

SCALING UP CARBON FINANCE IN INDIA

Background Paper

India: Strategies for Low Carbon Growth

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Acronyms and Abbreviations

AAA	Analytical and Advisory Activity
AAU	Assigned Amount Unit
AIJ	Activities Implemented Jointly
CDM	Clean Development Mechanism
CDM EB	Executive Board of the Clean Development Mechanism
CER	Certified Emission Reductions
CFL	Compact Fluorescent Light
CPF	Carbon Partnership Facility
DOE	Designated Operational Entity
DNA	Designated National Authority
ER	Emission Reductions
EU	European Union
EU ETS	European Union Emissions Trading Scheme
EUA	European Union Allowances
FCPF	Forest Carbon Partnership Facility
FMC	Indian Forward Market Commission
GOI	Government of India
GWP	Global Warming Potential
IET	International Emissions Trading
IRR	Internal Rate of Return
JBIC	Japan Bank for International Cooperation
LOA	Letter of Approval
MCX	Multi Commodity Exchange of India
MOEF	Ministry of Environment and Forests
MOUD	Ministry of Urban Development
NCDEX	National Commodities and Derivatives Exchange
ODA	Official Development Assistance
PDD	Project Design Document
POA	Program of Activities
PSU	Public Sector Units
REDD	Reducing Emissions from Deforestation and Degradation
SEBI	Securities and Exchange Board of India
SME	Small and Medium Enterprises
UNFCCC	United Nations Framework Convention on Climate Change
VER	Verified Emission Reductions

Executive Summary

The carbon markets have become the fastest growing financial market in the world. Market analysts estimate that should the industrialized nations adopt an aggressive emission reduction target of 50% or more by mid-century, and should they meet half of their emission reduction commitments through the purchase of project-based emission reductions from developing countries such as India, the market pursuant to the Clean Development Mechanism (CDM) could grow to \$100 billion sales annually (a growth of 20 times compared to 2006). That means that the CDM could be on par with Official Development Assistance (ODA) as a source of foreign capital flowing to developing countries.

However, there is a convergence of factors which are expected to contribute to the evolution and transformation of the carbon markets over the next few years, in particular for emission reductions originating in developing countries, namely: (i) the international community is discussing the second commitment period under the Kyoto Protocol (post-2012), and part of those discussions will likely include how to scale up the CDM and whether to modify operational procedures and eligibility requirements (ii) the European Union will likely extend the EU Emissions Trading Scheme beyond 2012, including linkages to the CDM, and (iii) there is a growing demand for carbon offsets from the voluntary market.

While the current paper does not address the possible outcomes in the evolution of the carbon markets, it analyzes India's performance in the early carbon market, and proposes a series of actions to be undertaken by both the Government of India, and the private sector, if India is to take full advantage of the carbon markets.

From the beginning, the Government of India considered the CDM to be a market mechanism targeted mostly at the private sector, and facilitated its growth through capacity building initiatives and the issuance of clear and transparent rules for project approval. As a result, India has demonstrated an early mover advantage and has one of the largest portfolios of carbon finance projects in the world, with more than 700 projects having been approved by the designated national authority (one of the early steps in the process). Of those, 283 have been registered by the CDM Executive Board, which is a step required to bring value to the asset. The size of the portfolio is often used as a measure to demonstrate India's success in the carbon market. However, other indicators demonstrate that India is not the market leader in the CDM. For instance, India was the second largest supplier of emission reductions in 2006 (by volume of emission reductions sold) at 12% of all CDM transactions, behind China at 61%. By most accounts, India is being outperformed by China, which is clearly dominating the CDM, in part due to the average project size (China has twice the average size than India), and notable absence of both the public sector and the financial players from India.

The final section outlines a series of recommendations to improve India's performance in the carbon markets. First and foremost the Government of India is to insist on a robust climate change regime in the second commitment period of the Kyoto Protocol (post-

2012) that will meet the objective of stabilization of greenhouse gases in the atmosphere, and that recognizes the role of market mechanisms to achieve that goal. Secondly, the Government of India should develop and implement a national CDM strategy, and require for example that all public investments, whether from domestic or international sources of funding, be screened for carbon finance potential. The recommendations also identify the need for greater involvement of public institutions in the carbon market, promotion of price transparency, development of a revolving fund, and need for greater legislative clarity for both public trading and legal status of emission reductions. Finally, the private sector is called upon to increase intermediation from both the financial sector and small and medium enterprises, and to establish a carbon trading platform once legal clarity is provided by the Government of India.

1.0 Introduction

In July 2005, the leaders of the G8 plus five countries (namely Brazil, China, India, Mexico and South Africa) adopted the Gleneagles Plan of Action on Climate Change, Clean Energy and Sustainable Development, which seeks to reduce greenhouse gas emissions that contribute to global climate change and to promote greater levels of investments in clean technologies, while expanding access to energy needed for growth and poverty reduction in developing countries. As part of that plan, the World Bank was asked to prepare, in consultation with other financial institutions and multilateral development banks, an Investment Framework for Clean Energy and Development to respond to the financial challenges ahead.

In December 2006, the Government of India (GOI) requested the World Bank to undertake an analytical and advisory activity (AAA) to articulate a cost-effective strategy for further lowering the carbon intensity of the Indian economy, i.e., the so-called *Strategies for Low Carbon Growth Study*. The Study has the following three objectives:

- i. to articulate a cost-effective strategy for further lowering the carbon intensity of the economy at the macro and sectoral levels in ways that enhance national growth objectives by identifying synergies, barriers and potential trade-offs, and the financial needs to address the barriers and trade-offs;
- ii. to identify opportunities for and facilitate leveraging of financial resources, including external finance such as carbon finance, that support a low-carbon growth strategy, as well as to explore the possible need for new financing instruments; and
- iii. to raise national awareness and facilitate informed consensus on India's efforts to address global climate change.

Consistent with those objectives, the final report will include a specific chapter on financial options that will identify opportunities for India to contribute to the global combat on climate change without compromising – but rather reinforcing – its growth and development objectives.

This current paper is an interim deliverable to be incorporated in the financial options chapter, and seeks to identify actions required by the public and private sectors in India to fully take advantage of the growing carbon market. It is based on discussions held by the study team with numerous stakeholders, but also informed by the Bank's efforts to scale up carbon finance in India. The study team intends to complement this current analysis through the conduct of a market study dedicated to the Indian carbon market.

The paper is divided in the following sections:

- the first section provides an introduction to the report and context
- the second section briefly describes the evolution of the global carbon market, and the major drivers and trends that have contributed to its historic growth

- the third section describes India's performance in the carbon market both as an early mover and expected performance given current trends
- the fourth section discusses whether India is poised to increase its market share, and provides a brief analysis of the barriers to growing the carbon market in India
- the fifth section provides preliminary recommendations that outline actions to be taken by the GOI and the private sector to overcome the barriers identified and to develop a strategy to increase India's share in the carbon market.

The recommendations will be adjusted once the market study dedicated to the Indian carbon market is completed, and following further discussions with the GOI.

2.0 The Evolution of the Carbon Market

2.1 Market Drivers

The carbon markets are a prominent part of the response to climate change, and have been largely driven by two specific international regulations:

(i) the Kyoto Protocol, which was adopted in 1997 pursuant to the UN Framework Convention on Climate Change (UNFCCC), which in accordance with the principle of common but differentiated responsibilities, requires industrialized countries to collectively reduce GHGs by an average of 5.2% as compared to 1990 levels between 2008-2012¹; and

(ii) the European Union (EU) Emissions Trading Scheme (EU ETS), which is a main pillar of the EU's effort to meet emission reduction commitments under the Kyoto Protocol, and which allows large emitters of carbon dioxide within Europe to trade in allowances issued by national governments, in decreasing amounts as compared to a business as usual scenario. The EU ETS allows the use of Certified Emission Reductions (CERs) (see Box 1) from the Kyoto Protocol's CDM.

A less significant but emerging driver of the carbon market in India is the trade in Emission Reductions (ERs) or Verified Emission Reductions (VERs) under voluntary emission reduction commitments.

Although market mechanisms have had some success to reduce sulfur dioxide and nitrous oxide emissions in the United States, the emergence of the EU ETS and the CDM are a significant achievement as they represent the first attempt at creating markets for environmental compliance on a regional or even global scale.

