Journal of Management (JOM)
Volume 9, Issue 3, Sep-Dec 2022, pp. 37–77, Article ID: JOM_09_03_004
Available online at https://iaeme.com/Home/issue/JOM?Volume=9&Issue=3
ISSN Print: 2347-3940 and ISSN Online: 2347-3959
DOI: https://doi.org/10.17605/OSF.IO/GYUZK

CHALLENGES AND OPPORTUNITIES FOR SUSTAINABLE CLEAN ENERGY CDM PROJECTS IN INDIA - FINANCIAL PERSPECTIVE

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ABSTRACT

***Background**: The Clean Development Mechanism (CDM) has developed at an astonishing pace ever since 2002 and is well thought-out to have made optimistic hand-outs to the expansion of greenhouse-gas- reducing projects in rising nations. Taking into consideration its chronological implication as the primary effort of its kind and its existing success, a methodical assessment of its structure and its efficiency is the need of the hour.*

***Aim**: Aligned with this background, this case study intimately examines the existing system practices, barriers and challenges confronted by the CDM project developers in India in its implementation, especially focusing on the financing aspect. For the scrutiny, the author executes an all-embracing quantitative and financial analysis amplified by a descriptive study, on the basis of data of selected CDM projects.*

***Methodology:** Both primary & secondary sources are used to collect data.*

***Results/Findings:** The results of the case study put forward that the growth of CDM projects is enthused by positive economic, social and technical surroundings in host nations as well as encouraging CDM management. Further the case study found that financial performance of companies associated with CDM projects is increased with the CDM revenue and vice versa. The breakdown of most of the CDM projects is attributable to technological, financial and operational troubles at the early phase of project execution. Conclusion: Based on the results, the case wind up with policy proposals to improve the competence and the performance of the key players in the CDM market.This research will help decision makers, policy analysts, industries, banks for further research work and to all others those who have the potential to engage in CDM project activities.*

Key words: IRR, mitigation, carbon dioxide, greenhouse gases, adaptation.

Cite this Article: Renuka Deshmukh and Srinivas Subbarao Pasumarti, Challenges and Opportunities for Sustainable Clean Energy CDM Projects in India - Financial Perspective, *Journal of Management (JOM)*, 9 (3), 2022, pp. 37–77.
https://iaeme.com/Home/issue/JOM?Volume=9&Issue=3

1. CASE INTRODUCTION

BRIEF HISTORY OF FINANCING CDM PROJECTS

The Clean Development Mechanism (CDM) is one of the flexibility mechanisms defined in the Kyoto Protocol[1] that provides for emissions reduction projects which generate Certified Emission Reduction units which may be traded in emissions trading schemes.

The CDM is defined in Article 12 of the Protocol, and is intended to meet two objectives: (1) to assist parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC), which is to prevent dangerous climate change; and (2) to assist parties included in Annex I in achieving compliance with their quantified emission limitation and reduction commitments (greenhouse gas (GHG) emission caps). "Annex I" parties are those countries that are listed in Annex I of the treaty, and are the industrialized countries. Non-Annex I parties are developing countries[2].

Banks play a significant role in shifting investments to renewable energy production and energy efficiency solutions, and away from high-carbon and fossil fuel investments. Bank can integrate climate risk into overall client risk identification and assessment process and develop a set of assessment tools to determine carbon reduction options.

Challenges for the banking sector appears from diverse directions such as: regulations that are planned to limit GHG emissions, physical changes that take place due to climate change impacts, legal challenges to be brought on by insufficient governance, reputational fallout for companies due to corporate positions on climate change, and cutthroat pressures in the marketplace as production costs shift and products are substituted in response to the new reality of a carbon-constrained world[3]. Indeed, reports have been published forewarning of the budding exposures in all segments of the sector[4].

These challenges present new risks and opportunities for financial sector and for the financial service industry as well[5]. The sector will have to acclimatize internal policies, processes, products, and services, in order to meet the challenges that its clients face and to defend its own feasibility. At the same time, climate change will unlock new opportunities for the financial sector, one of which is carbon financing under Clean Development Mechanism (CDM).

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[1]**IPCC (2007)** Fourth Assessment Report. Intergovernmental Panel on Climate Change Secretariat. http://www.ipcc.ch/. Geneva, Switzerland.

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In summary, the carbon market has evolved from the early days of direct investments in emission reduction projects by a small number of leading governments and private sector companies, to a semi- mature market in which projects can draw from a range of different financing options, due to the existence of CERs as a globally recognized, tradable commodity.

2. MAIN ISSUES

Parties Involved in Financing a CDM Project

- **Project host**:The project host is the body providing the land, amenities or resources that are necessary to embark on the CDM project in the risingnation's location of the project. There may possibly be more than one project host – for instance, in case of a wind farm venture, single party may possess the land and another may set up and own the wind turbines. Project hosts may perhaps be persons, corporations, or government organizations.

- **CDM project developer**: The CDM venture developer is the bodyaccountable for driving the project all the way through the CDM project cycle. The project host may perhaps take on this position, or it might be endowed with by a particular CDM project developer corporation.
- **CER buyer**:In theory, any entity can obtain CERs from a project. Nonetheless, in order to be able to utilize the CERs for fulfillment under the Kyoto Protocol or any obligatory system associated to the Kyoto Protocol, the procurer of the CERs ought to either be an Annex I Party or
- be approved by an Annex I country Designated National Authority, in order to be able to transfer CERs from a CDM project into an account in the registry of the nation of the procurer.
- **Designated Operational Entity (DOE):** It's mandatory for the DOE to authenticate the project prior to registration as a CDM project, and to authenticate the emission cutback of a project preceding to issuance of CERs. fundamentally, it plays the task of autonomous assessor.
- **Designated National Authority (DNA):** The DNA of the rising nations in which the project is situated is required to approve the scheme (by issuing a Letter of Approval) prior to validation.
- **CDM Executive Board (EB):** The CDM Executive Board is accountable for managing the measures relating to the registration of ventures and issuance of CERs.

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[3]**Pearce (2015)** The Social Cost of Carbon, in Helm. Climate Change Policy UK: Oxford UniversityPress, chapter 5.

[4]**Lloyd's (2020)** Climate change—adapt or bust. 360 Risk Project Catastrophy Trends.

[5]**Kalia (2021)** Sustainability - The Way Ahead for Banking and Financial Institutions.Ernst and Young.

3. Types of Finance Available for a CDM Project

The CDM projects require finance during planning, construction and operation phase:

Planning phase:

- **Government tenders and carbon funds**: Which will often reimburse amount of these expenses in return for an agreement to procure few or the entire of the resultant CERs
- **Private sector CDM project developers**: Who may wrap fraction or the entire of the CDM- specific expenses in return for an agreement to buy a few or all of the consequential CERs
- **Project hosts:** Either public or private sector units which offer their own internal finances to build up projects with which they have a connection as, for instance, property-owner or fuel supply contributor.

Construction phase:

- **Lenders**: Who may offer limited recourse debt to moderately big projects with protected revenue inflows and fairly small risks or to other ventures with recourse to a monetarily well-built sponsor
- **Private sector CDM project developers**: capable of financing typically minor projects with their own equity.
- **Equipment suppliers:** Who may offer resources on rent or credit
- **CER buyers:** Who may give up-front payments adjacent to future CER deliveries

4. PAST AND CURRENT BUSINESS PERFORMANCE

Status of CDM projects (As on October 2015)

Exhibit I: Status of CDM Projects

Status of CDM projects in the project cycle	Number
At validation	**861**
Request for registration	9
Request for review	
Correction requested	
Under review	
Total in the process of registration	**9**
Withdrawn	63
Rejected by EB	272
Validation negative by DOE	267
Validation terminated by DOE	2096
Registered, no issuance of CERs	4834
Registered, CER issued	2837
Total registered	**7671**
Total number of different projects	11239
Replaced PDDs	1083
Total PDDs submitted	12322

Source:UNEP RisoeTheCDM / JI Pipeline Analysis and Database:http://cdmpipeline.org/

As of May 2021, **all over the world** total 8630 CDM projects are now included in the Pipeline, out of which major share is occupied by renewable energy sector i.e. 6128, excluding the 267 projects given a negative validation by DOEs. 7630 of the projects are

now registered and a further 14 are in the registration process. 2770 CDM projects have got CERs issued. (UNEP Risoe CDM/JI Pipeline Analysis and database)

In India, as of May 2021, total 2211 CDM projects are registered, out of which major share of 930 projects is occupied by wind energy followed by 231 Hydro Projects.

In the state of Maharashtra as of 31st December 2021, total 304 CDM projects are registered, out of which wind sector has prime share of 162 projects followed by 12 hydro projects. (http://cdmpipeline.org/publications/CDMStatesAndProvinces.xlsx)

5. CONFLICTS

PDD upgrading

- Necessity for enhanced excellence, apparent & inclusive certification of the projects for CDMsanction
- Elimination of shortages in the existing PDD development circumstances to decrease the threatof sanction procedure at DOE/ EB level
- Persuade internal capacity building of bigger companies, PSUs, organizations, chamber ofcommerce, industry associations, Co-ops

Low wakefulness level

- Public Sector Undertakings namely GAIL, SAIL, IOCL, etc. have not so far involved in CDM investments.
- Small and Medium Enterprises and bundling prospective have not been utilized to its fullest extent.
- Need to fill the gap between management and operational level
- Lack of knowledge with context to business opportunity associated with Programmatic CDM

Difficulties in incorporating CDM industry with core business

- Need for domestic capacity building programmes
- Guidance and training for staff handling CDM related activities.
- Conducting regular, licensed CDM executive's education programme at global level.
- Assimilating CDM into compulsory energy audits beneath the Energy Conservation Act of GoI

Policy concern

- Government's has a major role to play in organizing Carbon trade fairs or expos along with diverse bilateral /multilateral institutions.
- To fetch clearness in purchaser/vendor market
- To generate an equivalent podium for undersized, average and big vendors

Project outlay concern

- Bilateral CDM projects needs to be augmented with more foreign investment for project financial support

CDM under the Kyoto protocol intends at a cost-effective cutback of GHG emissions, technology know-how and capital movement from industrialized to emergent and developing countries [6].

[6]**Nagai (2020)** How Cost-effective are Carbon Emission Reduction under the Prototype Carbon Fund?Environmental Change Institute, University of Oxford.

The present execution of the CDM has been concerned and extensively questioned about (i) the environmental efficiency that relates to whether the CDM contributes to global greenhouse gas emission reductions[7,8,9,10,11,12,13,14,15]

(ii) restricted capacity to obtain financing for the fundamental greenhouse gas emission reduction activities, predominantly in the least developed countries, inadequate or no awareness of the CDM Modalities and Procedures among financial intermediaries in the CDM host countries, deficiency of enough approaches, tools and skills for CDM project evaluation or either are uneven and irregular to the skills in analogous institutions in developed countries, lack of experience in structuring arrangements for financing a project among potential project proponents[16].

