ignored while Registered projects are only considered for the study. The projects are deployed with variables such as Registration Date, Title of Projects, Host Parties, Other Parties, Methodology (Large Scale, Small Scale and Consolidated; details are in the CDM methodology booklet), Reductions (Estimated Emissions Reductions in metric tonnes of CO_2 equivalent per annum; stated by the project participants) and Reference Number. Yearly CERs is taken from the description of individual project. Data is also taken from Indian CDM report (USUI, 2012) to identify the potential projects in India.

Basically, descriptive analyses are mainly used to present the findings. Moreover, the index of Estimated Emissions Reduction (EERs) and Certified Emissions Reduction (CERs) and correlation of these two variables are discussed.

So, this paper is to draw attention to the policy in manufacturing projects in reducing emissions and its impacts in relation with project ventures and carbon credits. Thus, from the second section, it is important to discuss the theories of emission trading, then, the policy of developing countries, and finally, explore the manufacturing projects of private sector and sovereign buyers in South Asia in relation with estimated emissions reduction (EERs) and certified emissions reduction (CERs).

2. Emissions Trading System (ETS): Theories and Mechanisms

The United Nations Framework for Convention on Climate Change (UNFCCC) established an international agreement standing on its own and requiring separate ratification by governments. The Kyoto Protocol, among other things, sets reduction targets and time-frame for six types greenhouse gas (GHGs) emissions. Note that the Convention encouraged industrialized countries to stabilize GHG emissions while the Protocol commits them to

do so. The Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005. The detailed rules for the implementation of the Protocol were adopted at COP 7 in Marrakesh in 2001, and are called the 'Marrakesh Accords'. The most important aspect of the Protocol is its legally binding commitments for industrialized countries (listed in Annex B of the Kyoto Protocol) and to reduce their GHG emissions by an average of 5.2% relative to that of the 1990 level over the five year period 2008-2012 (UNFCCC, 2012). Thus, under the Treaty, countries must meet their targets primarily through national measures. However, the Kyoto Protocol offers them an additional means of meeting their targets by way of three market-based mechanisms[7].

2.1 Emissions Trading- known as 'the carbon market'

Parties with commitments under the Kyoto Protocol (Annex B Parties) have accepted targets for limiting or reducing emissions. These targets are expressed as levels of allowed emissions, or 'assigned amounts', over the 2008-2012 commitment period. The allowed emissions are divided into 'assigned amount units' (AAUs**).** Emissions trading, as set out in Article 17 of the Kyoto Protocol allows countries that have emission units to spare - emissions permitted them but not 'used'- to sell this excess capacity to countries that are over their targets. Thus, a new commodity was created in the form of emission reductions or removals. Since carbon dioxide is the principal greenhouse gas, people speak simply of trading in carbon. Carbon is now tracked and traded like any other commodity. This is known as the 'carbon market'. More than actual emission units can be traded and sold under the Kyoto Protocol's emissions trading scheme.

The other units which may be transferred under the scheme, each equal to one tonne of CO2, may be in the form of:

- A removal unit (RMU) on the basis of land use, land-use change and forestry (LULUCF) activities such as reforestation;
- An emission reduction unit (ERU) generated by a joint implementation project; and
- A certified emission reduction (CER) generated from a clean development mechanism project activity.

Transfers and acquisitions of these units are tracked and recorded through the registry systems under the Kyoto Protocol. An international transaction log ensures secure transfer of emission reduction units between countries.

2.2 Joint Implementation

The mechanism known as 'joint implementation', defined in Article 6 of the Kyoto Protocol, allows a country with an emission reduction or limitation commitment under the Kyoto Protocol (Annex B Party) to earn emission reduction unit (ERUs) from an emission-reduction or emission removal project in another Annex B Party, each equivalent to one tonne of CO2, which can be counted towards meeting its Kyoto target. Joint implementation offers Parties a flexible and cost-efficient means of fulfilling a part of their Kyoto commitments, while the host Party benefits from foreign investment and technology transfer. These mechanisms would help the countries with commitments to meet their targets by reducing emissions or removing carbons from the atmosphere in other countries. It stimulates efficiency investment and encourages the private sector and developing country in reduction efforts.

