

# A Financing Facility for Low-Carbon Development

*Christophe Gouvello  
Ivan Zelenko  
with Philippe Ambrosi*



THE WORLD BANK

# A Financing Facility for Low-Carbon Development

*Christophe de Gouvello*

*Ivan Zelenko*

*with Philippe Ambrosi*



**THE WORLD BANK**  
Washington, D.C.

Copyright © 2010

The International Bank for Reconstruction and Development/The World Bank

1818 H Street, N.W.

Washington, D.C. 20433, U.S.A.

All rights reserved

Manufactured in the United States of America

First Printing: April 2010



Printed on recycled paper

1 2 3 4

13 12 11 10

World Bank Working Papers are published to communicate the results of the Bank's work to the development community with the least possible delay. The manuscript of this paper therefore has not been prepared in accordance with the procedures appropriate to formally-edited texts. Some sources cited in this paper may be informal documents that are not readily available.

The findings, interpretations, and conclusions expressed herein are those of the author(s) and do not necessarily reflect the views of the International Bank for Reconstruction and Development/The World Bank and its affiliated organizations, or those of the Executive Directors of The World Bank or the governments they represent.

The World Bank does not guarantee the accuracy of the data included in this work. The boundaries, colors, denominations, and other information shown on any map in this work do not imply any judgment on the part of The World Bank of the legal status of any territory or the endorsement or acceptance of such boundaries.

The material in this publication is copyrighted. Copying and/or transmitting portions or all of this work without permission may be a violation of applicable law. The International Bank for Reconstruction and Development/The World Bank encourages dissemination of its work and will normally grant permission promptly to reproduce portions of the work.

For permission to photocopy or reprint any part of this work, please send a request with complete information to the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, MA 01923, USA, Tel: 978-750-8400, Fax: 978-750-4470, [www.copyright.com](http://www.copyright.com).

All other queries on rights and licenses, including subsidiary rights, should be addressed to the Office of the Publisher, The World Bank, 1818 H Street NW, Washington, DC 20433, USA, Fax: 202-522-2422, email: [pubrights@worldbank.org](mailto:pubrights@worldbank.org).

ISBN: 978-0-8213-8521-0

eISBN: 978-0-8213-8525-8

ISSN: 1726-5878 DOI: 10.1596/978-0-8213-8521-0

**Library of Congress Cataloging-in-Publication Data has been requested.**

# Acknowledgments

---

The authors would like to thank Michael Toman, Research Manager, Environment and Energy in the World Bank Economic Research Department; Kenneth G. Lay, Vice President and Treasurer for his support; Hennie van Greuning from the Treasury for helping us drive the publication process; Olivier Schmitt from the Quantitative, Risk and Analytics Department of the Treasury for reviewing the LCDf model; and all the experts from the World Bank who reviewed and gave comments on the paper.

Of course, all errors are the responsibility of the authors.

# About the Authors

---

All authors are with the World Bank. Christophe de Gouvello is a Senior Energy Specialist in the Latin American and Caribbean Region, Ivan Zelenko is the Head of Structured Finance at the Treasury Department, and Philippe Ambrosi is an Economist in the Environment Department.

# Acronyms and Abbreviations

---

CDM	Clean Development Mechanism
CER	Certified Emission Reduction
COP	Conferences of Parties
CTF	Clean Technology Fund
DOE	Designated Operational Entities
ERTC	Emission Reduction Transformation Cost
EU	European Union
EUA	European Unit allowance
EUETS	European Union Emissions Trading Scheme
FDI	Foreign Direct Investment
GEF	Global Environment Facility
GHG	Greenhouse gas
IDA	International Development Association
IPCC	International Panel on Climate Change
KP	Kyoto Protocol
LCDF	Low Carbon Development Facility
MRV	Monitoring Reporting and Verification
NAMA	Nationally Appropriate Mitigation Activities
ODA	Official Development Aid
UNFCCC	United Nations Framework Convention for Climate Change