¹ The Kyoto Protocol adopted three market based mechanisms: the Clean Development Mechanism (CDM), Joint Implementation (JI) and International Emissions Trading (IET) pursuant to Article 17 of the Kyoto Protocol. Of these, JI and IET have yet to be fully operationalized, as Emission Reduction Units (ERUs) and Assigned Amount Units (AAUs) can only be issued at the beginning of the first commitment period.

Box 1: Emission Reduction Commodities

Certified Emission Reductions (CERs) are units of greenhouse gas reductions from CDM projects (in countries that do not have emission reduction commitments under the Kyoto Protocol), verified by external, UN-accredited third party verifiers, using approved baseline and monitoring methodologies, and issued by the CDM Executive Board (CDM EB), i.e., the regulatory body of the CDM. CERs can be used for compliance with Kyoto Protocol obligations or to meet emission caps under the European Union Emissions Trading Scheme (EU ETS).

Verified Emission Reductions (VERs) are units of greenhouse gas emissions that are verified by third party auditors, and that can either be converted to a CER, or traded under a number of emerging regional regulatory schemes, or to entities that have adopted a voluntary emission reduction commitment. Forward sales of VERs were particularly prevalent in the early carbon market, as they allow the seller to transfer the registration risk to the buyer of the asset.

Emission Reductions (ERs) are units of greenhouse gas emissions that are not verified by a third party, and that are traded to entities that have adopted a voluntary emission reduction commitment.

EU Allowances (EUAs) are allocated units of greenhouse gas that grant the holder – typically a private emitter regulated under the EU Emissions Trading Scheme (EU ETS)- the right to emit the equivalent quantity of CO₂e. Allowances are unique to cap and trade schemes, issued by national governments and allocated to emitters either by auctions, regulation or specific decree.

2.2 Market Performance

The CDM evolved very rapidly, immediately following the adoption of the Kyoto Protocol in December 2007. As early as 1998, various players entered the market including brokers, perhaps informed by their experience in the Activities Implemented Jointly (AIJ), which was a predecessor to the CDM. Hence up to 20 Mt CO₂e in emission reductions were traded in the newly established carbon markets in 1998, even in the absence of modalities that would govern the flexible mechanisms, which only came in November 2001 with the adoption of the Marrakech Accords by the Parties to the UNFCCC. In 1999, the World Bank launched the first carbon fund, with the objective of building capacity, benchmarking assets, and pioneering the carbon market (initially through the purchase of VERs). By 2004, more than 100 MtCO₂ arising from project based emission reductions were traded, largely dominated by VERs. The year 2004 also saw the emergence of allowance markets² (56 Mt CO₂e were traded between January 2004 and March 2005), in particular through the UK and Danish Emissions Trading Schemes.

² Allowances are allocated units of tons of CO₂ that grant the holder the right to emit the equivalent quantity of CO₂ towards meeting emissions obligations under a cap and trade system.

The year 2005 was a landmark year for the growing carbon markets, as (i) the European Union launched the first (pilot) phase of the EU ETS as of January for the years 2005-2007 and (ii) after much uncertainty, the Kyoto Protocol finally came into force in February.

Due to these significant regulatory developments, an astounding number of buyers entered the market during that year, either by pooling resources through the establishment of carbon funds, by issuing tenders for the purchase of emission reductions, or by working through brokers or other intermediaries, or simply through direct over-the-counter purchases (see Box 2 for market structure). Given the growth of the market, the CDM Executive Board (CDM EB), which as a regulator must approve baseline and monitoring methodologies developed by project developers prior to project validation, and which must also register each project, struggled to respond in a consistent and timely manner, in part due to financial constraints which have for now been resolved. In 2005, the carbon markets were worth \$10 billion, with \$8.2 billion for the allowance markets (322 MtCO₂e traded) and \$2.7 billion for project-based emission reductions, mostly dominated by the CDM (374 Mt CO₂e).

During 2005, real time information about prices of allowances (EUAs) sold pursuant to the EU ETS began to become publicly available, given the liquidity of trading in allowances, whereas the market began to suffer from the lack of transparency for CER prices. Consequently, many sellers began to request that CER prices be pegged to EUA prices, in particular for contracts where CERs prices were not fixed at the date of signature. From the beginning CERs prices in forward contracts were discounted relative to EUA prices due to (i) the various risks related to project performance, methodology approval, non-registration and other project risks and (ii) the timing of the introduction of CERs into the EU ETS, which depended on the implementation of the International transaction log by the UNFCCC.

The year 2006 was marked by significant uncertainty and volatility in the pricing of emission reductions. In May of that year, spot prices for EUAs, by far the largest carbon market in terms of value and volumes, decreased by 40% or more following the release of the first annual verified emissions data for all sources covered by the EU ETS which unexpectedly indicated that the overall position of the regulated industry under the EU ETS was long (when it widely believed to be short prior to the submission of verified emissions data). In the latter part of that year, EUA prices for 2005-2007 vintages³ continued to tend toward zero. EUA prices for vintages beyond 2007 remained in the €15-20 price range during 2006 on the expectation that the European Commission would tighten the overall compliance caps from 2008-2012.

³ Phase I of the EU ETS was a pilot conducted between 2005-2007, which did not allow for the carry forward of unused allowances beyond 2007. Phase II of the EU ETS will be in force from 2008-2012.

Box 2: Market Structure

Carbon Funds: group a number of participants together, who agree in advance on the types or location of carbon assets they intend to purchase, and specific objectives of the carbon fund. Most carbon funds buy assets across a portfolio of projects to reduce the risk of non-delivery, and either pay a success fee or only cover the costs of the fund manager. While the motivation of fund participants and investors vary, most are either interested in purchasing high quality assets or interested in learning more about market dynamics. Many carbon funds have an appetite to provide technical assistance, develop new methodologies, or purchase assets in difficult sectors.

Compliance Buyers: are those that purchase typically large volumes of CERs for the purpose of compliance with domestic legislation, for example the more than eleven thousand private sector facilities that are targeted by the EU ETS. Compliance buyers are typically interested in the specific year that the CER will be delivered, also called vintage, as they must verify on a yearly basis that they are in compliance with decreasing allowances to emit greenhouse gases. For compliance buyers, CERs compete with other asset classes such as EUAs and ERUs.

Tenders for the Purchase of Emission Reductions: are most popular with industrialized (Annex I) governments who use such tenders to comply with rules regarding transparency in contracting for services. There is a strong preference in tenders for either registered projects, or projects with a low registration risk. Typically, there is a short window for submissions of projects pursuant to each tender.

Brokerage Firms: specialize in maximizing the value of emission reductions and in matching buyers' needs with sellers' assets, and operate on a success fee or flat-rate model. By their vary nature, brokerage firms have a sophisticated knowledge of price fluctuations under different market conditions.

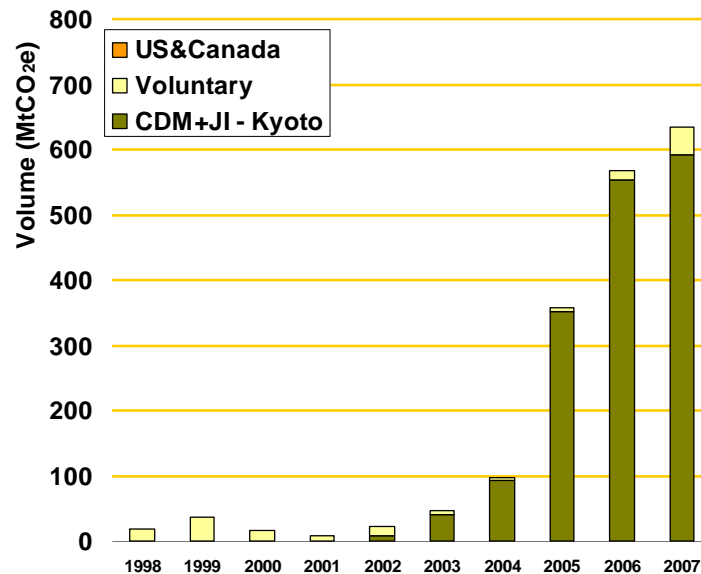
Consulting Services: offer upstream assistance to develop carbon assets, for instance by preparing documentation and registering CDM projects with the CDM EB. In some instances in particular in India, consulting services are also known to seek offers to purchase emission reductions on behalf of clients, and operate either on a success fee or flat-fee model.