2.3 Clean Development Mechanism

The Clean Development Mechanism (CDM), defined in Article 12 of the Protocol, allows a country with an emission-reduction or emission-limitation commitment under the Kyoto Protocol (Annex B Party) to implement an emission-reduction project in developing countries. Such projects can earn saleable certified emission reduction (CERs) credits, each equivalent to one tonne of CO_2, which can be counted towards meeting Kyoto targets. It is the first global, environmental investment and credit scheme of its kind, providing standardized emissions offset instrument; CERs. A CDM project activity might involve, for example, a rural electrification project using solar panels or the installation of more energy-efficient boilers. The mechanism stimulates sustainable development and emission reductions, while giving industrialized countries some flexibility in how they meet their emission reduction or limitation targets.

[7] The theories are based on the information presented at www.unfccc.int.

From the above discussion we have identified our focus area of carbon trading in relation with developing countries is CDM. This instrument is available to assist the target countries in achieving sustainable development and contributing to the ultimate objective of the convention. It aims to assist Annex-I Parties to implement project activities that reduce (or subject to constraints removes) GHG emissions in non-Annex-I Parties (most of the developing countries), in return for certified emission reduction (CERs). The CERs generated by such project activities can be used by Annex-B Parties to meet their emissions targets under the Kyoto Protocol.

3. Emissions Trading System: Project Selection Policies

According to the Kyoto Protocol, the CDM has two goals: to promote sustainable development in the host countries, and to aid Annex I Parties in achieving their targets cost-effectively.

Therefore, to develop the utmost benefit criteria for CDM, and improve the procedures for stakeholders' activities several calls for public inputs are invited by the CDM Executive Board. Several institutes responded and recommended rules to enhance the CDM's sustainable development benefits. The criteria are usually qualitative guidelines which leave room for interpretation to form local policy in a concrete and verifiable mode.

3.1 Criteria for Party Approval of CDM Projects

To be eligible for approval under the CDM, Sterk (2011) stated the projects being assessed against different criteria[8]

General Criteria:

The project respects internationally agreed human and property rights, employees freedom of association as well as the right to collective bargaining. The project does not involve any involuntary resettlement, the alteration, damage or removal of any critical cultural heritage, any form of forced or compulsory labor, any form of child labor, any form of discrimination based on gender, race, religion, sexual orientation or any other basis, and corruption. The project provides workers with a safe and healthy work environment and is not complicit in exposing workers to unsafe or unhealthy work environments. Finally, the project does not lead to a net loss of employment.

Environmental Criteria

The Project should maintain certain air quality, water quality and quantity, soil condition, pollutants and biodiversity.

Social Criteria

The project should result in maintaining the quality of employment, standard livelihood, access to affordable clean energy services, human and institutional capacity, gender equality and social well-being of communities.

Economic Criteria

The project should result in quantitative employment and income generation, positive impact on balance of payment and investment, technology transfer and self-reliance, and adaptation to climate change.

CDM projects help to ensure the sustainable development criteria are also recommended by the High-Level Panel, CDM policy dialogue (A Call to Actions, 2011). Nonetheless, the policy encompasses setting a robust standard of emerging market based mechanism, implementing standardized methods for performance benchmark, strengthen co-benefits and enhance the scope of energy technology and encourage greater access to the CDM for developing or low-income countries.

3.2 South Asian Countries' (Host Party) CDM Policies

After ratification, accession or approval of the Kyoto Protocol the local government of the concerned countries establish their designated National Authority (DNA). The main task of the DNA is to assess potential CDM projects to determine whether they will assist the host country in achieving its sustainable development goals and to provide a letter of approval to project participants in CDM projects. This letter of approval must confirm that the project activity contributes to sustainable development in the country. It is then submitted to CDM Executive Board to support the registration of the project. However, here are the policy formulations done by the DNA for the particular country presented below:

[8] Adapted from CDM Sustainability Benefit, Wuppertal Institute for Climate, Environment and Energy, Wuppertal 2011.