# Executive Summary

---

The reality of climate change requires a drastic reduction in global emissions of greenhouse gases (GHG) in the coming decades. In its 2007 report, the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat predicted that emissions would reach 61.5 gigatons carbon dioxide equivalent (GtCO<sub>2</sub>e) in 2030 under a baseline (or “no-mitigation” scenario), whereas a strict upper limit of 29 GtCO<sub>2</sub>e in 2030 is required to stabilize climate degradation. The UNFCCC subsequently established a challenging target for emission reductions of 32.5 GtCO<sub>2</sub>e. Under the baseline scenario, Annex I countries, which are the countries committed to reducing emissions under the 1997 Kyoto Protocol,<sup>1</sup> would emit together 22.1 GtCO<sub>2</sub>e in 2030. Clearly, even by drastically cutting emissions, these countries cannot alone meet the UNFCCC target of 32.5 GtCO<sub>2</sub>e. The same basic arithmetic also demonstrates that the offsets-based flexibility mechanisms of the Kyoto Protocol will not be sufficient to solve the problem. Developing countries must reduce emissions beyond the important but too limited role of offsetting a share of Annex I country emissions.

Recent studies have shown that the cost-effective<sup>2</sup> emissions mitigation potential in developing countries ranges between 7.7 and 25 GtCO<sub>2</sub>e per year in 2030. Low-carbon development leading to avoided emissions in developing countries near the upper end of this range likely would bring the global emissions target within reach. Moreover, these GHG mitigation opportunities would come from the implementation of low-carbon technologies in investment projects that support the economic development of non-Annex I countries.

However, many low-carbon investment projects do not materialize because they have restricted access to financing, even though the projects may offer low or negative GHG abatement costs. In fact, many projects validated under the Clean Development Mechanism (CDM) of the Kyoto Protocol cannot achieve financial closure, even though they are eligible for carbon finance. Carbon finance alone cannot support the full GHG emission abatement potential in non-Annex I countries. Therefore, removing the investment financing barrier should be a priority, independent of the evolution of the carbon finance market.

This paper proposes an innovative financing mechanism known as the Low-Carbon Development Facility (LCDF). The LCDF would bring additional investment financing at concessional rates to unlock economically beneficial, low-carbon development projects in non-Annex I countries, thus enabling a rapid scaling up of project-based emissions avoidance in these countries (potentially up to 10 GtCO<sub>2</sub>e in 2030). The LCDF could be a modality of the Copenhagen Green Climate Fund to implement the financial pledges made by Annex I countries as a result of Copenhagen and post-COP15<sup>3</sup> negotiations to support projects, programs, policies and/or other activities in developing countries related to Nationally Appropriate Mitigation Actions (NAMAs). The LCDF would not replace the Global Environment Facility (GEF) and the Clean Technology Fund (CTF), but would rather support the scaling-up of innovative projects pioneered by these instruments.

The LCDF would function as a AAA lending facility initially endowed with capital by Annex I countries. At inception, the LCDF would receive \$68 billion<sup>4</sup> in capital from Annex I countries. This amount would grow to \$80 billion during a 10-year build-up phase, which would be enough to sustain the AAA rating over the long run while lending to low-carbon development projects an annual \$100 billion. The LCDF would manage in steady-state a loan portfolio of \$1 trillion with an average BBB rating. The LCDF would invest its capital in a portfolio of liquid and safe securities and would fund its loans by issuing bonds in capital markets. It would have a light cost structure (with operational costs representing 0.15 percent of the loan portfolio) relative to international financial entities. The LCDF would offer loans at the LIBOR rate plus 10 basis points. This rate is very competitive, comparable with the lending rates offered by multilateral development banks, and situated significantly below the borrowing conditions faced by developing countries.

The financial viability of the LCDF would mean that its annual revenues would more than cover the default risk on its loans on average to yield a positive net income on average. In the build-up phase, profits would be reinvested to reach the \$80 billion in capital in year ten. Profits could then be distributed to finance sustainable development projects worldwide. LCDF capital would be enough to weather a worst-case operating loss in 99.9996 percent of cases and thereby justify the AAA rating. The projects financed, with an average 21-year lifespan, would together generate estimated emission reductions on the order of 10 GtCO<sub>2</sub>e per year in 2030. The annual \$100 billion of financing to developing countries would compare well to \$613 billion foreign direct investment (FDI) to developing countries and \$74.3 billion official development assistance (ODA) in 2007.