(iii) its contribution to the sustainable growth goals in host nations as it's formerly framed in the Article 12 of the Kyoto Protocol[17,18,19,20,21,22,23]

(iv) the need to encourage equitable geographic allocation of the CDM project activities at regional and sub regional levels [24,25].

(v)the institutional arrangement of the CDM and connected hurdles in implementing CDM project activities like long project cycle, lead times and estimated CER creation, additionality argumentation, stakeholder involvement etc.[26 27 28 29 30 31]

(vi) sectoral allotment and windfall profits of projects that relates to the discrepancy of GHG reduction by CDM projects among sectoral emissions reductions potential [32 33] and high windfall profits/producer surplus of some project proponents and host countries as the costs of achieving some emission reduction have been very low[34 35];Kolshus, Hans H. et.al. (2001)

(vii) Lack of knowledge among projects entities, local banks and insurance companies [36 37].

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6. Corporate participation

Observing India's CDM scenario with context to corporate participation, it is found that the energy efficiency sector, including HFC, is producing the maximum CERs. Leading Indian companies including Tata, ITC, Reliance, Ambuja, Birla, Bajaj, GFL, HFL, NFIL etc emitting millions of tonnes of carbon dioxide into the environment receive attractive revenues in the appellation of 'clean development mechanism'.

Corporates engaged in the carbon trading are earning huge profits. Till early 2013, the Jindal group made 25-billion rupees from selling supposedly 'reduced emissions' (1.3-million CERs) at their steel plant in Karnataka. The Tata Motors sold 288,784 CERs from clean wind projects at 15.7 euros/CER in 2020. Tatas' sponge iron projects in Orissa are set to yield 45,762 CERs every year.

7. CONCLUSION

One of the challenges facing Clean Development Mechanism (CDM) projects today is their limited ability to secure financing for the underlying greenhouse gas emission reduction activities, particularly inthe least developed countries. Among the key reasons for this is the fact that most financial intermediaries in the CDM host countries have limited or no knowledge of the CDM Modalities and Procedures. Moreover, approaches, tools and skills for CDM project appraisal are lacking or are asymmetrical to the skills in comparable institutions in developed countries. Consequently, developing country financial institutions are unable to properly evaluate the risks and rewards associated with investing or lending to developers undertaking CDM projects, and therefore have, by-and-large, refrained from financing these projects. In addition, some potential project proponents lack experience in structuring arrangements for financing a project

TEACHING NOTE

Case synopsis

The premise of this case study is to understand the existing system, practices of commercial banks in Maharashtra for financing CDM projects and the major barriers and challenges confronted therein. It focuses on the capacity building measures and infrastructure required for banks to finance CDM projects. The case as well attempts to analyze the impact on the profitability of companies associated with CDM projects implemented in Maharashtra. How the influential factors like government measures, development of separate CDM Cell in banks, development of sustainable funds/products impact the execution of CDM projects?

Learning Objectives

1. To study the current scenario of CDM projects and examine the current financial structures of the CDM projects and the specific schemes implemented by financial institutions for financing the projects.
2. To analyze the challenges faced by financial institution.
3. Analyzing the profitability of select projects using suitable tools of financial analysis.

Assignment questions

1. What are the existing practices adopted by commercial banks in Maharashtra for financing CDM projects and the major barriers and challenges confronted therein?
2. What is the impact on the profitability of corporate associated with CDM projects in India?
3. Highlight the major areas in India where a focused technical assistance & capacity building activities needs to be developed for more CDM investments.

Teaching plan

The teaching plan included and comprised of the following points put forth below:

1. The brief history of global warming and the international developments that took place to mitigate the climate change.
2. The current scenario of CDM projects in India.
3. Financial analysis of 5 CDM projects in India to study the impact on the profitability of corporate associated with them. The financial data for analyzing the financial feasibility of CDM projects was obtained from secondary sources likehttps://cdm.unfccc.int/index.html and National CDM Authority Ministry of Environment and Forests, Government of India www.cdmindia.gov.in.
4. Analysis of existing practices of commercial banks in Maharashtra for financing CDM projects and the major barriers and challenges confronted therein with the help of primary data collected from 80 commercial banks in Maharashtra.
5. Recommendations for capacity building measures for increasing CDM investments in India.

Analysis (suggested/possible answers to assignment questions)

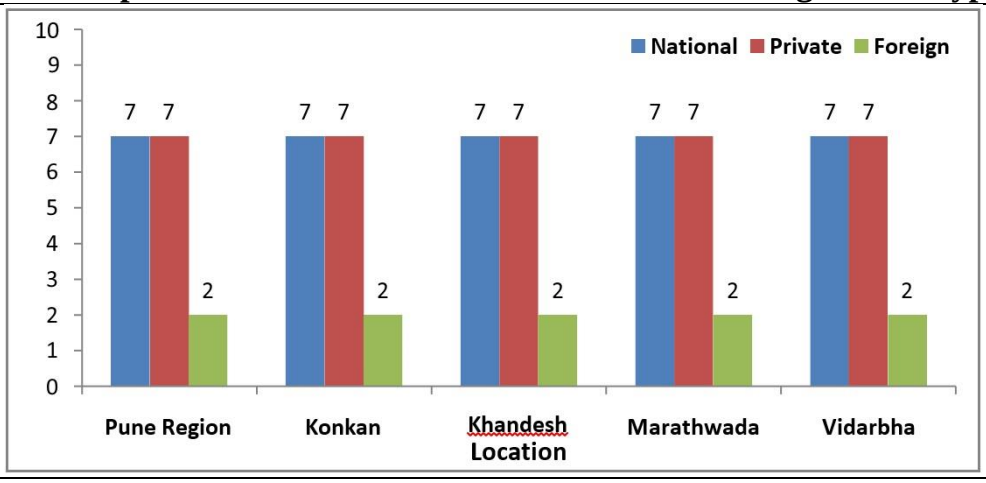
Exhibit II: Highlights of Selected projects							
#	Project No.	Type of project	Capacity (MW)	Cost of project (Rs. In lacs	Cost of Capital	IRR (w/o CDM revenue	IRR with CDM Revenue
1	796	Wind power	12	4881	10.91%	9.49%	12.18%
2	2770	Wind power	1.5	974	11.85%	8.35%	12.75%
3	3642	Wind power	67.5	11208	11.38%	10.41%	13.21%
4	3700	Wind power	13.75	7860	11.82%	9.34%	12.43%
5	3710	Wind power	6	3720	11.38%	1036%	13.89%
Source: https://cdm.unfccc.int/index.html							

Data Analysis of responses collected from managers of banks

Exhibit III:Distribution of location of banks according to their types						
Banks	Location					Total
	Desh ((Rest of Maharashtra)	Konkan	Khandesh	Marathwada	Vidarbha	
National	7 (43.8)	7 (43.8)	7 (43.8)	7 (43.8)	7 (43.8)	35 (43.8)
Private	7 (43.8)	7 (43.8)	7 (43.8)	7 (43.8)	7 (43.8)	35 (43.8)
Foreign	2 (12.4)	2 (12.4)	2 (12.4)	2 (12.4)	2 (12.4)	10 (12.4)
Total	**16 (100.0)**	**16 (100.0)**	**16 (100.0)**	**16 (100.0)**	**16 (100.0)**	**80 (100.0)**
Source: Statistical analysis						

Values are n (% of banks).

Exhibit IV: Graph: Distribution of location of banks according to their types



Source: Researchers own study

Comment: The information is collected from 5 major locations across Maharashtra (Viz. Pune region, Kokan, Khandesh, MarathwadaandVidarbha). A total of 16 banks (7 National, 7 Private

and 2 Foreign) were selected from each location. From each bank, the information was obtained from the concerned Manger/Representative through the validated and structured questionnaires.

Exhibit V: Distribution of designation of respondents

Banks	Designation of the Respondent			Total
	Administrative	Executive	Lower	
National	7 (21.2)	25 (58.1)	3 (75.0)	35 (43.8)
Private	18 (54.5)	16 (37.2)	1 (25.0)	35 (43.8)
Foreign	8 (24.2)	2 (4.7)	0	10 (12.5)
Total	**33 (100.0)**	**43 (100.0)**	**4 (100.0)**	**80 (100.0)**

Source: Researchers own study

Values are n (% of banks).

Comment: Table 2 shows the distribution of designation of respondents in each bank type. In general,majority of respondents were executives. Only 4 respondents had lower grade.

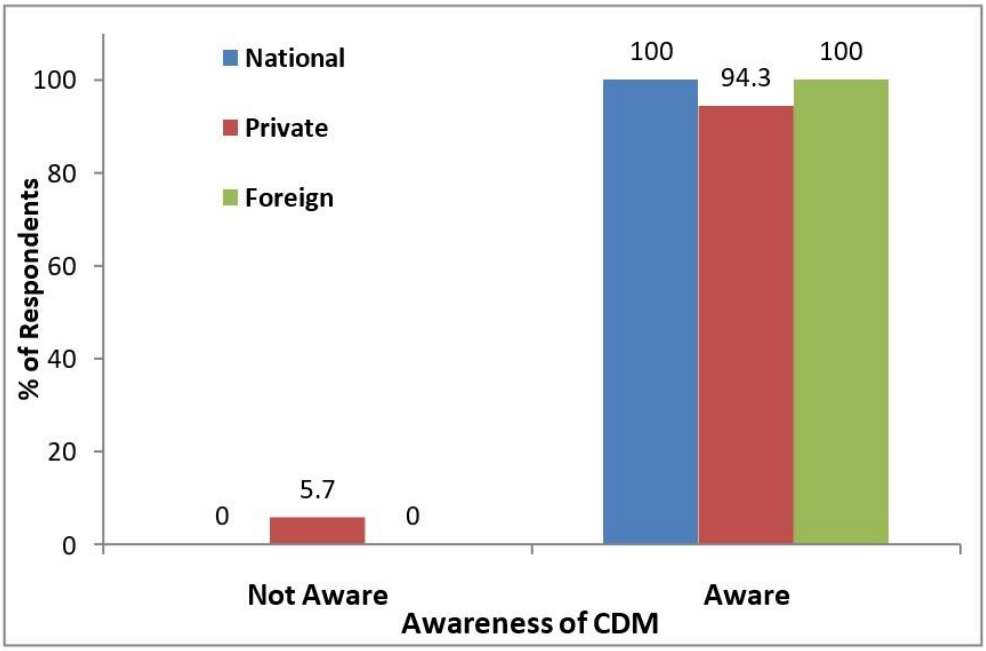
Exhibit VI: Distribution of awareness of CDM according to bank types

Banks	Awareness of CDM		Total
	Not Aware	Aware	
National	0	35 (100.0)	35 (100.0)
Private	2 (5.7)	33 (94.3)	35 (100.0)
Foreign	0	10 (100.0)	10 (100.0)
Total	**2 (2.5)**	**78 (97.5)**	**80 (100.0)**

Source: Researchers own study

Values are n (% of banks).