Bangladesh

Bangladesh acceded the Kyoto Protocol in 22 October 2001. It established the Designated National Authority (DNA) in 2003. They have proposed sustainable development indicators for Bangladesh. Ministry of Environment and Forest is the focal point of CDM activities. Rezauddin & Sinha (2003) and Ali et al (2011) discussed elaborately the indicators that are strictly followed to approve any potential CDM projects in Bangladesh. Likewise, the CDM projects must meet the international screening criteria first. The policy of the CDM strategy ((policy is adapted from Ali et al., 2011, as well as Rezauddin & Sinha, 2003) are as follows:

- CDM projects must conform to existing sectoral policy;
- It enables environmental development and social welfare;
- It plays role in poverty alleviation and focused on unemployment;
- It is to attract private investment climate related development activities;
- It should contribute to the reduction of foreign expenditures and national debt; and
- It should be compliant with national sustainable development Agenda.

The policy guidelines indicate as usual the Environmental, Economic, Social and Technological Indicators as well as emphasize adaptation to local condition. Greenhouse Gas reductions, contributions to reduction of foreign expenditures, creation of new jobs and economic activities and transfer of clean and cost-effective technologies are prioritized.

India

India acceded the Protocol in 26 August 2002. Later, in December 2003, it established the DNA. As usual, the projects must be in compliance with the sustainable development criteria established by the authority. Therefore, it is the prerogative of the host Party to confirm whether a clean development mechanism project activity assists it in achieving sustainable development. The CDM should also be oriented towards improving the quality of life of the very poor from the environmental standpoint. Ministry of Environment and Forest conducts the CDM matter.

The following aspects should be considered while designing CDM project activities[9]:

- Social well-being: The CDM project activity should lead to alleviation of poverty by generating additional employment, removal of social disparities and contributing to provision of basic amenities to people leading to improvement in their quality of life;
- Economic well-being: The CDM project activity should bring in additional investment consistent with the needs of the people;
- Environmental well-being: This should include a discussion of the impact of the project activity on resource sustainability and resource degradation, if any, due to the proposed activity; biodiversity-friendliness; impact on human health; reduction of levels of pollution in general; and
- Technological well-being: The CDM project activity should lead to transfer of environmentally safe and sound technologies with a priority to the renewable sector or energy efficiency projects that are comparable to best practices in order to assist in upgrading the technological base.

Nepal

Nepal signed the UNFCCC in 12 June 1992 and later ratified it in 2 May 1994. The country representative has been regularly participating in COPs and other subsidiary meetings. It became party to the Kyoto Protocol by submitting its instruments of Accession in 16 September 2005. The National CDM Council is active in formulating policy and approving projects. Industrial Affluent Standards are in force to formulate action plans for sustainable development projects. Ministry of Environment acts as the focal point.

Pakistan

Pakistan signed the United Nations Framework Convention on Climate Change at the 'Earth Summit' held in Rio de Janeiro in 1992. It acceded the Kyoto Protocol in 11 January 2005. The Ministry of Environment is to prepare and submit an annual report on CDM activities in Pakistan. The government policy documents such as National Operational Strategy 2006, Draft National GHG Inventory 2008, and Draft National Climate Change Policy 2011 are analyzed. It is found that the National Authority allows unilateral, bilateral and multilateral

[9] Interim approval criteria, Source: Ministry of Environment and Forest, Government of India

CDM projects preferably in the following areas

- Energy including renewable energy, energy efficiency, energy conservation and fossil-fuelled cogeneration;
- Land use, Land use Change and Forestry (e.g. biodiversity protection, soil conservation, watershed maintenance and sustainable forest/rangeland management)
- Agricultural and livestock practices;
- Waste Management (e.g. landfills, solid waste management, recycling, animal/livestock wastes);
- Transportation (e.g. alternative fuel vehicles, mass transit systems, cleaner engines, Compressed Natural Gas); and
- Industrial Process.

No income tax or duty should be levied on transfer/sale of CDM emissions credits (Certified Emission Reduction (CERs), Verified Emission Reduction (VERs)etc). Similarly, credits should be awarded fully to the project sponsors. Banks and other financial institutions shall be encouraged to provide special incentives to the investors (National Operational Strategy 2006).