As noted, the purpose of the LCDF is to significantly scale up low-carbon development in non-Annex I countries—development that is in their own economic interest but cannot be realized due to financial barriers. It is not a primary purpose of the LCDF to generate tradable Certified Emission Reductions (CERs).<sup>5</sup> Only projects that remain financially unviable, after enjoying the concessional financing conditions offered by the LCDF, would be awarded CERs, thus promoting a transparent and sound interface with the carbon finance market. Moreover, the proportion of emissions reductions achieved by LCDF-financed projects that could be converted into tradable CERs would be capped initially at 20 percent, so that their market price would not be driven so low by an overflow of CERs, which could in turn weaken national policies and actions in Annex I countries to reduce GHGs. Because CERs supplied to the market would only come from low-carbon projects with indispensable needs for revenues from CER sales to become profitable, the risk of hot air jeopardizing the environmental integrity of global mitigation efforts would be reduced.

To ensure environmental consistency with the existing UNFCCC framework and with the methodology and regulation assets built under the CDM, the LCDF would rely on an enhanced CDM monitoring, reporting, and verification process (MRV) to measure emission reductions. All projects financed by the LCDF would be registered under an enhanced CDM process and apply approved CDM monitoring methodologies, therefore ensuring the reliability of environmental performance in projects deemed eligible for financing under the LCDF. As an additional safeguard to environmental integrity, the concessional rate could be revised and increased if the



project does not comply with the CDM MRV requirements or does not maintain its environmental performance.

The identification of projects and assessment of their financial returns would associate private banks and financial intermediaries in a public-private partnership framework. As a result, additionality screening—one of the current weaknesses of the CDM—would be strongly improved by the financial due diligences performed during the LCDF financing process.

Regarding the origination and the management of the large portfolio of low-development projects of the LCDF, two capacities would be deployed: potential candidates for financing would be identified by (i) the CDM, as of a natural focal point for low-carbon projects, and (ii) by the private sector banks, to which the LCDF offers a huge business opportunity in terms of originating loans.

Regarding the capacity of the CDM, statistical and analytical reviews indicate that this mechanism already has the potential to support thousands of projects. While several limitations have constrained its performance (although these are expected to be relaxed in a renewed and enhanced CDM), the CDM portfolio has in fact grown rather steadily for several years, now with more than 5,000 projects in validation, registration, or implementation stages. Simple projections indicate that this number could increase to about 10,000 projects by 2012 and more than 40,000 projects by 2030, just by maintaining the current annual flow of new projects applying to CDM every year.

Private and development banks are also expected to bring a sustained flow of projects. Private sector entities would lend to projects alongside the LCDF, whose conditional rates should considerably enlarge and strengthen their initial borrower base. We estimate the cofinancing ratio to be two-thirds brought by the LCDF and one-third by other lenders. This cofinancing would create a strong incentive for strict selection of projects from the point of view of their solvency.

The cost of this new large-scale financing mechanism would be borne by Annex I countries, consistent with both the KP “common but differentiated responsibility” dictum and the pledges of Annex I countries at Copenhagen to increase financing for low-carbon development. The likely cost would be far lower than if such effort were supported through carbon finance only. Much if not most of the emissions avoided under the LCDF could be delivered at less than \$1 per tCO<sub>2</sub>e, compared to the market price of CERs of \$12 per tCO<sub>2</sub>e in 2010, expected by analysts to move toward \$30–\$40 per tCO<sub>2</sub>e going forward. The LCDF thus would enable Annex I countries to significantly leverage the resources they commit to the global mitigation effort.

The estimates of potential abatement volumes given in the paper should be taken for what they are: estimates based on informed judgments of analysts. The actual potential could be more or less than the figures cited here. One key advantage of the LCDF is that it provides a low-cost means to address this uncertainty, which has loomed over debates about GHG mitigation from the start. If access to finance for low-cost, economically beneficial abatement projects is less than is hoped, the result will be a limited draw on the capital pledged to the LCDF by Annex I countries, and the mechanism can be reworked or abandoned after a trial period with limited financial cost. If the access barrier is even more important than anticipated, demand for LCDF resources will end up exceeding its financing capacity and the program can be enlarged.

## Notes

<sup>1</sup> Annex I countries historically have produced the most GHG emissions.