Trading Platforms and Auctioning: while most transactions described above are over-the-counter transactions, trading platforms and auctions are emerging in the market, whereby project developers can seek offers for the sale of emission reductions. The key feature for trading platforms and auctions is the use of a standardized contract, which may guarantee the delivery of the asset, or at least identify elements of recourse in the case of non-delivery.

Notwithstanding this volatility, the carbon markets were evaluated at \$30 billion annually in 2006, with \$25 billion in trade of allowances, and \$5 billion in project-based emission reductions, mostly from the CDM (450 MtCO_{2e}). Average CER prices in 2006 were

\$10.90 or €8.40 per tCO₂e, with the majority of transactions in the range of \$8-14 or €6-11. The year 2006 also saw the beginning of a market for secondary CERs⁴ (in the price range of \$14.30-19.50 or €11-15 per tCO₂e) and record sales in the voluntary markets, led by the Chicago Climate Exchange and New South Wales Market, although these remained relatively small. A summary of the growth of project-based emission reductions is included in Figure 1.

Figure 1: Annual Primary Project- Based Emission Reductions Transactions



Source: State and Trends of the Carbon Market 2008, World Bank, Washington, D.C.

2.3 Impact of Carbon Finance

To date, there are seventy seven methodologies, twenty four small scale methodologies and more than 800 projects registered worldwide by the CDM EB (see Box 3 on CDM project cycle). Since the inception of the carbon markets till date, more than half of the emission reductions traded (by volume) pursuant to the CDM have been from the oxidation of HFC23 gases (generated as a by-product during the production of HCFC-22 which is a gas used as a refrigerant and as feedstock in the production of Teflon). In hindsight, this is not surprising since such projects are particularly financially attractive, as the CDM improves the internal rate of return (IRR) by a factor of 500 % at current prices (due to a high global warming potential {GWP⁵} of 11,700). In addition, such projects have a particularly short lead time and very low implementation risks. Given the commitments to gradually phase out the production of HCFC-22 under the Montreal

⁴ CERs traded in secondary markets are issued and fully guaranteed

⁵ Global Warming Potential (or GWP) is a measure of how much a given mass of greenhouse gas is estimated to contribute to global warming, as compared to the same mass of carbon dioxide, which is given a GWP of one.

Protocol by 2030⁶, no new CDM projects arising from the production of HCFC-22 are expected beyond 2012. Other asset classes which reduce GHGs with significant GWPs are also well represented in the market so far, namely N₂O (GWP of 310) at 11% (by volume), and CH₄ (GWP of 21) from landfill gas projects (6% by volume), animal waste (3 %) and coal mine methane (1%). Collectively, renewable energy and energy efficiency projects which displace carbon dioxide (GWP = 1) represent 25 % of the market so far. Table 1 indicates the sensitivity of pricing of emission reductions on the incremental rate of return for renewable energy and waste management projects provided by CDM revenues.

Box 3: CDM Project Cycle

Under the CDM, project proponents must first develop a Project Design Document (PDD) using a baseline and monitoring methodology approved by the CDM EB, which identifies the additionality or eligibility of the project, the baseline scenario, and an explanation of how the baseline and project emissions and emission reductions will be calculated. If no approved methodology exists, accredited auditors (Designated Operational Entities or DOEs) can submit new baseline and monitoring methodologies together with a draft PDD to the CDM EB on behalf of project proponents in a bottom-up approach. The approval of a new baseline and monitoring methodology can take 4 months in theory, although in practice, this has taken much longer, between one to two years, due to the bottleneck of methodologies submitted by project proponents through DOEs.

There are a number of asset classes that are under-represented, in particular: transportation projects (which generate 13.5% of global emissions), which suffers from the fact that the CDM only covers a small fraction of the high incremental costs of cleaner technologies and due to inherent methodological difficulties; demand-side energy efficiency projects, which suffers from a lack of capacity in intermediation and some inherent methodological difficulties; and land-use change and forestry, which has been restricted to afforestation and reforestation for the first commitment period, and which suffers from an artificial limitation on demand (industrialized countries have a limit on how many such emission reductions they can use against their target, and this asset was excluded from the EU ETS so far).

Experience in the CDM so far indicates that the sale of emission reductions catalyzes a much larger financial investment in the underlying project, which is what was intended by the concept of additionality. World Bank data indicates that on average during 2002 to 2006, total investments in underlying projects were 2.8 times the value of the carbon revenues. This means that in 2006, a carbon market of \$ 5 billion has attracted investments of \$14 billion in climate-friendly technologies. World Bank data also shows that the leverage factor is much higher, i.e., 5.7 if industrial gases such as HFC23 and

⁶ Under the Montreal Protocol, developing countries have agreed to the following schedule to phase out the production of HCFC22; freeze by January 1, 2013; reduction of 10% of production by 2015; 35% by 2020; 67.5% by 2025 and full phase-out by 2030

N20 are excluded from the analysis. The leverage ratio for renewable energy tends to be around 9.

Table 1: Sensitivity Analysis of Impact of Carbon Price (ERs, VERs, CERs) on Internal Rate of Return for CDM Projects in Renewable Energy and Municipal Solid Waste

Incremental Internal Rate of Return in Renewable Energy Projects					
CER prices	Purchasing Period				
	5y ('08-12)	7 years	10 years	14 years	21 years
\$5.00	0.5%	0.6%	0.8%	1.0%	1.2%
\$10.00	1.0%	1.4%	1.7%	2.1%	2.3%
\$15.00	1.6%	2.1%	2.7%	3.1%	3.3%
\$20.00	2.2%	2.9%	3.6%	4.1%	4.5%

Incremental Internal Rate of Return in Municipal Solid Waste Projects					
CER prices	Purchasing period				
	5y ('08-12)	7 years	10 years	14 years	21 years
\$5.00	17.9%	24.1%	29.2%	31.7%	32.8%
\$10.00	52.3%	59.1%	62.4%	63.5%	63.8%
\$15.00	88.2%	93.3%	95.4%	95.9%	96.0%
\$20.00	123.7%	127.3%	128.6%	128.8%	128.9%

Source: unpublished data from the World Bank's carbon finance portfolio

3.0 India's Performance in the Carbon Market

As a developing country, India does not have any emission reduction target, but it is able to sell CERs pursuant to the CDM, to large emitters covered by the EU ETS, countries that have emission reduction targets under the Kyoto Protocol, or any other entity that wishes to purchase such CERs for compliance purposes. It can also supply ERs and VERs for the growing voluntary markets.

3.1 Historical Trends

India's participation in the carbon markets has contributed to the recognition that it is a useful tool in attracting climate friendly investments. India was an early player in the market, and it used the hosting of the Eighth Conference of Parties to the UNFCCC in Delhi in October 2002 to sensitize the business community about the opportunity provided by carbon finance and the modalities of the emerging CDM.

In 2004, the growth in the Indian carbon market was fostered by a healthy number of indigenous management and technical consultants, which began to offer services to potential sellers of emission reductions, and the response from primarily the private sector to capacity building initiatives concerning the nascent market. In its capacity as the Designated National Authority (DNA) for the CDM, the Ministry of Environment and

Forests (MOEF) also had the foresight to develop simple and transparent rules, whereby project developers can obtain a Letter of Approval (LOA) theoretically within sixty days, which is a key step required for project registration. By the end of 2004, India was the market leader in the forward sale of emission reductions, with 50 % of the supply market. Early successes included the registration of two projects which consisted of the thermal oxidation of HFC23 generated as a by-product during the manufacturing of the refrigerant HCFC-22, but also a number of small scale co-generation projects using bagasse, rice husk and mustard crop residues as a source of biomass, and small scale hydro.

As the Kyoto Protocol came into force and the EU ETS was enacted, China entered the carbon market in full force in 2005. At the same time, many buyers reported that it was becoming difficult to close deals in India in 2005, as carbon prices, in particular for EUAs sold pursuant to the EU ETS, began to rise. Even in the absence of price transparency for CERs and other asset classes, many sellers in particular from India, showed a great risk appetite as they expected prices to also continue to rise, and attempted to add value to their CERs through project registration. As a result, India dropped to third place in the global supply of project-based emission reductions in 2005 (at 3%), behind China (73%) and Brazil (11%).