Sri Lanka

Sri Lanka acceded the Kyoto Protocol in 3 September 2002. The Ministry of Environment and Natural Resources is the national focal point for UNFCCC and the Kyoto Protocol. To contribute to sustainable development through developing and establishing the institutional, financial, human resources within a legislative framework necessary to participate in Clean Development Mechanism(CDM) activities under the Kyoto protocol while developing a mechanism for trading 'Certified Emissions Reduction' (CERs) and 'Removal Unit' (RMUs) earned through CDM activities, there are policy objectives described by Kasturiarachchi (2012). Thus the policy principles are as follows:

- Participations in CDM projects shall be in line with existing sectoral policies;
- CDM projects shall have tangible national impacts and will contribute to the national sustainable development agenda;
- CDM will be used to encourage sector investments in climate friendly development activities;
- CDM projects shall be designed so as to contribute to the improvement of the environment and the welfare of the society as a whole;
- CDM projects shall be encouraged to include elements that would contribute to poverty reduction and employment generation;
- CDM projects shall promote and encourage the inward transfer of new, proven, affordable and relevant technologies;
- CDM projects shall be approved through a participatory and transparent process that involves a detailed assessment of their economic, social and environmental benefits and their relevance to local needs and priorities; and
- CDM projects shall recognize the rights of the people of Sri Lanka in relation to all emissions, exercised thought the Government of Sri Lanka.

Applicants from approval of CDM projects will meet the costs associated with the evaluation of their applications by making such payments to the Secretariat as the Authority may determine.

3.3 Potential CDM Projects

Since its establishment, the Indian DNA has approved a significant number of projects such as biomass utilization, waste/gas heat utilization and renewable energy initially. Afterwards, it has started various HFCs (a genre of GHGs) reduction and mainly energy efficiency (cement, steel; manufacturing industry) and others (Usui 2012). Energy efficiency projects share about 10% and cement 2% of total registered projects in India till 31 May 2012 (Authors' own calculation, data source: Basic Data for Registered CDM Project, Institute for Global Environmental Strategies). This indicates the potential CDM manufacturing industry projects in India. Kasturiarachchi (2012) stated some key sectors such as Energy, Industry, Transport, Waste Management etc. as potential CDM projects for Sri Lanka. For Bangladesh, 'Potential sectors are identified as Power, Pulp and Paper,

Cement, Ammonia or Urea, Steel re-rolling and Brickfields' (Teri Pembina, 2002). Koirala (2005) identified some potential projects in Nepal such as renewable energy, energy efficiency, low emissions brick kilns and hydropower replacing fossil fuels etc. Finally, the potential CDM sector for Pakistan is stated in the host Party policy sections. Finally, the policy discussion does not identify any specific target for emission reductions or for certified amount to be issued for emissions trading for the manufacturing industry. Some sectors are merely identified as potential CDM projects for different South Asian countries.

4. Findings

The implementation of the manufacturing projects started from 2006. Bangladesh, India, Pakistan and Sri Lanka act as hosts and have started various unilateral, bilateral or multilateral CDM projects. Other parties being available are European Union countries, Canada, Japan, and Switzerland.

4.1 Number of Projects

A total of 25 registered projects was selected. Withdrawn or rejected projects are not considered for analysis because there is no CERs issued against those projects. Until 2009, 18 projects were registered in South Asia: among them 17 were in India and only one was in Sri Lanka. The implementation has been rather slow as in 2010, merely 1 project in Pakistan and 1 in Bangladesh were registered. Figure 1 presents the number of manufacturing projects in South Asia up to 2012. Analysis shows that almost 90% projects are registered in India. Sustainable Development and profit oriented project ventures could also be implemented in other south Asian countries such as Bangladesh, Pakistan, and Sri Lanka, in order to obtain a significant amount of carbon credits.

4.2 Size of the Projects

Two types of scale[10] of manufacturing projects are available in South Asia; Large scale projects and Small scale projects. Overall 44% projects are large scale projects and all of them are registered in India (Author's Own Calculation, Data Source: CDM Project Cycle Search, UNFCCC, September 2012).