<sup>2</sup> Below 60 euros/tCO<sub>2</sub>e.

<sup>3</sup> Fifteenth session of the Conference of the Parties (COP15).

<sup>4</sup> All dollar amounts are U.S. unless otherwise noted.

<sup>5</sup> Also called “carbon offsets.”

# Contents

---

Acknowledgments .....	v
About the Authors.....	vi
Acronyms and Abbreviations .....	vii
Executive Summary.....	viii
1. Introduction.....	1
2. Meeting the Mitigation Challenge: The Decisive Participation of Developing Countries .....	3
3. Call for New Financing Mechanisms .....	5
4. The Proposed Low-Carbon Development Facility .....	9
LCDF Concept: Objective, Design, and Scale.....	9
Assessing the LCDF Impact.....	10
Financial Viability .....	12
Economic Efficiency.....	16
5. Building on the Kyoto Instruments: Attracting and Monitoring a Large Portfolio of Low-Carbon Development Projects .....	18
6. Coordination with Carbon Markets: Complementarities of the LCDF and CDM.....	22
7. Conclusion .....	24
References.....	25
Appendixes.....	27
Appendix A. Mitigation Potential in Non-Annex I Countries.....	28
Appendix B. Historical and Projected Evolution of the CDM Pipeline: Rapid Widening of Scope and Quick Growth of the Project Portfolio and Mitigation Potential .....	29
Appendix C. LCDF Financial Model Initial Capital Estimate and Financial Viability .....	34
 <b>Tables</b>	
Table 3.1. Estimated Potential Demand for International Offsets by 2020 .....	7
Table 4.1. Profitability of the LCDF: Net Income Forecast 2010–22.....	14
Table A3.1. Profitability of the LCDF over a 12-Year Period, Net Income and Return on Equity.....	39
 <b>Figures</b>	
Figure 4.1. Evolution of the LCDF Loans for a 10 GtCO <sub>2</sub> e Annual Emission Reductions Target in 2030.....	15
Figure 5.1. Historical and Projected Growth of the Number of Projects Submitted to the CDM by the End of 2012 .....	20

Figure 5.2. Projected Mitigation Capacity of the CDM Portfolio by the End of 2012.....	20
Figure A2.1. Pace of Submitting New CDM Methodologies.....	29
Figure A2.2. Pace of Approving CDM Methodologies .....	30
Figure A2.3. Number of CDM Projects Submitted for Validation .....	31
Figure A2.4. Mitigation Capacity of Projects That Have Applied to the CDM (Validation Stage) .....	31
Figure A2.5. Projected Number of Projects Submitted to the CDM by the End of 2012 .....	32
Figure A2.6. Projected Mitigation Capacity of the CDM Portfolio by the End of 2012 .....	33
Figure A3.1: Number of Loans in Default, Cumulative Distribution and 99.9996% Level .....	37

## Boxes

Box 1.1. Countries' Common but Differentiated Responsibilities .....	2
Box 3.1. Major International Regimes for the Carbon Market.....	7

# Introduction

---

The Climate Change Conference of 2009 saw the heads of state and governments of the largest nations agree on the so-called Copenhagen Accord, whose text begins with:

“We underline that climate change is one of the greatest challenges of our time. We emphasize our strong political will to urgently combat climate change in accordance with the principle of common but differentiated responsibilities and respective capabilities.”

The reality of climate change associated with anthropogenic emissions is now widely acknowledged by the scientific community. Its potential devastating future harms are equally well perceived and, as stated in the Copenhagen Accord, major nations agree on the need to jointly and urgently combat climate change. The international community is also quite aware that stabilizing atmospheric concentrations of GHG at supportable levels will require a drastic reduction in GHG emissions within a limited period of time. Undertaking such an enormous effort triggers several interlinked challenges: (i) technically mitigating GHG emissions to the required level; (ii) implementing these solutions in countries where the required amount of emission reduction is most realistically and efficiently achievable, in particular through involving and using in full the large potential of developing countries; and (iii) mobilizing the large amount of financing needed to ensure that the corresponding projects and programs can be effectively implemented. Furthermore, these challenges must be simultaneously addressed in a way that is acceptable to all the parties involved. This means in particular that any arrangement designed to meet the global GHG emission reduction challenge must be consistent with the principle of the common but differentiated responsibilities of developed and developing countries (box 1.1).