Following the volatility in prices in 2006, many sellers in the carbon market became aware of the need to adopt risk hedging strategies given the highly volatile nature of the CDM and other nascent carbon markets. This was particularly true in India, where many sellers preferred to implement projects “unilaterally,” i.e., without cooperation with a buyer, because they preferred to register the project and later sell issued CERs, rather than sell VERs or forward sell their CERs, whose prices are discounted due to project, delivery and transfer risks. The Integrated Energy Policy issued by the Indian Planning Commission in August 2006 for instance recommends that India consider selling emission reductions at a later date when such selling is more attractive, presumably referring to better prices. While it is difficult to assess the extent to which Indians hold on to their CERs to maximize price in the absence of a full market study, there is some anecdotal evidence that this behavior is not as prevalent now as it was before the EUA price fluctuations experienced 2006.

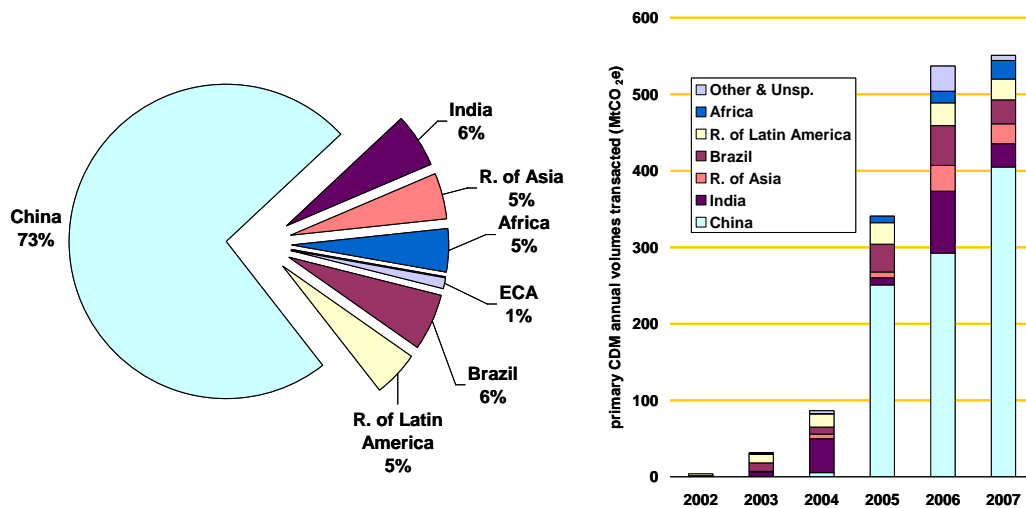
In 2007, India’s market share, measured in value of signed Emission Reduction Purchase Agreements for either spot or forward sales, was at 6% in 2006, second only to China which supplied 73% (see Figure 2 for a summary of the growth in the carbon market in India).

Other indicators reveal that India ranks:

- first by number of projects registered by the CDM EB at 345 followed by China’s 221. Of these 61 % were small scale projects (212).
- second by number of projects in the UNEP/RISOE pipeline when considering the total number of projects at validation, requesting registration and registered (1252 projects for China vs. 966 for India) as of June 2008.

- second by volume of issued CERs at 42.9 Mt CO₂e (coming mainly from two HFC23 projects), after China's 44.6 Mt but before South Korea's 27.2 Mt. and 21.5 Mt for Brazil as of June 2008
- second in the UNEP/ RISOE CDM pipeline in the number of expected CERs by 2012 at 353 MtCO₂e (or 15.7%) when including HFC23 assets (compared to China at 1187 MtCO₂e or 52.7% and Brazil at 155 Mt or 6.9%) as of September 2007
- third by share of signed emission reduction purchase agreements since market inception, when HFC23 assets are excluded from the analysis, as follows: China (40%), Brazil (15%) and India (8%) as of September 2007
- India also has the largest number of projects rejected at the registration stage (29) and withdrawn (6)

Figure 2: India's Current and Historical Market Share of Global Project-Based Emission Reductions (by volume)



Source: State and Trends of the Carbon Market 2007, World Bank, Washington, D.C.

3.2 Analysis of Performance

What emerges from the above analysis of trends is that as an early mover in the supply market, India is performing well compared to China in the expected volume of CERs to be delivered by 2012. While China's supply to the CDM market should be 4 times that of India when taking into account current greenhouse gas emissions, China will deliver 3.5 times as many CERs as India by 2012.

However, it is certain that beyond 2012, China will outperform India in the carbon market, given that (i) it has already surpassed the Indian number of projects taking into account the total number of projects under validation, requesting registration and registered and (ii) the average project size in China is 2.72 times that in India's. Consequently, it is expected that China will have a CDM supply market of 4.75 times that of India beyond 2012 when considering projects registered until 2007, and much

larger once the projects currently in the pipeline are registered. See Box 4 for an analysis of China's strategic interventions to facilitate the CDM.

What is more troublesome is that China is significantly outperforming India in *market access*. China is the preferred destination of buyers of emission reductions, and China sold *five times* the emission reductions than India since market inception. This can be partly explained by the fact that Chinese project developers must identify the sellers when requesting a Letter of Approval from the DNA, whereas a good number of Indian project developers prefer to seek to maximize price by first registering the project and selling once the emission reductions are certified, which creates more value added albeit at higher risks.

The Chinese DNA also selectively promotes specific sectors that have been assigned priority for the CDM, many of which target the meeting of national energy efficiency and generation targets. However, the troublesome fact is that the vast majority of Indian projects are small in scale (60% of projects registered so far), and in the absence of aggregation, these are of less interest to carbon buyers given the amount of due diligence and transaction costs required to purchase significant volumes, and this reduces the negotiating power of individual project developers and increases project risks.

It is also conceivable that the sale of issued CERs will compete at some point prior to 2012 with the sale of large volumes of assigned amount units (AAUs) which are a form of emissions allowance pursuant to International Emissions Trading (IET) according to article 17 of the Kyoto Protocol that are available in ample quantities particularly from Russia and the Ukraine to meet any gap that industrialized countries may have in meeting their emission reduction targets.

The Indian carbon market is largely driven by small and medium enterprises (SMEs), which is not surprising, as India has nearly three million SMEs which constitute more than 80 percent of total number of industrial enterprises in the country. According to recent estimates by the Indian Institute of Foreign Trade, approximately 60 percent of the country's GDP comes directly or indirectly from SMEs. In the absence of price transparency, it is not clear that project developers from SMEs have the necessary information about market fundamentals to develop sophisticated risk-hedging strategies in a highly volatile market. Although there are a number of brokers and consultants available in the Indian carbon market, price projections vary widely. Hence small projects and SMEs are largely disadvantaged in the current carbon market.

The public sector in India has also been relatively absent from the carbon market. Of the 333 projects registered at the CDM EB from India, only 16 originated from public sector units (PSUs). Even among these, 10 use small scale methodologies. This is particularly noteworthy since public spending still dominates key candidate sectors for CDM.

Box 4: China's Strategic Interventions to Facilitate CDM

China is a relatively late entrant into the CDM arena, with its first project appearing in the CDM pipeline in November 2004, and only 25 projects as of December 2005. However, since January 2006, Chinese participation in the CDM has changed the entire market for CERs. Currently with the largest pipeline of projects (822) when considering projects at validation stage, requesting registration and registered, China's market power is underlined by its huge potential, and current status as the larger supplier of CERs to the market (61% of market share in 2006). The growth in the Chinese CDM market has been facilitated by a number of initiatives, the most important ones being:

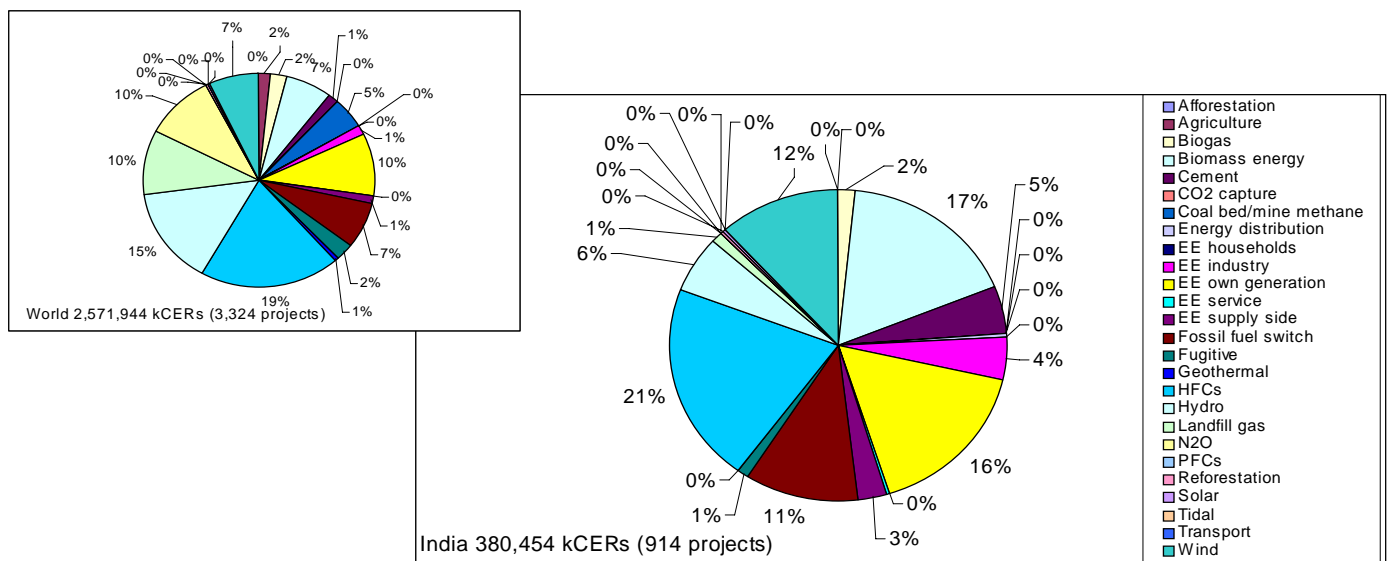
1. Several capacity building initiatives delivered, most with international assistance.
2. The designation of the National Development and Reform Commission, which is the national authority governing the allocation of all state resources for development expenditure, as the Designated National Authority
3. The promotion of specific sectors to be targeted for development of carbon assets by multilateral development banks (such as steel industry or biogas sectors to the World Bank) with a view to achieving national renewable energy and energy efficiency targets.
4. The adherence to an informal pricing policy (as a pre-condition for the issuance of letters of approval), which sets a floor price for CERs even in forward contracts, on a project-by-project basis, currently €10/ tCO₂e, as also an insistence on having buyer(s) identified for the entire likely volumes of CERs in project design documents.

In October 2005, the Government issued regulations to manage the carbon market, including a provision for the state to claim a share of revenues from Carbon Finance transactions. When two HFC-23 project entities entered into an Emission Reduction Purchase Agreement with the World Bank acting as Trustee to the Umbrella Carbon Facility in December 2005, the Government of China (GOC) claimed 65% of the CER revenues to be placed in a dedicated CDM Fund, which was developed with assistance from the World Bank for investments in climate change activities and CDM capacity building activities. The Government's share is much lower for priority sectors such as coal mine methane, renewable energy or landfills (2%).

When fully capitalized by 2012, the CDMF's total revenues would be about **USD1.5 billion**. This is a very potent example of a win-win-win situation for GHG reduction, CDM market capitalization, and carbon dollars recycled for more climate change activities.

An analysis of the asset classes (see Figure 3) offered to markets so far from Indian sellers (from the UNEP/RISOE database reveals trends similar to the global market: the early dominance of HFC23 gases (by volume) is now reduced with just about one fifth of the total volume coming from this activity. This is followed by biomass based energy generation. Overall, the renewable energy generating sources (wind, solar etc.) account for about 35% of total volume of ERs likely by 2012, The relatively low contribution of volumes from EE projects (about 25%) can be clearly identified as an area where more projects/programs could be devised. Of note, India has very few landfill gas-to-energy and animal waste projects registered so far when compared to global trends, thus indicating possible structural issues in the underlying projects. The fact that many energy projects from India took advantage of the CDM can be partly attributed to the availability of approved methodologies for grid-connected capacity additions from renewable energy and electricity generation from biomass residues for both large and small scale projects, coupled with the publication by the Indian Central Electricity Authority (CEA) of baseline emissions data for the five regional grids.

Figure 3: Share of Asset Classes Globally and from India



4.0 Barriers to the Carbon Market in India

The GOI is facing some international pressure to adopt an emission reduction target for the second commitment period of the Kyoto Protocol. India maintains that it will not adopt a target, as this would negatively impede its economic growth and poverty reduction objectives. In that context, the CDM remains one of the major financial tools at India’s disposal to participate in global efforts to mitigate greenhouse gases. The UNFCCC estimated that that should the industrialized nations adopt an aggressive emission reduction target of 50 % or more by mid-century, and should they meet half of their emission reduction commitments through the purchase of project-based emission reductions from developing countries such as India, the CDM market could grow to a level of \$100 billion sales annually (a growth of 20 times compared to 2006). That

means that CDM could be on par with ODA as a source of foreign capital flowing to developing countries.

That is of course an upper boundary estimate of the potential market size. The relative demand for emission reductions from industrialized countries will depend on the nature of the second commitment period of the Kyoto Protocol (post-2012), and in the absence of such an agreement, the demand from regional and voluntary markets, as well as policies in industrialized countries. In that context, it will be important to note the discussions on complementarity, where countries that are net buyers may wish to limit the quantity of offsets available from developing countries. Typically, proponents of strong limits on the import of carbon offsets from developing countries cite the need for domestic action to address climate change and competitiveness issues to support their position.

There is unfortunately no market data available specific to India's participation in the carbon market. From global data, it is estimated that as of the end of 2006, India has entered into emission reductions transactions representing more than 111.6 MtCO₂e (of which 70 MtCO₂e came from HFC 23 projects), with an approximate value of \$800 million, leveraging climate friendly investments of \$2.25 billion.

4.1 Uncertainty Regarding the Second Commitment Period of the Kyoto Protocol

It is well documented that long term commitments by industrialized countries are needed to ensure the long term viability of the carbon markets, including the CDM, as these establish a demand and value for emission reductions. In the absence of such commitments, demand for emission reductions will be driven by regional markets such as the EU-ETS, including any post-2012 phase, and other regional regimes which allows the introduction of offsets.

In January 2008 the EU Commission adopted a proposal regarding the design of the EU ETS post-2012. For projects started /registered after 2012, issued CERs can only be introduced from *least developed countries*. If an international agreement is reached regarding the second commitment period of the Kyoto Protocol (i.e., after 2012), 50% of the additional commitment can be achieved through the CDM from participating countries. In essence this means that the largest demand for CERs will dry up from large developed countries like India will dry up if there is no agreement on a second commitment period of the Kyoto Protocol.

In India, the continued uncertainty of any agreement regarding the second commitment period means that there will be an increased emphasis on projects with short lead times, such as demand side energy efficiency projects, and projects that are already under sound financial footing, i.e., where the financial closure does not strictly depend on the forward sale of emission reductions. This means that carbon finance has limited influence in investment decisions for large scale infrastructure projects with long gestation periods that have the potential to deliver a large quantity of emission reductions until the uncertainty is significantly reduced.

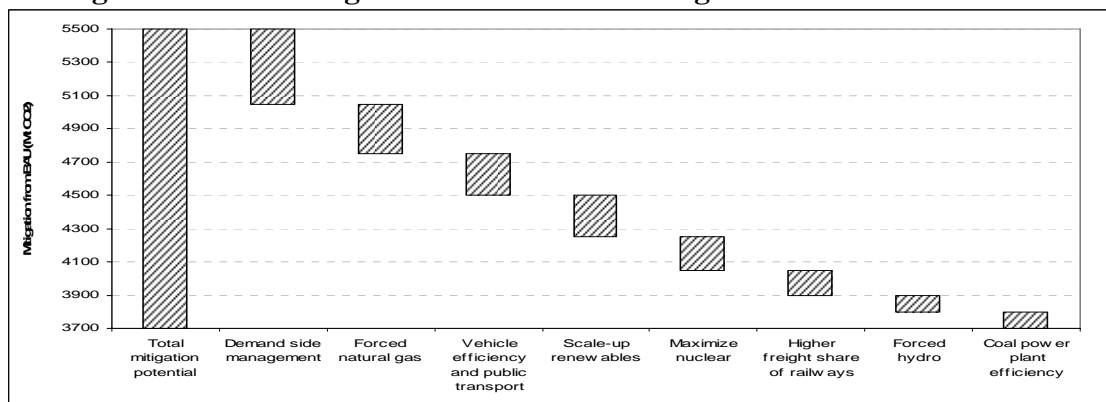
4.2 Lack of Concerted Strategy

So far, the GOI has considered the CDM and by extension carbon finance to be strictly market based mechanisms, and has decided therefore not to interfere through any targeted programs or funds to increase or promote any specific programs. It has however fostered the growth of the market in India through capacity building initiatives, and the setting of clear and transparent guidelines for project approval. However, it is becoming increasingly clear that China is dominating this market, and has partnered with many international organizations to address any gaps and advance the use of carbon finance to meet national objectives. China is also about to launch its CDM Fund which will further develop its domestic market. The GOI should respond through the development and implementation of a national strategy on carbon finance to further advance the use of this market mechanism.