4.3 Sectoral Scope/ Methodological Categorization

This is important to identify the industry sectors being implemented to reduce carbon emissions. Cement and Brick manufacturing are two industry sectors mainly available for manufacturing industy projects. Figure 2 shows that the largest share; 44% industry sectors of CDM projects in South Asia is of Cement, 24% is of Brick manufacturing, 20% is of Power related and the remaining is other sectors. The conventions (UNFCCC) categorized the methodological scope for Manufacturing Industries are Renewable energy, Energy Efficiency, GHG destruction, GHG emission avoidance, Fuel/Feedstock Switch, GHG removal by sinks and Displacement of a more-GHG-intensive output. Nevertheless, the analysis shows most of the projects fall under Fuel/Feedstock Switch and Energy Efficiency (details of category in CDM booklet, UNFCCC). In the analysis, it is found that 81% of the large projects fall in the Fuel or Feedstock category whereas the cement industry sector shares almost 80% of the total activity in this category. In addition, all the small scale projects fall mainly in the Energy Efficiency category whereas the Brick manufacturing sector alone represents the major share; 35%.

4.4 Growth of Estimated Emissions Trading (EERs) and Ertified Emissions Trading (CERs)

Growth is the most important indicator of outcome of the CDM project registered in South Asia. To present the analysis of growth of CERs, EER is considered the basis whereas EER as mentioned earlier, is the estimated emissions reductions in metric tonnes of carbon dioxide equivalent per annum for total registered projects in the

[10] What is the difference between small-scale and large-scale project activities? (CDM FAQ, UNFCCC, September 2012)

There are three types of small-scale project activities. Decision 1/CMP.2 revised the definitions for small-scale project activities referred to in paragraph 6 (c) of decision 17/CP.7, and Annex II of Decision 4/CMP.1 as follows:
(a) Type I: renewable energy project activities with a maximum output capacity of 15 megawatts (or an appropriate equivalent); (b) Type II: project activities relating to improvements in energy efficiency which reduce energy consumption, on the supply and/or demand side, by up to 60 giga-watt hours per year (or an appropriate equivalent);
(c) Type III: other project activities that result in emission reductions of less than or equal to 60 kilo-tonnes of carbon dioxide equivalent annually. Any CDM project activity not possessing the abovementioned characteristics is considered a large-scale CDM project activity.

corresponding year as estimated by project participants. In South Asia, in the 6 year period (2006-2011), a total of 1347825 tonnes of carbon dioxide equivalent EERs is estimated for 25 registered projects. In the same period, requested CERs were 747803 tonnes of carbon dioxide equivalent which is 55% of the total EERs (Source: Authors' calculation, UNFCCC CDM Project Cycle Search Database. Yearly data from different countries and various projects are summed). Though, India held stable position in CDM projects registration and issuance of CERs, Sri Lanka, Pakistan and Bangladesh contribute also to total CERs in the recent three years; between 2009 and 2011.

Figure 3 presents the Growth of EERs and CERs. Because of several large scale project registrations, EERs is highest in 2007. The CERs amount is high in 2008 and 2009. Later it declines. The issued amount of CERs is not satisfactory against the total amount of EERs for registered projects for any particular year.

Figure 4 shows the comparative growth status between issued CERs in against the EER starting from 2006. Overall, the CERs is rather low except in 2009 having its peak; 362% against the EER of the registered CDM in that year (Figure 4).

It is obvious that the growth of CERs is very unstable in relation with that of EERs even the requested CERs are 20% of the EERs of the registered projects in 2007 and 15% in 2011. To depict the relation between the performance of yearly CERs against the yearly EERs, the correlation is calculated. It shows a very weak correlation of 30% between the performance of CERs in relations with the target of reduction of emissions; EERs although the average of CERs in respect to EERs is 116% on average.

A surprising pitfall is identified in analyzing the growth of CERs against the EERs of registered projects in South Asia. The projects cycle database reveals that CERs can be issued on a regular basis for the same projects. Evidence shows that one CDM project (project code 0717: India Cements WHR Projects) in India registered in 2007 has had CERs issued in 2007, 2009, 2010 and in 2011[11]. Therefore, the EERs of this project can be considered for the following years in measuring the CERs performance. Finally, this should lead us to develop a cumulative frequency for EERs in analyzing the performance of CERs.

Figure 5 presents the comparative growth between cumulative EERs and CERs of CDM projects in South Asia. The very downward sloping CERs curve points out that achievement in obtaining CERs against the target of emissions reduction overall projects is not realistic. The CERs have been below 20% against the EERs of registered projects undertaken since 2007. It is 4% in 2010 and below 1% in 2011.The average for CERs is 17% with respect to cumulative EERs. Moreover, a negative correlation (-33%) between EERs and CERs demonstrates the disappointing gap between targets and achievements.