Daunting as they may be, these challenges also present an extraordinary development opportunity. While helping to meet the most urgent emission reduction challenge, the mobilization of vast amounts of financing may also trigger powerful new growth paths in developing countries based on low-carbon and efficient energy. Emission reduction and development are closely intertwined. Arrangements to address one of these two major global issues should ideally address both and benefit from all potential synergies.

Another crucial criterion by which to assess new, concrete arrangements is the need to accelerate the fight against climate change. Time is short, and if ambitious GHG concentration targets are to have any prospect of being achieved, new

arrangements should be built, to the extent possible, on existing assets of international cooperation, in global finance as well as in carbon finance. To be more specific:

- New arrangements should use and leverage the capacity of multilateral banks, international public agencies, but also and quite importantly private sector banks.
- New arrangements should make use of the CDM, a powerful tool constructed over the past two decades for verifying and monitoring projects from an environmental angle, and a tool that can be enhanced in response to recent critiques to achieve higher productivity.
- New arrangements should however be more discriminating in what types of emission reductions require the extra financial benefit of carbon finance through the sale of CERs.
- Because of the significant uncertainties surrounding these issues, new arrangements should facilitate learning and subsequent adaptation of mechanisms to new information.

This paper proposes an international financing instrument that meets the challenges and the conditions set out above. The Low-Carbon Development Facility (LCDF), as its name suggests, is designed to foster development together with mitigation.

The LCDF could be a modality of the Copenhagen Green Climate Fund to implement the financial pledges made by Annex I countries as a result of Copenhagen and post-COP15 negotiations to support projects, programs, policies, and/or other activities in developing countries related to NAMAs. By neither limiting financing to incremental costs nor focusing on transformational projects, the LCDF will not replace the GEF and the CTF, but instead would support the scaling-up of the innovative projects pioneered by these instruments.

### **Box 1.1. Countries' Common but Differentiated Responsibilities**

Acknowledging the global nature of climate change, the preamble of the UNFCCC calls for *"the widest possible cooperation by all countries and their participation in an effective and appropriate international response, in accordance with their common but differentiated responsibilities and respective capabilities."* The notion of differentiated responsibilities recognizes that *"the largest share of historical and current global emissions of greenhouse gases has originated in developed countries."* As a result, the UNFCCC, in article 4.5 (p. 8), determines that *"[t]he developed country Parties and other developed Parties included in Annex II shall take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how to other Parties, particularly developing country Parties, to enable them to implement the provisions of the Convention."*

Source: United Nations, text of the UNFCCC (1992).

# Meeting the Mitigation Challenge: The Decisive Participation of Developing Countries

---

Climate change is a threat to the prosperity all nations and needs to be mitigated by rapid and effective joint actions to reduce emissions. In addition, global efforts to overcome poverty and advance development can no longer ignore the serious and immediate threat that climate change poses to development prospects. At the same time, efforts to mitigate climate change need to creatively leverage development opportunities for less-developed countries.

To date, the global mean temperature has risen about 0.8°C above preindustrial levels. Among the changes observed in the earth's climate are more frequent and severe extreme weather events, affecting disproportionately the poor and sometimes eroding development gains earned over decades. Drawing on a wide set of business-as-usual GHG emissions scenarios (that is, with no further mitigation efforts), models project that the global mean temperature could rise 2.5°C to 7°C above preindustrial levels by the end of this century. There is convincing evidence that the capacity of societies and ecosystems to cope with climate change will be tested with increasing severity as warming advances beyond 2°C. Limiting global mean temperature rise to below 2°C requires urgent actions or else the target soon will be out of reach given inertias in the climate system (climate change will progress further even after emissions decline), and inertias in the built environment (which drive up the costs of action once higher-carbon capital investments are put in place).

Stabilizing GHG atmospheric concentrations at around 450 parts per million CO<sub>2</sub>e is consistent with the objective of trying to limit warming to 2°C.<sup>1</sup> However, this concentration target would require global GHG emissions to peak over the next decade and decrease at least by 50 percent below 2000 levels by 2050 (IPCC 2007).<sup>2</sup> By 2030, this could represent absolute emission reductions of about 30–40 GtCO<sub>2</sub>e.