Exhibit VII: Distribution of awareness of CDM according to bank types



Source: Researchers own study

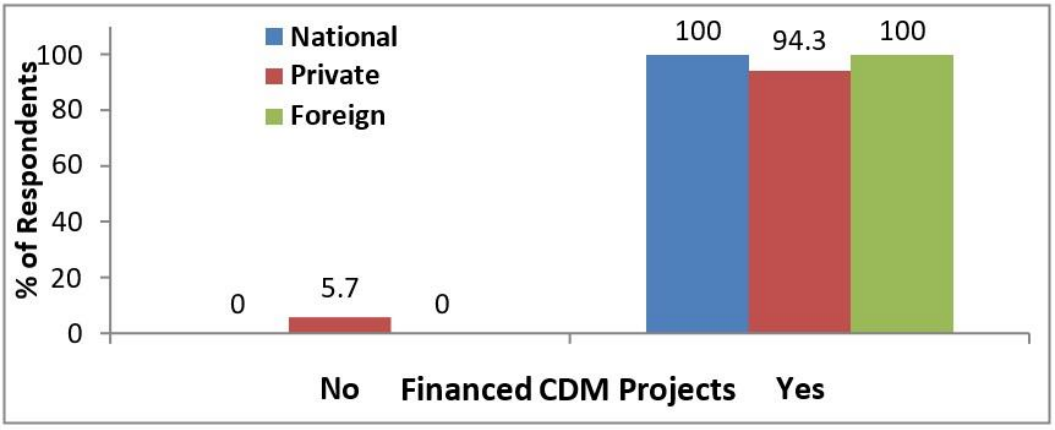
Comment: From table 3 it is understood that majority of respondents (78-97.5%) had awarenessregarding the CDM Projects. Only (2-2.5%) of respondents had no awareness.

Exhibit VIII: Distribution of banks and the status of financing CDM projects

Banks	Financed Projects	CDM	Total
	No	Yes	
National	0	35 (100.0)	35 (100.0)
Private	2 (5.7)	33 (94.3)	35 (100.0)
Foreign	0	10 (100.0)	10 (100.0)
Total	**2 (2.5)**	**78 (97.5)**	**80 (100.0)**

Source: Researchers own study

Exhibit IX: Distribution of banks and the status of financing CDM projects



Source: Researchers own study

Comment: From table 4 it is evident that (78 banks-97.5%) had history of financing CDM projects. Only 2banks (both private) did not finance CDM projects

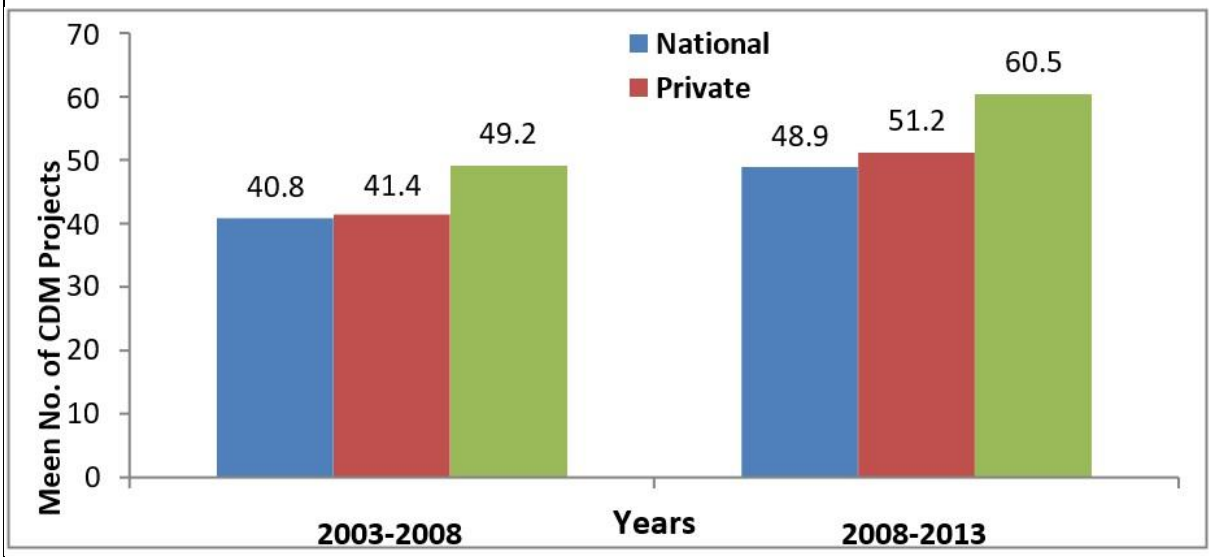
Exhibit X: Distribution of banks and the no. of CDM projects financed and rejected duringlast 10-years.

Banks	**2003 – 2008**		**2008 – 2013**	
	Sanctioned	**Rejected**	**Sanctioned**	**Rejected**
National (n=35)	40.8 ± 15.9	6.2 ± 4.2	48.9 ± 17.8	6.2 ± 3.4
Private (n=33)	41.4 ± 9.2	4.1 ± 1.1	51.2 ± 10.0	5.2 ± 1.1
Foreign (n=10)	49.2 ± 6.4	4.0 ± 0.7	60.5 ± 6.5	5.2 ± 1.4

Source: Researchers own study

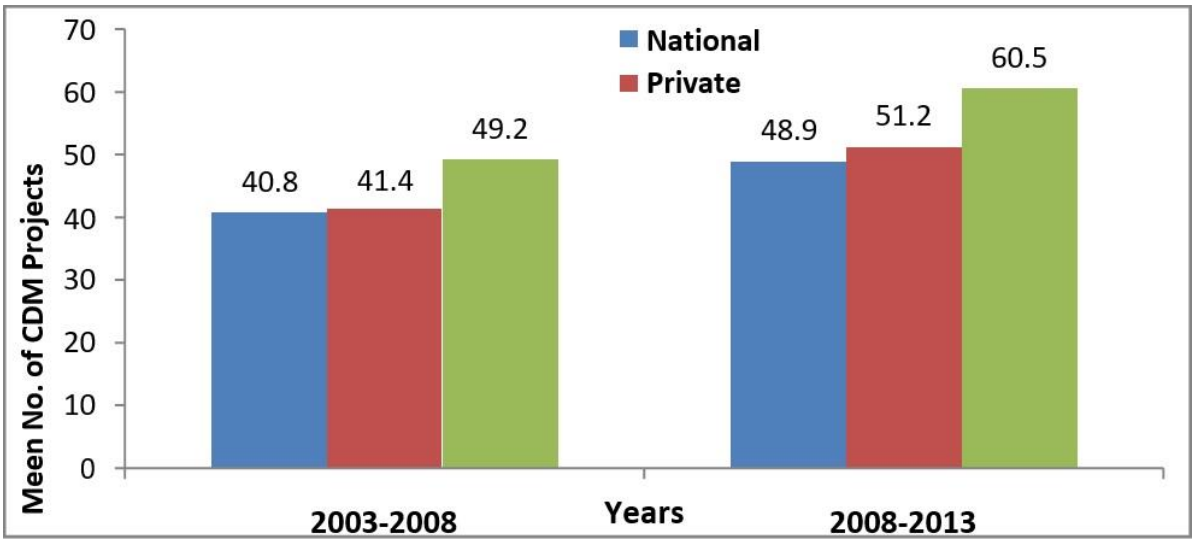
Values are Mean ± Standard Deviation.

Exhibit XI: Distribution of banks and the no. of CDM projects financed during last 10-years.



Source: Researchers own study

Exhibit XII: Distribution of banks and the no. of CDM projectsrejected during last 10 years.



Source: Researchers own study

Comment: Table 5 shows the average number of CDM projects financed (Sanctioned) and rejected during last 10 years. It is clear that foreign banks have financed higher number of projects than national and private banks.

Further it is important to note that number of projects sanctioned is more during 2008-13 than 2003-08 for all banks, which clearly indicates higher awareness of CDM amongst banks recently than what it was in the past.

Exhibit XIII: Distribution of banks and the type of CDM projects financed.

Banks	Type of Projects					Total
	Ind. sector energy efficiency	Co- gen/Renewable energy	Agriculture and livestock	Municipal solid waste management	Fuel Switch / Transport	
National	30 (85.7)	35 (100.0)	28 (80.0)	26 (74.3)	22 (62.9)	35 (100.0)
Private	30 (90.9)	32 (97.0)	23 (69.7)	23 (69.7)	22 (66.7)	33 (100.0)
Foreign	10 (100.0)	10 (100.0)	7 (70.0)	6 (60.0)	8 (80.0)	10 (100.0)

Source: Researchers own study

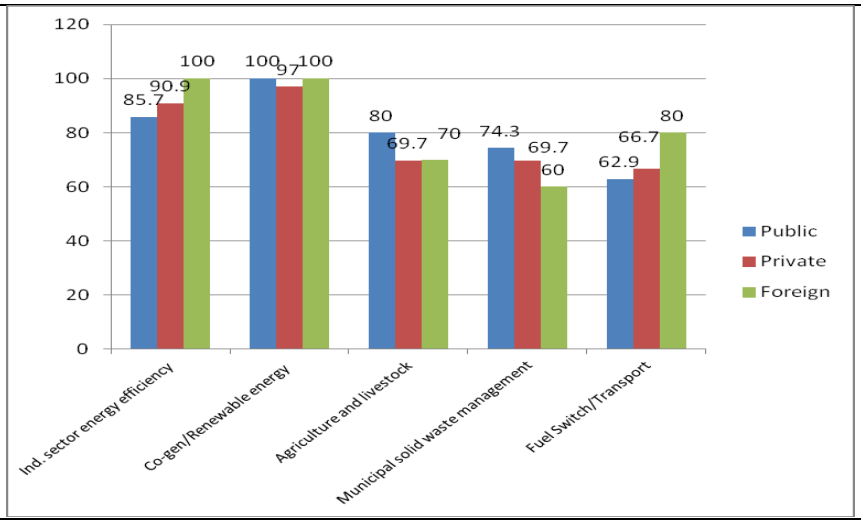
Values are n (% of banks).

Exhibit XIV: Chi-Square value

Banks	Chi-Square value	DF	P-value
National	16.938	4	0.002 (S)
Private	15.593	4	0.004 (S)
Foreign	8.672	4	0.070 (NS)

S: Statistically Significant, NS: Statistically Non-Significant.

Exhibit XV: Distribution of banks and the type of CDM projects financed.



Source: Researchers own study

Comment: Shows the distribution of banks and the type of CDM projects that they have financed. It is important to note that most of the banks have preferred financing industrial sector efficiency projects and co-generation energy renewable projects. Relatively lesser proportion of banks has preferred to finance fuel switch/Transport related CDM projects. The distribution of type of CDM projects sanctioned differ statistically significantly for national and private banks (P-value <0.05 for both). The distribution of type of projects sanctioned did not differ significantly for foreign banks (P-Value >0.05).

Exhibit XVI: Distribution of banks and the phase of CDM projects financed.