4.3 Lack of Methodologies

Figure 4 illustrates an array of available activities, as projected in the Planning Commission's Integrated Energy Policy report, which can contribute to the mitigation of GHGs in India. Several asset classes have limited potential to deliver emission reductions as follows: (i) the parties to the Kyoto Protocol have informally agreed to refrain from introducing nuclear power projects under the CDM, and no regional regime has ever recognized carbon assets from nuclear power (ii) land use, land-use change and forestry assets in the CDM are limited to afforestation and reforestation activities and (iii) the EU ETS does not allow the introduction of any assets from land use, land-use change and forestry, including those from afforestation and deforestation, and has limited the introduction of carbon assets from hydropower projects to those that meet guidelines issued by the World Commission on Dams.

Figure 4: Total Mitigation Potential According to Lowest Carbon Scenario



Source: Planning Commission (2006), Integrated Energy Policy, Government of India, New Delhi.

Most regional regimes require the use of approved methodologies to establish baselines and monitoring plans for carbon offset projects, and the CDM is certainly the most advanced regulatory regime in this regard. For illustrative purposes, Table 2 provides a preliminary analysis of the status of approved methodologies under the CDM for the main actions recommended Integrated Energy Policy Report.

For addition of capacity to the grid for example, sub-critical coal is expected to remain the least-cost option for the foreseeable future for most parts of the country, and thus other options such as renewable energy, ultra-supercritical, IGCC (either from indigenous or imported coal) and efficient gas should remain eligible for carbon finance as long as their costs are not competitive with other generation options in the India market.

There are a number of methodologies that have been adopted in the energy sector, although their ability to assist in the development of the sector remains limited. Of note are the following methodologies: capacity additions to the grid from renewable energy, captive power plants from biomass or natural gas, new grid connected fossil fuel fired power plants using a less greenhouse gas intensive technology⁷, and fuel switching to less greenhouse gas intensive fuels. However, there is a notable absence of either methodologies or application of methodologies compared to the potential for carbon finance in particular from India. This is true for demand-side management measures (which has the highest potential for generating emission reductions in the short term), improved efficiency of coal and hydropower plants, the introduction of best available technology in energy intensive sectors and higher freight share of railways.

In some cases where project activities exist, modifications to methodologies through re-submissions to the CDM EB would be required if carbon finance is to be scaled up and contribute to large scale investments in lower carbon technologies, taking into account local conditions.

Table 2: Preliminary Assessment of Status of Approved Baseline and Monitoring Methodologies According to Main Actions Recommended in the Integrated Energy Policy

Relevant Recommendation	Current Situation with Regard to CDM Methodology	Way Forward
Relentlessly pursue energy efficiency	Methodologies exist for some activities (ACM 12, AM 20, AM 44, AM46), Small scale methodologies also available (AMS II.D, AMS II.E).	Move away from project by project approach. Identify positive list of technology applications. Develop tailored applications for several sectors, in particular the building sector, industrial and household.
Develop fully the nuclear and hydro option	Parties to the Kyoto Protocol have agreed to refrain from introducing nuclear power project in the CDM;	Explore feasibility of expanding the use of CDM to large hydro and forced hydro.

⁷ The methodology that was approved by the CDM EB for grid-connected supercritical coal-fired generation requires that (i) the identified baseline fuel is used in more than 50% of total generation by utilities in the geographical area or within a country. To demonstrate this applicability condition data for latest three year shall be used. Maximum value of same fossil fuel generation estimated for three years should be greater than 50% and (ii) in order to construct a benchmark emission factor, a sample of the top 15% power plants that use the same fuel must be used. The best power plant sample group must include at least 10 plants, which have been built in the last 5 years. To make the sample group, grid connected plants should be included. If less than 10 plants have been constructed in the last five years within India, it is necessary to include plants in Asia. The benchmark has been applied to prevent credits being given to supercritical plants that are not additional, i.e., when they have penetrated the market. The methodology basically phases itself out at a certain level of technology penetration

Relevant Recommendation	Current Situation with Regard to CDM Methodology	Way Forward
	Methodologies for Hydro already available as part of renewable (ACM 2).	
Undertake pilot projects in biomass plantations and biofuels	Approved methodologies for grid connected biomass plantation based electricity (AM 42); Other biofuel methodologies awaiting CDM EB approval.	Approve new / existing methodology with appropriate caveats and practical approach for assessing upstream emissions which does not require full life cycle analysis.
Undertake solar technology... solar thermal economically attractive	Solar power usually used only on small scale (AMS IC and ID) and as part of ACM 2.	Demonstrate application of methodology for solar thermal on a large scale.
Assess off-shore wind power potential	Already covered under renewables (ACM 2).	Develop appropriate incentive schemes/policies and pilot under Program of Activities.
Improve Coal Power plant efficiency	Methodology for more efficient new technology plants recently approved (ACM 13).	Develop new methodology for R&M of power plants.
Produce biodiesel in a decentralized manner and substitute all agricultural use of HSDO/LSHS/fuel oil with biodiesel	Biofuels are not yet approved by CDM EB; except from waste cooking oil (AM 47).	Encourage development of Program of Activities around biodiesel and Straight Vegetable Oil for agricultural sector.
Improve Railways' freight services for long distance goods traffic	No modal shift methodologies for road to rail approved.	Develop a CDM PoA around increase of Indian Railway's share of freight traffic
Promote urban mass transport to reduce demand for personal motorized vehicles	BRTS methodology already approved (AM 31).	Develop CDM projects with Rail MRTS.
Improve fuel efficiency of motorized vehicles by a factor of two through vehicle design	No methodology approved.	While this is being done in collaboration with manufacturers', explore CDM potential of improvement of road infrastructure for inter-city traffic.

At face value, carbon finance and the CDM in particular should contribute to India's efforts to provide lifeline energy to all households and electrify the 400 million poor by 2012, and to assist the development of the large hydro potential from the mid-Himalayan region. In the case of rural electrification, the CDM EB had been reluctant to approve a methodology that would recognize the substitution of non-renewable biomass (i.e., fuel wood), which is the fuel of choice for the world's poor, although two such methodologies will be considered at the next Conference of Parties. As the inclusion of hydropower in the CDM does not have full consensus among all stakeholders, the outcome of any request for registration from such projects is not certain.⁸

Hence, the lack of approved baseline and monitoring methodologies or methodologies which are applicable to domestic conditions remain a formidable barrier to the growth of the carbon market for some sectors where the CDM could potentially make a significant contribution. If the CDM is to realize its full potential, it is clear that methodologies have

⁸ The largest hydropower project registered to date in the CDM remains a 192 MW run-of-river from India

to be applicable to entire sectors, rather than their current limited application on a project-by-project basis. Already project developers have demonstrated the use of bundling, which allows the aggregation of a number of small activities under a single project, provided the individual activities are known at project registration. The recently adopted rules on programs of activities (POAs), which allows for a verification of individual activities ex-post from registration, should further expand the use of the CDM. However, more standardization is required to facilitate the broadening of methodologies and specific components to the sector level.

4.4 Lack of Incentives to Reduce Emissions in the Public Sector

The carbon market has really captured the imagination of Indian entrepreneurs, and there has been a significant amount of awareness-raising regarding the carbon market. However, in most organizations including PSUs, the task of identifying the opportunities provided by the carbon market has been assigned to an individual, who often has other responsibilities, rather than a dedicated CDM cell. There are notable exceptions. In June 2007, the Ministry of Urban Development (MOUD) established a High Power CDM Committee to disseminate technical and financial information regarding carbon finance, and promote the use of the CDM in the urban sector. A capacity building program lead by the MOEF has identified a number of intermediaries at the state level. However, there is a lack of incentives for PSUs to undertake CDM projects, in particular because it is not always clear whether CDM revenues will accrue to the project or entity that successfully implemented the project. Other factors that contribute to the lack of involvement of the PSUs in the market include: procedural constraints in engaging with foreign agencies, lack of data management systems and concerns regarding disclosure of data.