5. Conclusion

Considering the registered ongoing projects, total EERs should be cumulative. In that case, the relative CERs should be much less per year than as is shown in the analysis part. Industrial processes are generally cited to formulate CDM policy. Hence, specific targets for manufacturing industry are not present in the global as well as in the local policy dialogue. Therefore, a quantified target is recommended for yearly Estimation and Certifications. This is not so only for CERs, but also the for EERs for the South Asian region. Moreover, the reform policy for carbon trading for the post 2012 era should also be industry oriented and industry specific. The cement industry sector and brick manufacturing should be special consideration in carbon emissions reduction. More projects should be implemented in other South Asian countries (vulnerable area; considering Maldives) besides India since this is one of the priorities of Policy Dialogue (A Call to Action, 2012, p.7).

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[11] It indicates that CERs might be requested every year for the same project but it might be issued or withdrawn based on the monitoring report.

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United Nations Framework Convention on Climate Change

Institute for Global Environmental Strategies

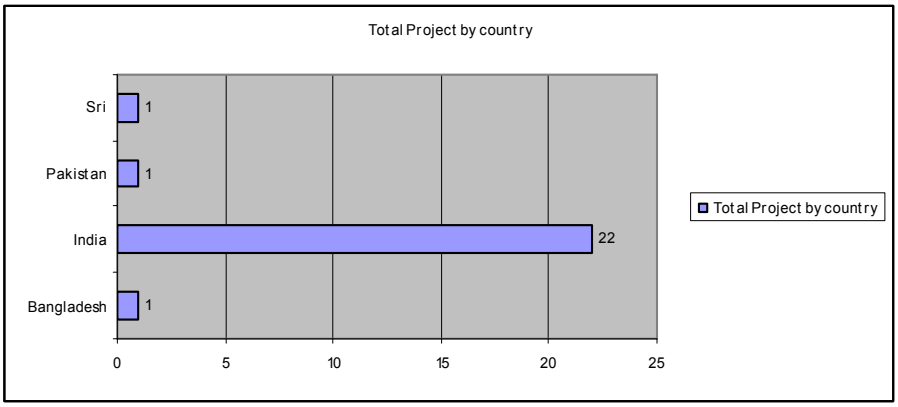


Figure 1: Number of registered CDM projects in South Asia (Author's Calculation, Data Source: CDM Project Cycle Search, UNFCCC, September 2012)

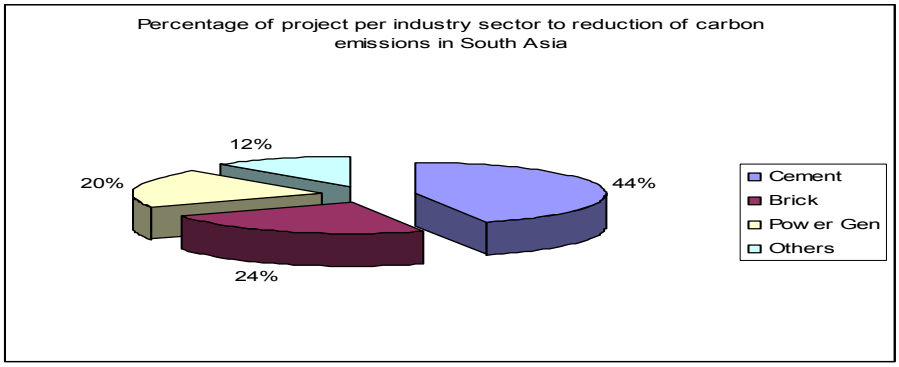
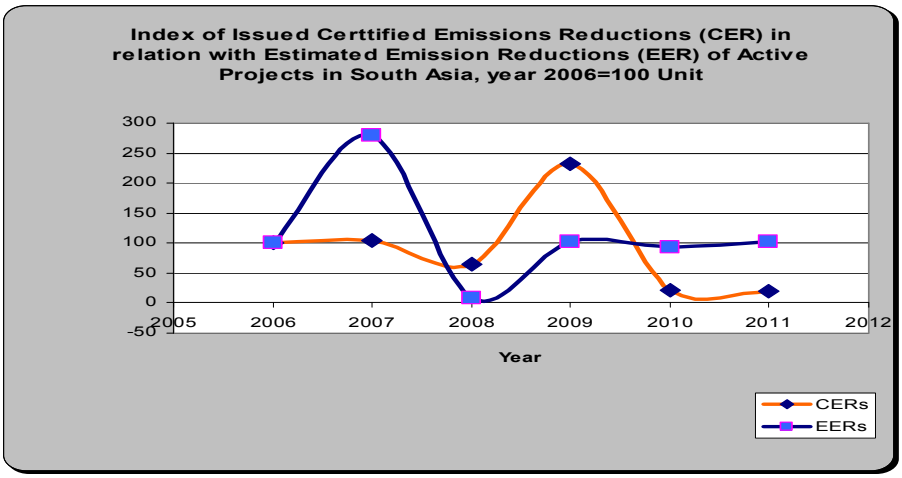