Banks	Phase of the Projects			Total
	Planning	Construction	Operation	
National	31 (88.6)	32 (91.4)	15 (42.9)	35 (100.0)
Private	29 (87.9)	27 (81.8)	11 (33.3)	33 (100.0)
Foreign	10 (100.0)	10 (100.0)	10 (100.0)	10 (100.0)

Source: Researchers own study

Values are n (% of banks).

Exhibit XVII: Chi-Square value

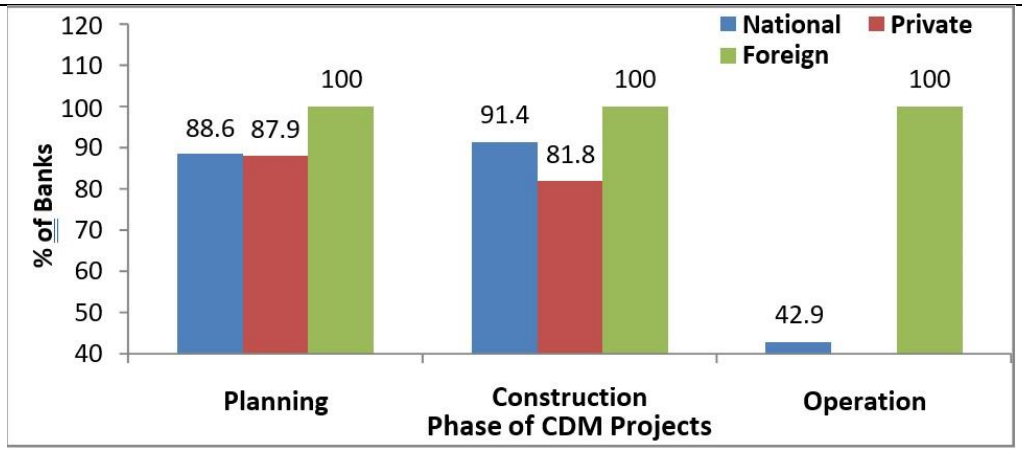
Banks	Chi-Square value	DF	P-value
National	27.222	2	0.001 (S)
Private	26.966	2	0.001 (S)
Foreign	0.000	2	0.999 (NS)

Source: Researchers own study

S: Statistically Significant, NS: Statistically Non-Significant.

Comment: Table 7 shows the distribution of banks and the phase of CDM projects financed. Most of the national and private banks prefer to finance CDM projects during planning and construction phase. It is interesting to note that all of the banks preferred financing the projects at all phases of the project. The distribution of phases for finance differed significantly for national and private banks (P-Value<0.001 for both). The distribution of phases for finance did not differ significantly for foreign banks (P— Value>0.05).

Exhibit XVIII: Distribution of banks and the phase of CDM projects financed.



Source: Researchers own study

Exhibit XIX: Distribution of banks and the duration of sanctioning

Banks	Duration of Sanctioning Project			Total
	Less than 1 Month	1 to 3 Months	More than 3 Months	
National	30 (85.7)	5 (14.3)	0	35 (100.0)
Private	23 (69.7)	10 (30.3)	0	33 (100.0)
Foreign	10 (100.0)	0	0	10 (100.0)

Source: Researchers own study

Values are n (% of banks).

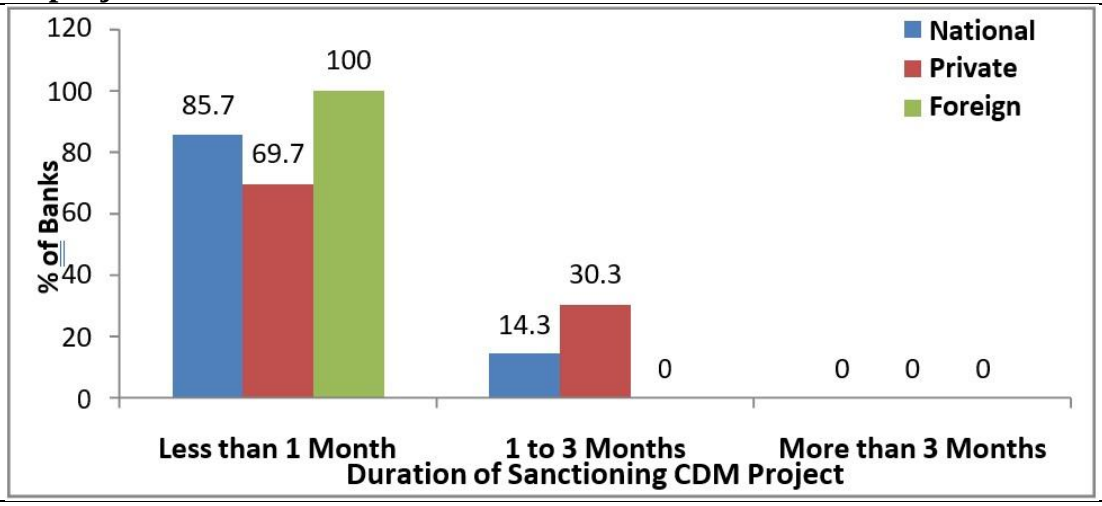
Exhibit XX: Chi Square value

Banks	Chi-Square value	DF	P-value
National	66.429	2	0.001 (S)
Private	36.273	2	0.001 (S)
Foreign	30.00	2	0.001 (S)

Source: Researchers own study

S: Statistically Significant, NS: Statistically Non-Significant

Exhibit XXI: Graph: Distribution of banks and the duration of sanctioning CDM projects



Source: Researchers own study

Comment: Table 8 shows the distribution of banks and the duration of sanctioning cdm projects. Most of the banks (national, private and foreign) take less than 1 month duration for sanctioning cdm projects. A few national and private banks (5 national and 10 private) took 1-3 months duration for sanctioning the projects. None took more than 3 months duration for sanctioning the projects. The distribution of duration of sanctioning projects differ significantly for all banks (p-value<0.001 for all banks).

Exhibit XXII: Distribution of banks and the problems faced during financing CDM projects.

Problems faced	**Banks**			Total
	National	**Private**	**Foreign**	
Regulations	4.22 ± 0.43	4.42 ± 0.23	4.50 ± 0.0	4.34 ± 0.34
In-House Expertise	3.45 ± 0.53	3.32 ± 0.30	3.00 ± 0.0	3.34 ± 0.43
Issues of Proposal	4.36 ± 0.41	4.19 ± 0.61	4.50 ± 0.0	4.30 ± 0.49
Planning Phase Risk	4.30 ± 0.39	3.70 ± 0.72	4.25 ± 0.26	4.03 ± 0.62
Construction Phase Risk	4.77 ± 0.43	4.46 ± 0.78	4.80 ± 0.42	4.64 ± 0.62
Operation Phase Risk	3.97 ± 1.62	3.57 ± 1.52	4.90 ± 0.32	3.91 ± 1.52
Cost Concern	4.14 ± 0.64	3.52 ± 0.85	4.90 ± 0.22	3.97 ± 0.84

Source: researchers own study

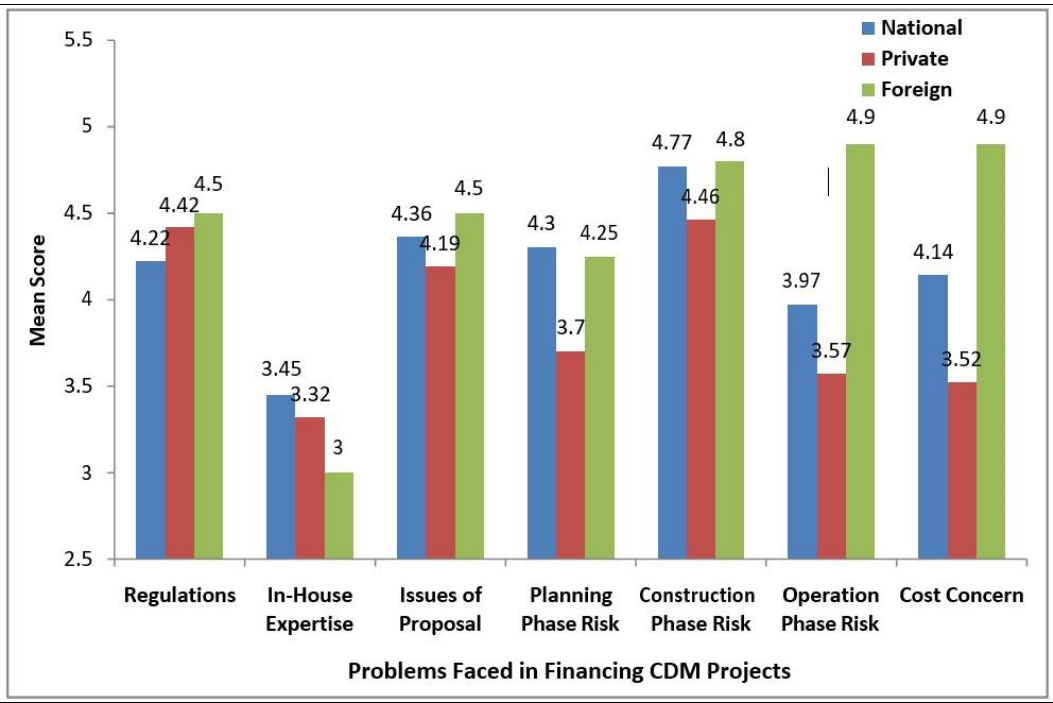
Values are mean ± standard deviation. Higher the mean score higher the impact of the corresponding problem/factor and vice- versa.

Exhibit XXIII: F-Value

Problems faced	F-value (ANOVA)	DF (Between groups)	P-value (ANOVA)
Regulations	4.745	2	0.011 (S)
In-House Expertise	4.757	2	0.011 (S)
Issues of Proposal	2.041	2	0.137 (NS)
Planning Phase Risk	11.301	2	0.001 (S)
Construction Phase Risk	2.747	2	0.070 (NS)
Operation Phase Risk	3.187	2	0.047 (S)

Source: researchers own study

Exhibit XXIV: Distribution of banks and the problems faced during financing CDM projects



Source: Researchers own study

Comment: Table 9 shows average level of perspective regarding problems faced during financing cdm projects for all bank types. the average score of regulations, in-house expertise, planning phase risk, operation phase risk and cost concern differed significantly across 3 types of banks (p-value<0.05 for all). the average score of issues of proposal and construction phase did not differ significantly across 3 types of banks. in other words, issues regarding proposal and issues regarding financing the projects at construction phase were similarly distributed

between all banks. it is important to note that operation phase risk and cost concern were major factors for foreign banks.