4.5 Lack of Aggregation for SMEs

For many buyers of emission reductions, India is not an attractive destination to purchase emission reductions, as the majority of projects are small scale and do not meet their minimum size requirements. Although buyers can aggregate a number of small projects into larger ones, they prefer that this function be managed by the sellers in order to reduce the amount of due diligence required and to reduce transaction costs. In some sectors, notably for energy efficiency measures in the brick construction and steel forging sectors, natural intermediaries emerged, such as technology providers or industry associations. Such intermediaries were able to aggregate a number of small projects into larger ones, which improved market access and reduced transaction costs. In another recent example, the Bureau of Energy Efficiency is developing a program of activities under the CDM for the substitution of incandescent lights with compact fluorescent lamps (CFLs). However, despite a number of capacity building efforts in the country regarding aggregation and intermediation, the market remains fragmented.

4.6 Relative Absence of Financial Sector

A supportive investment climate for CDM projects such as renewable energy projects requires a well designed regulatory and policy framework that helps to remove the barriers for implementation of renewable energy projects and enables efficient utilization of renewable resources by providing positive incentives for efficient renewable options. One of the concerns expressed by potential investors has been that in recent years the regulatory framework for renewable energy in India has become uncertain, having an adverse impact on the investment climate. Similarly, there has been a reluctance of commercial banks in India to lend for energy efficiency measures, which may improve the bottom-line, but does not necessarily directly contribute working capital that builds fresh production capacity.

Within this investment climate, very few Indian banks provide lending using a project finance model, which would lend itself well to take into account an additional revenue stream such as carbon finance. More often than not, Indian banks would heavily discount the carbon revenue stream, in part due to lack of knowledge or uncertainties regarding the carbon market, and would not consider Emission Reduction Purchase Agreements as part of collateral or guarantees to finance a project with climate-friendly technologies.

Consequently, there are very few indigenous examples to date of the use of financial engineering to improve lending terms, reduce project risks or monetize or securitize revenue flows from CDM projects. The vast majority of CDM projects are either financed on the balance sheet or financed without taking into account potential carbon finance revenues, which are seen as an upside.

4.7 Lack of Price Transparency

Unfortunately, there is no real-time price discovery for CERs. Apart from the European Climate Exchange that accounts for 80 % of the trades in EUAs so far, there is no international platform with sufficient liquidity where prices of CERs can be benchmarked. Even EUA prices under the European Climate Exchange are not a good indicator of CERs prices for Indian projects, as these would depend on issues such as default risk, financial strength of sellers, as well as registration and project related risks.

While the large multinational companies from India will have access to CER pricing information, the SMEs and PSUs, which rely on bilateral and over-the-counter transactions, are at a disadvantage because of the lack of sufficient price related information (i.e., factors that determine price), poor negotiating capabilities and poor access to international markets. Given the volatile nature of the carbon market, there is a need for more transparency in pricing of CERs and an efficient system for the dissemination of information regarding market fundamentals that could better inform potential sellers regarding risk hedging strategies. Price discovery mechanisms that allow project developers to seek bids from numerous buyers through either an auction or a platform using standard contracts are beginning to emerge in part to fulfill the need for greater price transparency.

In September 2007, the European Carbon Exchange launched a futures and options contract for CERs⁹ as an alternative to over-the-counter CER contracts. The Brazilian Mercantile and Futures Exchange has been trying to establish a carbon trading platform in Brazil and recently auctioned CERs from a public sector project (see Box 5). The Asian Carbon Exchange hosted in Singapore has been facilitating electronic auctions of PDDs and issued CERs followed by out of exchange settlement, along the lines of a brokerage model, since 2005¹⁰. Eurex and the European Energy Exchange have also declared their intentions to launch CER futures contracts. The Japan Bank for International Cooperation (JBIC) is establishing a trading platform and national registry with the participation of number of trust banks to clear and settle trades involving Japanese companies. These platforms are expected to supplement over-the-counter CER contracts and allow users to lock-in prices delivered at set dates in the future, which will contribute to a much more transparent and robust CER market.

However, these emerging trading platforms and auctions are expected to have a limited appeal to Indian project developers, in particular for SMEs and PSUs, due to a lack of presence and credibility in the Indian market and lack of regulatory certainty regarding the public trade of CERs. As well, the trades under these emerging auctions and platforms are small in volume, and they are not true indicators of price for Indian CERs.

Several domestic entities, most notably the National Commodities and Derivatives Exchange (NCDEX) and the Multi Commodity Exchange of India (MCX), have proposed the establishment of domestic carbon trading platforms. However, the establishment of a carbon trading platform in India faced a number of regulatory barriers, since emission reductions are neither defined as commodities or services, and there is a limited regulatory regime to allow the forward trading of intangible commodities, i.e., those commodities that cannot be physically delivered. The Forward Contract (Regulation) Act, 1952 (FCRA) specifically requires the physical delivery of the regulated good, and it is not clear that CERs could meet the current legal definition of goods without a regulatory amendment. In early 2008, a notification has been issued by the government, allowing trading in carbon credits on the commodities exchange and would thus be regulated by the FMC.

⁹ On September 24, 2007, the Chicago Climate Exchange (a partner of ECX), organized the first public auction of issued Certified Emission Reductions through a regulated exchange. The asset was 163,784 tCO₂e from a wind power project in India on behalf of Tata Motors Ltd., which sold at \$22.11 per CER.

¹⁰ The Asia Carbon Exchange requires that transactions be settled outside of the trading platform and therefore the transactions are not guaranteed. Minimum transaction size is currently set at 150,000 tCO₂e per annum per transaction.

Box 5: Increasing Market Access through BMF's Trading Platform in Brazil

Brazil has been a pioneer in the carbon market and considers project-based greenhouse gas emissions trading as an important tool to reach its development objectives. While substantial progress has been made, Brazil has yet to reach its full potential in the carbon market, due to the lack of key infrastructure that would promote market access, and barriers faced in particular by the public sector units (PSUs) and larger industrial companies. The key barriers include the absence of clear regulatory and market mechanisms that would allow the selling of CERs other than through the bilateral and over-the-counter transactions, and the lack of financial instruments to enhance the value of CERs in a volatile market.

Recognizing these constraints, the Brazilian Mercantile and Futures Exchange (BM&F) and the Brazilian Ministry of Development, Industry and Foreign (MDIC) Trade entered into a Memorandum of Understanding (MOU) in 2004 to develop and implement the Brazilian Emission Reduction Market (MBRE), with the purpose to develop a trading platform for the futures and spot transactions for CERs. In 2006, the Government of Brazil signed a grant agreement with the Japan Policy and Human Resources Development (PHRD) fund managed by the World Bank, to support BM&F's ongoing efforts and strengthen the financial infrastructure and institutions of the Brazilian carbon market. The specific activities covered by the grant include:

- an outreach program with selected key industry groups that have not yet benefited from the carbon market
- the provision of technical assistance to such industries to prepare carbon finance activities in these industry groups
- the development of a system for the marketing of the CERs and various related financial instruments in a manner that is consistent with Brazilian regulations and procedures for public entities
- an outreach and technical assistance effort to engage the financial sector in Brazil to participate in the carbon market
- the promotion of a trading platform for the sale of certified emission reductions

Through these efforts, BM&F successfully launched on September 26, 2007 a public auction for the sale of 800,000 tCO₂e of issued CERs from a single landfill project of the Municipal Government of Sao Paulo, which settled at a price of €16.20 /tCO₂e.

4.8 Lack of Designated Operational Entities (DOEs)

So far, 29 companies have been accredited by the UNFCCC as DOEs, they play the crucial role of validating each and every project prior to submission for registration by the CDM EB, and of periodically verifying the emission reductions generated prior to their certification. Due to the significant entry barriers, in particular with regard to liability insurance requirements and the need for a track record in auditing across several sectors, there are no indigenous DOEs from India, although around 7 of the international

firms have a presence in the Indian market, depending on how “presence” is defined. Nevertheless, the number of accredited DOEs in India is already a constraint, and given the number of projects in the pipeline, this constraint will soon have an impact on transaction costs and liquidity as the market expands.