Figure 2: Shares of Industry Sectors in CDM manufacturing projects (Author's Calculation, Data Source: CDM



Project Cycle Search, UNFCCC, September 2012).

Figure 3: Index of EERs and CERs (Authors' own calculation)

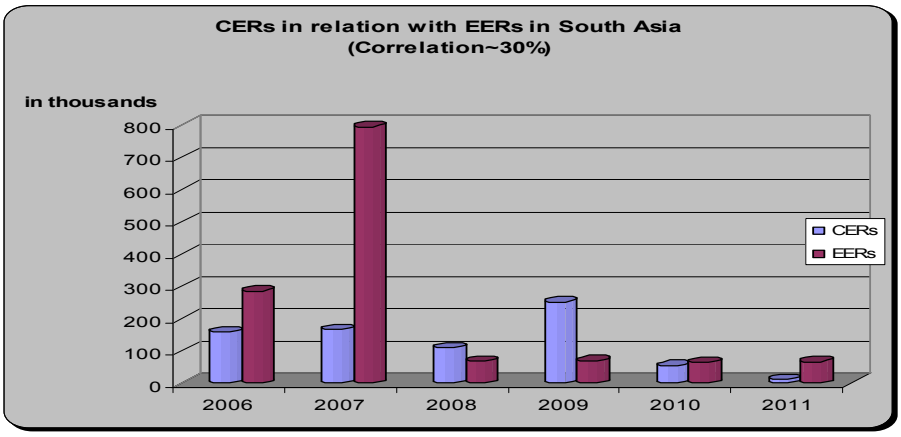


Figure 4: Growth of CERs in relation with EERs. (Authors' own calculation)

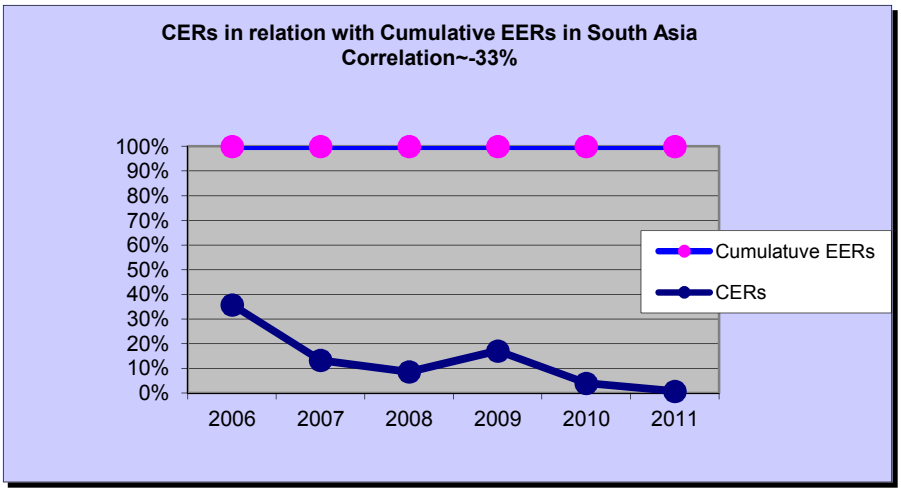


Figure 5: Growth of CERs in relation with cumulative EERs in South Asia (Author's own calculation).

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