Exhibit XXV: Distribution of banks and the recommendations to ensure smooth financing process of CDM projects				
Recommendation Scores	**Banks**			**Total**
	National	**Private**	**Foreign**	
Regulations	4.52 ± 0.23	4.22 ± 0.62	4.57 ± 0.39	4.39 ± 0.48
In-House requirements	4.43 ± 0.32	4.22 ± 0.38	4.02 ± 0.44	4.29 ± 0.38
Planning phase	4.49 ± 0.22	4.28 ± 0.33	4.04 ± 0.21	4.34 ± 0.31
Construction Phase	4.46 ± 0.43	4.07 ± 0.63	4.25 ± 0.26	4.26 ± 0.54
Operational Phase	3.90 ± 0.58	3.97 ± 0.80	4.00 ± 0.58	3.94 ± 0.68
Source: Researchers own study				

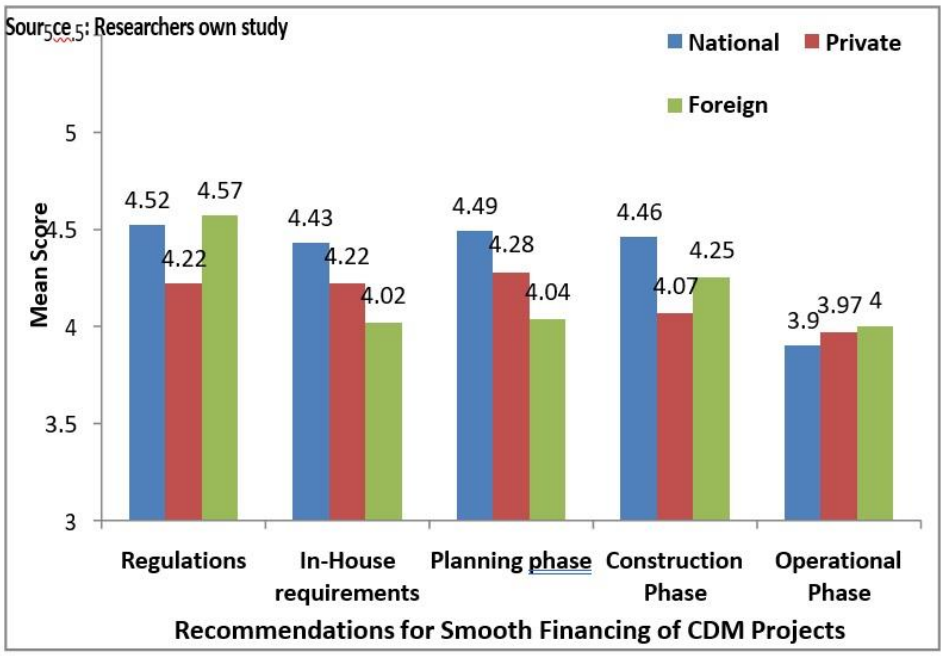
Values are Mean ± Standard Deviation. Higher the mean score higher the impact of the corresponding factor and vice-versa.

Exhibit XXVI: F Value			
Problems faced	**F-value**	**DF (Between groups)**	**P-value (ANOVA)**
Regulations	4.696	2	0.012 (S)
In-House requirements	6.055	2	0.004 (S)
Planning phase	12.557	2	0.001 (S)
Construction Phase	4.921	2	0.010 (S)
Operational Phase	0.133	2	0.876 (NS)
Source: Researchers own study			

S: Statistically Significant, NS: Statistically Non-Significant.

Comment: Table 10 shows average level of perspective regarding recommendations in smooth financing of CDM projects. The average score of recommendations regarding regulations, in-house requirements, planning phase, construction phase differed significantly across 3 types of banks (P-value<0.05 for all). The average score for recommendations regarding operation phase did not differ significantly across 3 types of banks (P-value>0.05).

Exhibit XXVII: Distribution of banks and the recommendations to ensure smooth inancing process of CDM projects



Source: Researchers own study

Exhibit XXVIII: Distribution of sustainable finance / low carbon products / services that the banks offer

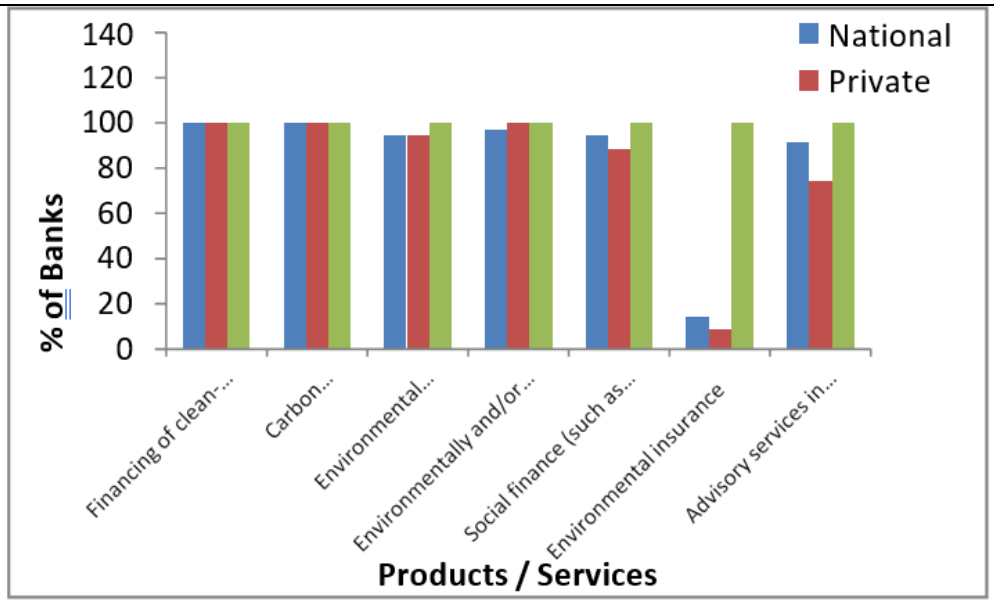
	National	Private	Foreign	
Financing of clean- tech/ renewable/ energy efficiency	35 (100.0)	35 (100.0)	10 (100.0)	80 (100.0)
Carbon sales, trading, and origination	35 (100.0)	35 (100.0)	10 (100.0)	80 (100.0)
Environmental infrastructure funds	33 (94.3)	33 (94.3)	10 (100.0)	76 (95.0)
Environmentally and/or socially responsible investment (e.g. responsible investment funds, sustainability indices)	34 (97.1)	35 (100.0)	10 (100.0)	79 (98.8)
Social finance (such as microfinance, SME financing, rural lending, impact investments)	33 (94.3)	31 (88.6)	10 (100.0)	74 (92.5)
Environmental insurance	5 (14.3)	3 (8.6)	10 (100.0)	18 (22.5)
Advisory services in relation to sustainable finance products/services	32 (91.4)	26 (74.3)	10 (100.0)	68 (85.0)

Source: researchers own study

Exhibit XXIX: Chi square value			
Products / Services	**Chi-Square value**	**DF**	**P-value**
Financing of clean-tech/renewable/energy efficiency	0	2	0.999 (NS)
Carbon sales, trading, and origination	0	2	0.999 (NS)
Environmental infrastructure funds	0.602	2	0.740 (NS)
Environmentally and/or socially responsible investment (e.g. responsible investment funds, sustainability indices)	1.302	2	0.522 (NS)
Social finance (such as microfinance, SME financing, rural lending, impact investments)	1.75	2	0.417 (NS)
Environmental insurance	39.693	2	0.001 (S)
Advisory services in relation to sustainable finance products/services	6.05	2	0.049 (S)
Source: Researchers own study			

S: Statistically Significant, NS: Statistically Non-Significant

EXHIBIT XXX: Distribution of sustainable finance / low carbon products / services that the banks offer



Source: Researchers own study

Comment: The distribution of products of services such as financing of clean-tech, carbon sales, infrastructure funds, sustainable indices, social finance did not differ significantly across 3 types of banks(p-value>0.05 for all). The distribution of products related to insurance and advisory services differed significantly across 3 types of banks (p-value<0.05 for both).

CAPACITY BUILDING MEASURES

1. **Banks and financial institutions:** Training should be provided to all the concerned authorities, employees, staff handling Climate change and CDM related matters. It may be noted that all the major private banks have their well-established staff training colleges. The bigger banks like SBI group, Bank of India etc. have an elaborate training infrastructure. The RBI has in addition established a Banker's Training College. There are also some specialized institutions like National Institute for Bank Management at Pune. All these institutions could be networked into training programmes directed at informing them trends in risk management tools, climate change related risks to their portfolios in the light of future scenario of targets, market mechanisms – CDM in particular and also project structuring for qualification as CDM. The banks have been looking for investments into the clean energy and technology projects. It may be worthwhile for the bilateral agencies to develop programs for the bank officials at various levels from operating level to policy/decision making levels. Lastly, banks lack a database of CDM statistics, lending amounts and record of customers to whom carbon finance is provided. Hence there is a need to maintain such database for future reference.

2. Industry: While Indian industry is the most informed among stakeholders, there still few issues on which capacity building and institutional links need to be established. There is a high level of confusion between project level emission reduction and emission trading. Also, some of the stakeholders feel that GOI may be in a position to control the CER price. Some institutions especially research institutions and GOI ministries still feel that social upliftment/community welfare, programmes can directly qualify for CDM investments. All these misconceptions need to be removed. Also, the understanding of sustainable development aspects and extent of need for their quantification needs to be clarified. Similarly, the misconceptions about Technology Transfer, which is confused with cross border transfer of advanced technology need be cleared. One more aspect where awareness needs to be created is the operational mechanism for the CDM. It could delve into issues like institutional framework needed for affecting the CER registration and transfer at both national level and the UNFCCC level. The latter issues would also involve the government stakeholders. Moreover, sectorally specialized project document preparation training courses are crucial as baseline and monitoring rules will differ considerably according to project types.

GOVERNMENT AND REGULATORY BODIES:

1. Awareness creation among additional concerned ministries: So far only key ministries like MOEF, MNES, MOP have been involved in debates on climate change. Many other ministries and organizations which are concerned with the subject of climate change are Ministries of Urban and rural Development, Agriculture, Industry, Commerce, Chemicals and Fertilizers, Petroleum and Natural Gas and organizations like CERC, CEA and CPCB. Specialized training/awareness building programs need to be prepared and delivered so as to enable the GOI to facilitate CDM investment in the country. The program should also inform about limitations of CDM, so as not be viewed as a solution to all problems.

2. Awareness creation among state level stakeholders: As described earlier, several state level organizations play an important role in preparation of a CDM project. Some of these are Transmission, Distribution companies, SERCs in the electricity generation for grid projects, municipalities/urban local bodies and state urban development ministries for urban solid waste and transport projects, irrigation and town planners etc. The understanding of the climate change regime and CDM is slowly percolating to these stakeholders, especially in the states which are proactive. It is essential to reach these in a systematic manner through properly designed programs. While the RE projects selling power may like to receive the best possible tariff and also keep the additional benefits of CDM investments, a balance must be arrived so as to ensure that the environmentally benign power does not come at a very high cost to the consumer.

TEACHING NOTE EXHIBITS

Financial analysis of selected CDM projects

Project 1:

12 MW Bundled Wind Power Project in Tenkasi, Tamilnadu (0796)

Brief Description

The project activity is the installation of 16 Wind Electric Generators (WEGs) in Tenkasi of Tirunelveli District in Tamil Nadu, Southern India.