4.9 Lack of Capacity

Although there are a number of workshops and events that have served to raise awareness of the CDM and the opportunity provided by carbon finance, there remains a skills shortage for the development and delivery of CDM projects in India. So far, there are no courses offered by vocational or technical schools on carbon finance, and the best way to learn how to develop a project remains the learning-by-doing approach. The lack of expertise to identify carbon finance opportunities and develop the carbon asset remains an important barrier to the carbon market in India.

5.0 Preliminary Recommendations

Attached are preliminary recommendations which will be reviewed following (i) the delivery of a market study dedicated to the carbon market in India that will be conducted as part of and (ii) further consultations with the GOI and stakeholders. The recommendations will be revised and included in report on Strategies for Low Carbon Growth Report.

5.1 Actions Required of the GOI

As a non-Annex I country, one of the only sources of additional funding to pay for the incremental costs of low-carbon growth across the economy remains the CDM. As India is further planning massive investments in infrastructure, urban development, and industrialization, while striving to ensure access to energy for an additional 400 million people, a targeted strategy to improve market infrastructure and increase access to the carbon market is recommended, as follows:

5.1.1 Strive for a Second Commitment Period that Fosters Scaling Up of the Carbon Market: For reasons beyond the scope of this paper, the GOI must insist on the adoption of an international regime that provides long term commitments by industrialized countries to reduce emission reductions, in order to achieve the objective of the UNFCCC “to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.” In that regard, Canada, Japan and the European Union have already decided to halve their emissions by 2050, as outlined in the chairman’s report to the participants to the G8 Summit (which included participation from Brazil, China, India, Mexico and South Africa) held in June 2007 at Heiligendamm, Germany, although some analysts are calling for deeper targets still. The joint statement to that Summit also

recognizes the role of economic instruments, including carbon markets, to leverage the necessary investments in climate friendly technologies at large scale.

In its efforts to conclude an international agreement to combat climate change long term, the GOI should seek the sustainability of the CDM, as it has proven an effective tool to lower the costs meeting emission reduction commitments of industrialized countries, while meeting sustainable development objectives of host countries. However, it should be recognized that in its current form, it may be very difficult to scale up the CDM and bring it in line to meet the energy security needs of emerging economies, and the GOI should lead the way in proposing amendments or the development of new tools that would simplify the applicability of the CDM to entire sectors and/or large scale programs. Similarly, the GOI should promote the use of carbon offsets from developing countries in regional regimes such as the EU ETS and those emerging in the United States and elsewhere.

5.1.2. Require that all Public Investments, and Over Time, all Public “Operations” be Assessed for Carbon Finance Potential: The GoI could require that all public investments and, over time, all public “operations” are checked for their CDM potential. Similarly, the GOI should require all bilateral and multilateral donors to systematically assess their lending and non-lending portfolios in India, identify any opportunities for carbon finance and access the carbon market. The Climate Change Strategy under development provides a timely opportunity to articulate India’s approach to accessing carbon finance and related assistance in the second commitment period (post-2012).

5.1.3 Develop and Implement a National CDM Strategy: In order to address current market failures, the GOI should develop and implement a national CDM strategy, with the objective of increasing its market share in the carbon market. To that effect, the GOI should establish seek the assistance of domestic agencies to remove market barriers and review progress. For instance, each line ministry could be mandated to link carbon finance opportunities with specific programs, funds and initiatives that they manage. This would enable the MOUD for example to assess carbon finance opportunities in its Urban Renewal Mission, and the Ministry of Small Scale Industries to include revenue streams from carbon finance in its credit guarantee trust. As a priority, baseline and monitoring methodologies should be developed in the following sectors: energy (including rural electrification), transportation, urban and agricultural sectors. Ideally, the strategy would identify the appropriate partners, including bilateral and multilateral donors to implement various tasks, in accordance with their comparative advantage. It should for instance indicate how it wishes to engage with the World Bank on its two new carbon facilities, the Carbon Partnership Facility (CPF) and the Forest Carbon Partnership Facility (FCPF)¹¹.

¹¹ In September 2007, the Bank’s Board approved the launch of two new carbon facilities: (i) the Carbon Partnership Facility (CPF), which will purchase emissions reductions for at least 10 years beyond 2012 in its efforts to promote a shift towards investments in long-term, low-carbon technologies where otherwise greenhouse gas emissions would be locked in for decades to come; and (ii) a Forest Carbon Partnership Facility (FCPF) dedicated to reducing emissions from deforestation and degradation (REDD), setting the stage for future systems for performance-based payments that would provide incentives to slow deforestation and degradation. Consistent with the Bank’s role to further develop the carbon market, these

5.1.4 Create a Revolving Fund: In order to overcome the significant barrier related to the funding and development of carbon finance projects, the GOI should consider the establishment of a revolving fund that would facilitate the identification and development of carbon finance projects from PSUs, state and local governments, SMEs and other private sector initiatives. The fund would provide assistance for the development of project idea notes (PINs), PDDs, and baseline and monitoring methodologies, and be financed either through bilateral assistance or through a success fee model.

5.1.5 Increase Incentives for the Participation of the Public Sector in Carbon Finance: The identification and use of incentives may improve the use of carbon finance in the public sector, including: internal targets to increase revenues from the sale of emission reductions, public recognition of champions, incentives for both units and individuals that champion the use of carbon finance, etc.

5.1.6 Promote Market Access for SMEs: The Ministry of Small Scale Industries or the Bureau of Energy Efficiency should assess the carbon finance opportunities within each SME cluster, identify potential bundling agents, in particular from the financial sector, train them in carbon finance and the CDM, certify them as carbon finance intermediaries, and enable them to promote access to the carbon market for SMEs, including the showcasing of successful aggregation of projects.

5.1.7 Promote Price Transparency: Given the complexity of the market fundamentals, the GOI should strive to promote price transparency to inform sellers of CERs and enable them to adopt appropriate risk hedging strategies, i.e., by disseminating market data to the extent possible, and supporting the establishment of carbon auctions and trading platforms, which can contribute to an increase in price transparency and a reduction of transaction costs, i.e., legal costs, negotiation costs, due to standardized contracts, and perhaps some form of settlement guarantee.

5.1.9 The GoI Should Systematically Eliminate Tax Rules and Regulations that potentially conflict with the CDM incentive and create an enabling environment that is conducive to CDM projects and programs for entire sectors. That requires systematic integration of the CDM in development planning (which again requires a long-term CDM).

5.2 Actions Required of the Private Sector: The private sector has been the main driver for the success of the carbon market in India so far, and it has a significant role to play if India is to scale up its access to the market. Beyond advising governments on the interventions required to establish the proper enabling regulatory framework, the private sector should undertake the following:

5.2.1 Increase Aggregation in the SME Sector: the banking sector is challenged to take the lead in the bundling and aggregating small scale projects and programs into

two facilities are regime neutral, i.e., they will seek buyers for emission reductions from the regulated community under any international or regional regime, or from the growing voluntary market.

larger ones, given their intimate knowledge of project finance. Capacity building initiatives targeted at the banking sector, to demonstrate the potential for carbon finance and strategies to manage risks should be developed by the large industry associations such as FICCI and CII.

5.2.2 Adopt Corporate Strategies to Maximize Carbon Finance Revenues: In order to maximize carbon finance revenues, it is important to systematically appraise potential investment projects for their eligibility as carbon finance projects. The private sector is challenged to integrate CDM in project planning and systematically review each investment opportunity for carbon finance potential. It should become common practice to investigate the CDM potential of a project as part of the feasibility study, which would develop the baseline scenario (as the optimal business as usual scenario over time) and the optimal CDM project scenario (under some price assumptions).

5.2.3 Develop Financial Instruments that Take into Account Carbon Finance: the financial sector in particular should take the lead in understanding the opportunity of carbon finance, piloting financial engineering instruments that take into account carbon revenues and facilitating market penetration through the monetization of emission reduction purchase agreements. The banking sector, or appropriate brokers, could develop a standard CDM credit “made in India”, which would have the same features and risk regardless of the project source, and which could carry a delivery guarantee. The Indian banking sector would thus take over the due diligence that buyers will otherwise have to do – provided the guarantee is “solid”.

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