Exhibit XXXI: Financial analysis without CDM revenue (Rs. in Lacs)							
		2003	**2004**	**2005**	**2006**	**2007**	**2008**
1	**Total revenue (without CDM)**	927	927	927	927	927	927
2	**Less: Operational Cost**						
	Operation and Maintenance Cost		71	76.1	81.6	87.4	93.7
	--Insurance	18.3	18.3	18.3	18.3	18.3	18.3
	Total Expenses	18.3	89.3	94.4	99.9	105.3	112
3	PBIDT (1-2)	909	838	833	827	821	815
4	Depreciation	244	244	244	244	244	244
5	Interest	244	244	195	147	98	49
6	PBT [3-(4+5)]	420	349	393	436	479	522
7	Tax	33	27	31	34	38	41
8	**PAT** (6-7)	387	322	362	402	442	481
9	Add Depreciation	244	244	244	244	244	244
10	**Net Cash Accruals (Cash Inflow)** (8+9)	631	566	606	646	686	725
11	**Less: Use of funds (Cash Outflow)**						

	Capital Expenditure (Debt- 1921 + Equity- 2961 = **4882**)						
	Repayment of term loan		592	592	592	592	592
	Total Cash Outflow:		592	592	592	592	592
12	Surplus/Deficit (10-11)	631	-26	14	54	94	133
Source: Financial statement of the project							

Exhibit XXXI:Financial analysis withoutCDM revenue (Rs. in Lacs) ..Continue							
		2009	**2010**	**2011**	**2012**	**2013**	**2014**
1	**Total revenue (without CDM)**	927	927	927	927	927	927
	Less: Operational Cost						
	Operation and Maintenance Cost	100.5	107.7	115.4	123.7	132.6	142.1
	--Insurance	18.3	18.3	18.3	18.3	18.3	18.3
	Total Expenses	112	118.7	126	133.7	142	150.9
3	PBIDT (1-2)	808	801	793	785	776	766
4	Depreciation	244	244	244	244	244	244
5	Interest						
6	PBT [3-(4+5)]	564	557	549	541	532	522
7	Tax	44	44	43	42	42	41
8	**PAT**(6-7)	520	513	506	498	490	481
9	Add Depreciation	244	244	244	244	244	244
10	**Net Cash Accruals (Cash Inflow)** (8+9)	764	757	750	742	734	725
	Less: Use of funds (Cash Outflow)						
	Capital Expenditure (Debt- 1921 + Equity- 2961 = **4882**)						
	Repayment of term loan						
	TotalCash Outflow:						
12	Surplus/Deficit (10-11)	764	757	750	742	734	725
	IRR Without CDM revenue						9.49%
Source: Financial statement of the project							

Exhibit XXXII: Financial analysis with CDM revenue (Rs. in Lacs)							
		2003	**2004**	**2005**	**2006**	**2007**	**2008**
1	**Total revenue (without CDM in lacs)**	927	927	927	927	927	927
	CDM Revenue	158	158	158	158	158	158
	Total revenue (with CDM revenue in lacks)	1085	1085	1085	1085	1085	1085
2	**Less:Operational Cost**						
	-- Operation and Maintenance Cost		71	76	82	87	94
	--Insurance	18	18	18	18	18	18
	Total Expenses	18	89	94	100	106	112
3	PBIDT (1-2)	1066	995	990	985	979	973
4	Depreciation	244	244	244	244	244	244
5	Interest	244	244	195	147	98	49
6	PBT [3-(4+5)]	578	507	551	594	637	680
7	Tax	45	40	43	47	50	53
8	**PAT**(6-7)	533	467	508	548	587	626
9	Add Depreciation	244	244	244	244	244	244
10	**Net Cash Accruals (Cash Inflow)**(8+9)	777	711	752	792	831	871
11	**Less: Use of funds (Cash Outflow)**						
	Capital Expenditure (Debt- 1921 + Equity- 2961 = **4882**)						
	Repayment of term loan		592	592	592	592	592
	Total Cash Outflow:		592	592	592	592	592
12	Surplus/Deficit (10-11)	777	119	160	200	239	278
Source: Financial statement of the project							

Exhibit XXXII:Financial analysis with CDM revenue (Rs. in Lacs)….Continue							
		2009	**2010**	**2011**	**2012**	**2013**	**2014**
1	**Total revenue (without CDM in lacs)**	927	927	927	927	927	927
	CDM Revenue	158	158	158	158	158	158
	Total revenue (with CDM revenue in lacks)	1085	1085	1085	1085	1085	1085
2	**Less:Operational Cost**						
	Operation and Maintenance Cost	100	108	115	124	133	142
	--Insurance	18	18	18	18	18	18
	Total Expenses	119	126	134	142	151	160
3	PBIDT (1-2)	966	959	951	943	776	766
4	Depreciation	244	244	244	244	244	244
5	Interest						
6	PBT [3-(4+5)]	722	715	707	699	532	522
7	Tax	57	56	55	55	42	41
8	**PAT** (6-7)	665	659	652	644	490	481
9	Add Depreciation	244	244	244	244	244	244
10	**Net Cash Accruals (Cash Inflow)** (8+9)	909	903	896	888	734	725
11	**Less: Use of funds (Cash Outflow)**						
	Capital Expenditure (Debt- 1921 + Equity- 2961 = **4882**)						
	Repayment of term loan						
	TotalCash Outflow:						
12	Surplus/Deficit (10-11)	909	903	896	888	734	725
	IRR With CDM revenue						12.18%
Source: Financial statement of the project							

Without considering the CDM revenues for the above project the IRR works out to 9.49% and with CDM revenues, it works out to 12.18%. The cost of capital for the given capital structure is 10.91% and hence the project is viable only after considering CDM revenues.

Project 2:

1.5 MW Grid connected Wind Electricity Generation at Tirunelveli District, Tamilnadu, India by Kallam

Agro Products and Oils Private Limited (2770)

Brief Description

- The project activity is to establish a 1.5 MW Wind Electric Generator (WEG) in Tirunelveli District, Tamilnadu and export the electricity generated to the State grid the Tamil Nadu Electricity Board.

Exhibit XXXIII: Financial analysis without CDM revenue (Rs. in Lacs)							
		2003	**2004**	**2005**	**2006**	**2007**	**2008**
1	**Total revenue (without CDM)**	24.52	24.52	24.52	24.52	24.52	24.52
2	**Less:Operational Cost**						
	Operation and Maintenance Cost	1.07	1.07	1.07	1.07	1.07	1.12
	--Insurance		0.11	0.11	0.11	0.11	0.11
	Administration and General Overheads	0.3	0.32	0.33	0.35	0.36	0.38
	--Interest on term loan	8.26	7.38	6.2	5.02	3.84	2.66
	--Depreciation	4.3	4.3	4.3	4.3	4.3	4.3
	Total Expenses	13.93	13.17	12.01	10.85	9.68	8.57
6	**PBT** [1-2]	10.59	11.35	12.51	13.67	14.84	15.94
7	Tax				1.37	1.48	1.59
8	**PAT** (3-4)	10.59	11.35	12.51	12.31	13.35	14.35
9	Add Depreciation	4.3	4.3	4.3	4.3	4.3	4.3
10	**Net Cash Accruals (Cash Inflow)** (5+6)	14.89	15.65	16.81	16.61	17.65	18.65
	Less: Use of funds (Cash Outflow)						
	Repayment of term loan	5.13	10.26	10.26	10.26	10.26	10.26
	Interest	8.26	7.38	6.2	5.02	3.84	2.66
	Total Cash Outflow:	13.39	17.64	16.46	15.28	14.1	12.92
12	Surplus/Deficit (10-11)	1.5	(1.99)	0.35	1.33	3.55	5.73
Source: Financial statement of the project							

Exhibit XXXIII:Financial analysis without CDM revenue (Rs. in Lacs)…Continue							
		2009	**2010**	**2011**	**2012**	**2013**	**2014**
1	**Total revenue (without CDM)**	24.52	24.52	24.52	24.52	24.52	24.52
2	**Less:<u>Operational Cost</u>**						
	-- Operation and Maintenance Cost	1.18	1.24	1.3	1.37	1.44	1.51
	--Insurance	0.11	0.11	0.11	0.11	0.11	0.11
	--Administration and General Overheads	0.4	0.42	0.44	0.47	0.49	0.51
	--Interest on term loan	1.48	0.44				
	--Depreciation	4.3	4.3	4.3	4.3	4.3	4.3
	<u>Total Expenses</u>	7.47	6.52	6.16	6.24	6.34	6.43
6	**PBT**[1-2]	17.05	18	18.36	18.27	18.18	18.09
7	Tax	1.7	1.8	1.84	1.83	1.82	1.81
8	**PAT**(6-7)	15.34	16.2	16.53	16.45	16.36	16.28
9	Add Depreciation	4.3	4.3	4.3	4.3	4.3	4.3
10	**Net Cash Accruals (Cash Inflow)**(8+9)	19.64	20.5	20.83	20.75	20.66	20.58
11	**Less: Use of funds (Cash Outflow)**						
	Repayment of term loan	10.26	7.7				
	Interest	1.48	0.44				
	Total C<u>ash Outflow</u>:	11.74	8.14				
12	Surplus/Deficit (10-11)	7.91	12.36	20.83	20.75	20.66	20.58
	IRR Without CDM revenue						8.35%
Source: Financial statement of the project							

Exhibit XXXIV: Financial analysis with CDM revenue (Rs. in Lacs)							
		2003	**2004**	**2005**	**2006**	**2007**	**2008**
1	Total revenue (without CDM in lacks)	24.52	24.52	24.52	24.52	24.52	24.52
2	CDM Revenue	5.7	5.7	5.7	5.7	5.7	5.7

3	**Total revenue (with CDM revenue in lacks)**	30.21	30.21	30.21	30.21	30.21	30.21
4	**Less:Operational Cost**						
	Operation and Maintenance Cost	1.07	1.07	1.07	1.07	1.07	1.12
	--Insurance		0.11	0.11	0.11	0.11	0.11
	Administration and General Overheads	0.3	0.32	0.33	0.35	0.36	0.38
	--Interest on term loan	8.26	7.38	6.2	5.02	3.84	2.66
	--Depreciation	4.3	4.3	4.3	4.3	4.3	4.3
	Total Expenses	13.93	13.17	12.01	10.85	9.68	8.57
5	**PBT**[3-4]	16.28	17.04	18.2	19.37	20.53	21.64
6	Tax	1.3	1.36	1.46	1.55	1.64	1.73
7	**PAT**(5-6)	14.98	15.68	16.75	17.82	18.89	19.91
8	Add Depreciation	4.3	4.3	4.3	4.3	4.3	4.3
9	**Net Cash Accruals (Cash Inflow)** (7+8)	19.28	19.98	21.05	22.12	23.19	24.21
10	**Less: Use of funds (Cash Outflow)**						
	Repayment of term loan	5.13	10.26	10.26	10.26	10.26	10.26
	Interest	8.26	7.38	6.2	5.02	3.84	2.66
	Total Cash Outflow:	13.39	17.64	16.46	15.28	14.1	12.92
11	Surplus/Deficit (9-10)	5.89	2.34	4.59	6.84	9.09	11.29
Source: Financial statement of the project							

Exhibit XXXIV: Financial analysis with CDM revenue (Rs. in Lacs) …Continue

		2009	**2010**	**2011**	**2012**	**2013**	**2014**
1	Total revenue (without CDM in lacks)	24.52	24.52	24.52	24.52	24.52	24.52
2	CDM Revenue	5.7	5.7	5.7	5.7	5.7	5.7
3	**Total revenue (with CDM revenue in lacks)**	30.21	30.21	30.21	30.21	30.21	30.21
4	**Less: Operational Cost**						
	-- Operation and Maintenance Cost	1.18	1.24	1.3	1.37	1.44	1.51

	--Insurance	0.11	0.11	0.11	0.11	0.11	0.11
	--Administration and General Overheads	0.4	0.42	0.44	0.47	0.49	0.51
	--Interest on term loan	1.48	0.44				
	--Depreciation	4.3	4.3	4.3	4.3	4.3	4.3
	Total Expenses	7.47	6.52	6.16	6.24	6.34	6.43
5	**PBT** [3-4]	22.74	23.7	24.06	23.97	23.88	23.78
6	Tax	1.82	1.9	1.92	1.92	1.91	1.9
7	**PAT**(5-6)	20.92	21.8	22.13	22.05	21.97	21.88
8	Add Depreciation	4.3	4.3	4.3	4.3	4.3	4.3
9	**Net Cash Accruals (Cash Inflow)**(7+8)	25.22	26.1	26.43	26.35	26.27	26.18
10	**Less: Use of funds (Cash Outflow)**						
	Repayment of term loan	10.26	7.7				
	Interest	1.48	0.44				
	Total Cash Outflow:	11.74	8.14				
11	Surplus/Deficit (9-10)	13.49	17.96	26.43	26.35	26.27	26.18
	IRR With CDM revenue	12.75%					
Source: Financial statement of the project							

Without considering the CDM revenues the IRR works out to 8.35% and with CDM revenues, it works out to 12.75%. The cost of capital for the given capital structure is 11.85% and hence the project is viable only after considering CDM revenues.

Project 3:

Wind Power based electricity generation project in India by DLF Home Developers Limited (3642)

Brief Description

The project activity involves the establishment of a wind farm of 67.5 MW capacity enabling generation of electricity by state-of-art 1.5 MW capacity Wind Energy Generators (WEGs).

Exhibit XXXV: Financial analysis without CDM revenue (Rs. in Lacs)							
		2003	**2004**	**2005**	**2006**	**2007**	**2008**
1	**Total revenue (without CDM)**	284.1	284.1	284.1	284.1	284.1	284.1
2	**Less: Operational Cost**						
	Operation and Maintenance Cost	16.8	17.7	18.5	19.5	20.4	21.5
	Interest on term loan	88.3	83.8	75	66.2	57.4	48.5
	--Depreciation	45.1	45.1	45.1	45.1	45.1	45.1
	Total Expenses	150.2	146.6	138.7	130.8	122.9	115.1

3	**PBT** [1-2]	134	137.5	145.5	153.4	161.2	169
4	Tax						16.9
5	**PAT** (3-4)	134	137.5	145.5	153.4	161.2	152.1
6	Add Depreciation	45.1	45.1	45.1	45.1	45.1	45.1
7	**Net Cash Accruals (Cash Inflow)** (5+6)	179.1	182.6	190.6	198.5	206.3	197.2
8	**Less: Use of funds (Cash Outflow)**						
	Repayment of term loan		84.1	84.1	84.1	84.1	84.1
	Interest	88.3	83.8	75	66.2	57.4	48.5
	Total Cash Outflow:	88.3	167.9	159.1	150.3	141.4	132.6
9	Surplus/Deficit (7-8)	90.8	14.7	31.5	48.2	64.9	64.6
Source: Financial statement of the project							

Exhibit XXXV: Financial analysis without CDM revenue (Rs. in Lacs) … Continue…

		2009	**2010**	**2011**	**2012**	**2013**	**2014**
1	**Total revenue (without CDM)**	284.1	284.1	284.1	284.1	284.1	284.1
2	**Less: Operational Cost**						
	Operation and Maintenance Cost	22.5	23.7	24.8	26.1	26.1	26.1
	Interest on term loan	39.7	30.9	22.1	13.2	4.4	39.7
	--Depreciation	45.1	45.1	45.1	45.1	45.1	45.1
	Total Expenses	107.3	99.6	92	84.4	75.6	71.2
3	**PBT** [1-2]	176.8	184.5	192.1	199.7	208.5	213
4	Tax	17.7	18.4	19.2	20	20.9	21.3
5	**PAT**(3-4)	159.1	166	172.9	179.7	187.7	191.7
6	Add Depreciation	45.1	45.1	45.1	45.1	45.1	45.1
7	**Net Cash Accruals (Cash Inflow)** (5+6)	204.2	211.1	218	224.8	232.8	236.8
8	**Less: Use of funds (Cash Outflow)**						
	Repayment of term loan	84.1	84.1	84.1	84.1	84.1	
	loan						
	Interest	39.7	30.9	22.1	13.2	4.4	
	Total Cash Outflow:	123.8	115	106.1	97.3	88.5	
9	Surplus/Deficit (7-8)	80.4	96.2	111.9	127.5	144.3	236.8

	IRR Without CDM revenue	10.41%
Source: Financial statement of the project		

Exhibit XXXVI: Financial analysis with CDM revenue (Rs. in Lacs)

		2003	**2004**	**2005**	**2006**	**2007**	**2008**
1	Total revenue (withoutCDM in lacks)	284.1	284.1	284.1	284.1	284.1	284.1
2	CDM Revenue	52.5	52.5	52.5	52.5	52.5	52.5
3	**Total revenue (with CDM revenue in lacks)**	336.6	336.6	336.6	336.6	336.6	336.6
4	**Less: Operational Cost**						
	-- Operation and Maintenance Cost	16.8	17.7	18.5	19.5	20.4	21.5
	--Interest on term loan	88.3	83.8	75	66.2	57.4	48.5
	--Depreciation	45.1	45.1	45.1	45.1	45.1	45.1
	Total Expenses	150.2	146.6	138.7	130.8	122.9	115.1
5	**PBT** [1-2]	186.5	190	198	205.9	213.7	221.5
6	Tax						22.2
7	**PAT**(3-4)	186.5	190	198	205.9	213.7	199.4
8	Add Depreciation	45.1	45.1	45.1	45.1	45.1	45.1
9	**Net Cash Accruals (Cash Inflow)**(5+6)	231.6	235.1	243.1	251	258.8	244.5
10	**Less: Use of funds (Cash Outflow)**						
	Repayment of term loan		84.1	84.1	84.1	84.1	84.1
	Interest	88.3	83.8	75	66.2	57.4	48.5
	Total Cash Outflow:	88.3	167.9	159.1	150.3	141.4	132.6
11	Surplus/Deficit (9-10)	143.3	67.2	84	100.7	117.4	111.

Exhibit XXXVI: Financial analysis with CDM revenue (Rs. in Lacs)… Continue…

		2009	**2010**	**2011**	**2012**	**2013**	**2014**
1	Total revenue (without CDM in lacks)	284.1	284.1	284.1	284.1	284.1	284.1
2	CDM Revenue	52.5					
3	**Total revenue (with CDM revenue in lacks)**	336.6	284.1	284.1	284.1	284.1	284.1

4	: **Operational Cost**						
	-- Operation and Maintenance Cost	39.7	30.9	22.1	13.2	4.4	
	--Interest on term loan	22.5	23.7	24.8	26.1	26.1	26.1
	--Depreciation	45.1	45.1	45.1	45.1	45.1	45.1
	Total Expenses	107.3	99.6	92	84.4	75.6	71.2
5	**PBT**[1-2]	229.3	184.5	192.1	199.7	208.5	213
6	Tax	22.9	18.4	19.2	20	20.9	21.3
7	**PAT**(3-4)	206.4	166	172.9	179.7	187.7	191.7
8	Add Depreciation	45.1	45.1	45.1	45.1	45.1	45.1
9	**Net Cash Accruals (Cash Inflow)**(5+6)	251.5	211.1	218	224.8	232.8	236.8
10	**Less: Use of funds (Cash Outflow)**						
	Repayment of term loan	84.1	84.1	84.1	84.1	84.1	
	Interest	39.7	30.9	22.1	13.2	4.4	
	Total Cash Outflow:	123.8	115	106.1	97.3	88.5	
11	Surplus/Deficit (9-10)	127.7	96.2	111.9	127.5	144.3	236.8
	IRR With CDM revenue	13.21%					
Source: Financial statement of the project							

Without considering the CDM revenues the IRR works out to 10.41% and with CDM revenues, it works out to 13.21%. The cost of capital for the given capital structure is 11.38% and hence the project is viable only after considering CDM revenues.

Project 4:

13.75 MW wind power project in Davangere, Karnataka, India. (3700)

Brief Description

The project activity is an initiative by Sargam Retails Private Limited (SRPL), towards clean electricity generation using wind energy resources in the state of Karnataka. SRPL is engaged in Trading and Marketing Packaged Tea and Tobacco.

Exhibit XXXVII: Financial analysis without CDM revenue (Rs. in Lacs)							
		2003	**2004**	**2005**	**2006**	**2007**	**2008**
1	**Total revenue (without CDM)**	2100	2100	2100	2100	2100	2100
2	**Less: Operational Cost**						
	--Operation and Maintenance Cost		130	137	143	150	158
	--Service tax on OandM @12.36%		16	17	18	19	20
	-- Insurance	21	21	21	21	21	21
	--Interest	678	621	508	395	282	169

	--Depreciation	406	406	406	406	406	406
	Total Expenses	1106	1195	1090	984	879	775
3	**PBT**[1-2]	994	905	1010	1116	1221	1325
4	Tax				112	122	133
5	**PAT**(3-4)	994	905	1010	1004	1099	1193
6	Add Depreciation	406	406	406	406	406	406
7	**Net Cash Accruals (Cash Inflow)**(5+6)	1400	1311	1417	1410	1505	1599
8	**Less: Use of funds (Cash Outflow)**						
	Repayment of term loan		962	962	962	962	962
	Interest	678	621	508	395	282	169
	Total Cash Outflow:	678	1583	1470	1357	1244	1131
9	Surplus/Deficit (7-8)	723	(272)	(53)	53	261	468
Source: **Financial statement of the project**							

Exhibit XXXVII:Financial analysis without CDM revenue (Rs. in Lacs)… Continue

		2009	**2010**	**2011**	**2012**	**2013**	**2014**
1	**Total revenue (without CDM)**	2100	2100	2100	2100	2100	2100
2	**Less: Operational Cost**						
	--Operation and Maintenance Cost	166	174	183	192	202	212
	--Service tax on O and M @12.36%	21	22	23	24	25	26
	-- Insurance	21	21	21	21	21	21
	--Interest	56					
	--Depreciation	406	406	406	406	406	406
	Total Expenses	671	623	633	644	654	666
3	**PBT**[1-2]	1429	1477	1467	1456	1446	1434
4	Tax	143	148	147	146	145	143
5	**PAT**(3-4)	1286	1329	1320	1311	1301	1291
6	Add Depreciation	406	406	406	406	406	406
7	**Net Cash Accruals (Cash Inflow)** (5+6)	1693	1735	1726	1717	1707	1697
8	**Less: Use of funds (Cash Outflow)**						
	Repayment of term loan	962					
	Interest	56					
	Total Cash Outflow:	1018					

9	Surplus/Deficit (7-8)	675	1735	1726	1717	1707	1697
	IRR Without CDM revenue	9.34%					
Source: Financial statement of the project							

Exhibit XXXVIII:Financial analysis with CDM revenue (Rs. in Lacs)							
		2003	**2004**	**2005**	**2006**	**2007**	**2008**
1	Total revenue (without CDM in lacks)	2100	2100	2100	2100	2100	2100
2	CDM Revenue	487	487	487	487	487	487
3	**Total revenue (with CDM revenue in lacks)**	2587	2587	2587	2587	2587	2587
4	**Less:Operational Cost**						
	--Operation and Maintenance Cost		130	137	143	150	158
	--Service tax on O and M @12.36%		16	17	18	19	20
	-- Insurance	21	21	21	21	21	21
	--Interest	678	621	508	395	282	169
	--Depreciation	406	406	406	406	406	406
	Total Expenses	1106	1195	1090	984	879	775
5	**PBT**[3-4]	1481	1391	1497	1602	1707	1812
6	Tax	163	153	165	176	188	199
7	**PAT**(5-6)	1318	1238	1332	1426	1520	1613
8	+Depreciation	163	153	165	176	188	199
9	**Net Cash Accruals (Cash inflow)**(7+8)	1724	1645	1739	1832	1926	2019
10	**Less: Use of funds (Cash Outflow)**						
	Repayment of term loan		962	962	962	962	962
	Interest	678	621	508	395	282	169
	Total Cash Outflow:	678	1583	1470	1357	1244	1131
11	Surplus/Deficit (9-10)	1046	62	269	475	682	88
Source: Financial statement of the project							

Exhibit XXXVIII: Financial analysis with CDM revenue (Rs. in Lacs) … Continue

		2009	2010	2011	2012	2013	2014
1	Total revenue (without CDM in lacks)	2100	2100	2100	2100	2100	2100
2	CDM Revenue	487	487	487	487	487	487
3	**Total revenue (with CDM revenue in lacks)**	2587	2587	2587	2587	2587	2587
4	**Less: Operational Cost**						
	--Operation and Maintenance Cost	166	174	183	192	202	212
	--Service tax on O and M @12.36%	21	22	23	24	25	26
	-- Insurance	21	21	21	21	21	21
	--Interest	56					
	--Depreciation	406	406	406	406	406	406
	Total Expenses	671	623	633	644	654	666
5	**PBT** [3-4]	1916	1963	1953	1943	1446	1434
6	Tax	211	216	215	214	159	158
7	**PAT** (5-6)	1705	1747	1739	1729	1287	1277
8	+Depreciation	211	216	215	214	159	158
9	**Net Cash Accruals (Cash inflow)** (7+8)	2112	2154	2145	2136	1693	1683
10	**Less: Use of funds (Cash Outflow)**						
	Repayment of term loan						
	Interest						
	Total Cash Outflow:						
11	Surplus/Deficit (9-10)	2154	2145	2136	1693	1683	2154
	IRR With CDM revenue	12.43%					

Source: Financial statement of the project

Without considering the CDM revenues the IRR works out to 9.34% and with CDM revenues, it works out to 12.43%. The cost of capital for the given capital structure is 11.82% and hence the project is viable only after considering CDM revenues.

Project 5:

MW Wind --Power Project in Tamil Nadu by REI Agro Limited (3710)

Brief Description

The project activity consists of 12 nos. Vestas RRB make 500 KW wind turbines totaling to a capacity of 6 MW.

Exhibit XXXIX: Financial analysis without CDM revenue (Rs. in Lacs)

		2003	2004	2005	2006	2007	2008
1	**Total revenue (without CDM)**	105.1	105.1	105.1	105.1	105.1	105.1
2	**Less: Operational Cost**						
	--Operation and Maintenance Cost	9.3	9.7	10.2	10.7	11.3	11.8
	-- Insurance	2.8	2.8	2.8	2.8	2.8	2.8
	Total Expenses	12	12.5	13	13.5	14	14.6
3	**PBIDT** (1-2)	93.1	92.6	92.1	91.6	91.1	90.5
4	Interest	29.3	27.7	24.4	21.2	17.9	14.6
5	Depreciation	18.6	18.6	18.6	18.6	18.6	18.6
6	**PBT**[3-(4+5)]	45.2	46.3	49.1	51.9	54.6	57.3
7	Tax				5.2	5.5	5.7
8	**PAT** (6-7)	45.2	46.3	49.1	46.7	49.1	51.5
9	+ Depreciation	18.6	18.6	18.6	18.6	18.6	18.6
10	**Net Cash Accruals (Cash Inflow)**(8+9)	63.8	64.9	67.7	65.3	67.7	70.1
11	**Less: Use of funds (Cash Outflow)**						
	Repayment of term loan		31	31	31	31	31
	Interest	29.3	27.7	24.4	21.2	17.9	14.6
	Total outflow:	29.3	58.7	55.4	52.2	48.9	45.6
12	Surplus/Deficit (10-11)	34.5	6.3	12.3	13.1	18.8	24.5

Source: Financial statement of the project

Exhibit XXXIX: Financial analysis without CDM revenue (Rs. in Lacs) ….Continue

		2009	2010	2011	2012	2013	2014
1	**Total revenue**	105.1	105.1	105.1	105.1	105.1	105.1

	(without CDM)						
2	**Less: Operational Cost**						
	--Operation and Maintenance Cost	12.4	13	13.7	14.4.	15.1	15.8
	-- Insurance	2.8	2.8	2.8	2.8	2.8	2.8
	Total Expenses	15.2	15.8	16.5	17.2	17.9	18.6
3	**PBIDT** (1-2)	89.9	89.3	88.7	88	87.3	86.5
4	Interest	11.4	8.1	4.9	1.6		
5	Depreciation	18.6	18.6	18.6	18.6	18.6	18.6
6	**PBT**[3-(4+5)]	59.9	62.6	65.2	67.7	68.7	67.9
7	Tax	6	12.5	13	13.5	13.7	13.6
8	**PAT**(6-7)	53.9	50.1	52.1	54.2	54.9	54.3
9	+ Depreciation	18.6	18.6	18.6	18.6	18.6	18.6
10	**Net Cash Accruals (Cash Inflow)** (8+9)	72.5	68.7	70.7	72.8	73.5	72.9
11	**Less: Use of funds (Cash Outflow)**						
	Repayment of term loan	31	31	31	31		
	Interest	11.4	8.1	4.9	1.6		
	Total outflow:	42.4	39.1	35.9	32.6		
12	Surplus/Deficit (10-11)	30.1	29.5	34.9	40.2	73.5	72.9
	IRR Without CDM revenue	10.36%					
Source: Financial statement of the project							

Exhibit XL: Financial analysis with CDM revenue (Rs. in Lacs)							
		2003	**2004**	**2005**	**2006**	**2007**	**2008**
1	Total revenue (without CDM in lacks)	105.1	105.1	105.1	105.1	105.1	105.1
2	CDM Revenue	16.4	16.4	16.4	16.4	16.4	16.4
3	**Total revenue (with CDM revenue in lacks)**	121.5	121.5	121.5	121.5	121.5	121.5
4	**Less: Operational Cost**						
	--Operation and Maintenance Cost	109.5	109	108.5	108	107.5	106.9
	-- Insurance	29.3	27.7	24.4	21.2	17.9	14.6
	Total Expenses	18.6	18.6	18.6	18.6	18.6	18.6

	PBIDT (4-5)	61.6	62.7	65.5	68.2	71	73.7
	Interest				6.8	7.1	7.4
	Depreciation	61.6	62.7	65.5	61.4	63.9	66.3
5	**PBT**[3-4]	18.6	18.6	18.6	18.6	18.6	18.6
6	Tax	80.2	81.3	84.1	80	82.5	84.9
7	**PAT**(5-6)	109.5	109	108.5	108	107.5	106.9
8	+Depreciation	29.3	27.7	24.4	21.2	17.9	14.6
9	**Net Cash Accruals (Cash inflow)**(7+8)	18.6	18.6	18.6	18.6	18.6	18.6
10	**Less: Use of funds (Cash Outflow)**						
	Repayment of term loan		31	31	31	31	31
	Interest	29.3	27.7	24.4	21.2	17.9	14.6
	Total Cash Outflow:	29.3	58.7	55.4	52.2	48.9	45.6
11	Surplus/Deficit (9-10)	50.9	22.7	28.7	27.9	33.6	39.2
Source: Financial statement of the project							

Exhibit XL: Financial analysis with CDM revenue (Rs. in Lacs) …Continue

		2009	**2010**	**2011**	**2012**	**2013**	**2014**
1	Total revenue (without CDM in lacks)	105.1	105.1	105.1	105.1	105.1	105.1
2	CDM Revenue	16.4	16.4	16.4	16.4		
3	**Total revenue (with CDM revenue in lacks)**	121.5	121.5	121.5	121.5	105.1	105.1
4	**Less: Operational Cost**						
	--Operation and Maintenance Cost	12.4	13	13.7	14.4.	15.1	15.8
	-- Insurance	2.8	2.8	2.8	2.8	2.8	2.8
	Total Expenses	15.2	15.8	16.5	17.2	17.9	18.6
	PBIDT (4-5)	106.3	105.7	105	104.4	87.3	86.5
	Interest	11.4	8.1	4.9	1.6		
	Depreciation	18.6	18.6	18.6	18.6	18.6	18.6
5	**PBT**[3-4]	76.3	79	81.6	84.1	68.7	67.9
6	Tax	7.6	15.8	16.3	16.8	13.7	13.6

7	**PAT**(5-6)	68.7	63.2	65.2	67.3	54.9	54.3
8	+Depreciation	18.6	18.6	18.6	18.6	18.6	18.6
9	**Net Cash Accruals (Cashinflow)**(7+8)	87.3	81.8	83.8	85.9	73.5	72.9
10	**Less: Use of funds (Cash Outflow)**						
	Repayment of term loan	31	31	31	31		
	Interest	11.4	8.1	4.9	1.6		
	Total Cash Outflow:	42.4	39.1	35.9	32.6		
11	Surplus/Deficit (9-10)	44.9	42.6	48	53.3	73.5	72.9
	IRR With CDM revenue	13.89%					
Source: Financial statement of the project							