The target of 30 GtCO<sub>2</sub>e by 2030 is much more than anticipated Annex I baseline emissions without new mitigation action (20 GtCO<sub>2</sub>e).<sup>3</sup> In other words, even if Annex I countries entirely eliminated or offset their emissions by 2030, the world would still fail to reach the global 2030 mitigation target. Therefore, the global mitigation challenge goes well beyond the capacity of Annex I countries alone. Whether such large and rapid global emissions reductions are realistic is a matter of intense debate. However, the mostly untapped mitigation capacity in developing countries looks large enough to

at least reduce the gap. Several studies have estimated the mitigation potential in non-Annex I countries (see Appendix A: Mitigation Potential in Non-Annex I Countries). The results of these studies tend to show that, once added to the global effort, the mitigation potential in developing countries could enable sufficient global reductions to stay on track for staying below a 450 parts per million carbon dioxide equivalent. Moreover, these studies show that 50–70 percent of the global mitigation potential would be located in non-Annex I countries. Developing countries could yield up to 25 GtCO<sub>2</sub>e of reduced emissions annually.

In sum, developing countries are an indispensable part of the mitigation solution. The global community must find the mechanisms and the proper incentives to fully bring their emission reduction forces into the climate change battle. Ideally this mechanism would also scale up investment in emerging countries and the global development agenda.

## Notes

<sup>1</sup> Using a best estimate of 3°C for climate sensitivity, the amount of global warming associated with a doubling of atmospheric carbon dioxide concentration from preindustrial levels. Taking into account uncertainty on climate sensitivity, limiting global warming below 2°C above preindustrial levels with an estimated likelihood of about 80 percent (or higher) requires stabilizing GHG atmospheric concentrations at 378 parts per million (or below) (IPCC 2007), that is, very close to today's levels.

<sup>2</sup> In 2005, global GHG emissions were approximately 13 percent above 2000 levels.

<sup>3</sup> See, for instance, UNFCCC (2007), with required emission reductions of about 32 GtCO<sub>2</sub>e by 2030 or close to 150 percent of Annex I baseline emissions at this time, and McKinsey & Company (2009), with required emission reductions of about 42 GtCO<sub>2</sub>e by 2030 or close to 220 percent of Annex I baseline emissions at this time.



# Call for New Financing Mechanisms

---

The Kyoto Protocol laid the foundation for a global carbon market—an innovative scheme to efficiently manage GHG emissions, primarily led by industrialized countries (see box 3.1). Several countries, alone or jointly, have chosen carbon trading (or plan to do so) as a key component of their climate change policies, with The European Union (EU) through its EU Emissions Trading Scheme (EU ETS) a leader (see box 3.1).

An entity seeking to reduce its GHG emissions at least cost can either opt for internal abatement measures or acquire CERs (also called carbon offsets) from the carbon market, depending on the relative costs (abatement cost versus CER price). CERs are generated by emission-avoiding projects conducted in non-Annex I countries. Such projects can be registered under the CDM of the Kyoto Protocol. An official UN certification process, the CDM validates applying mitigation projects, assesses the expected emission reductions of such projects, imposes monitoring procedures, and certifies actual reductions. The corresponding CERs are then issued and delivered to the sponsor of the project (the primary market). These CERs are tradable. They can be used for compliance (that is, to meet specific abatement targets) by the project sponsor or sold on the secondary market for CERs.

The volume of CERs issued has been steadily increasing since 2005. From 2002 to 2008, CERs totaled about 1,900 MtCO<sub>2</sub>e with an approximate value of US\$23 billion, mainly sponsored by private sector. There are about 6,000 projects presently being processed at the CDM, which should yield an additional 1,035 MtCO<sub>2</sub>e in carbon offsets over 2008–12.<sup>1</sup> In 2009, the total value of transactions in carbon markets was around €90 billion, with its three main components being the EUETS (around €73 billion), the primary CER market (€2.5 billion), and the secondary CER market (€15 billion).<sup>2</sup>

But despite its formidable achievements—creating a large market with a single price for carbon, catalyzing and implementing CDM projects—carbon finance has three main limitations. First, carbon finance provides only limited means to overcome the investment financing barrier faced by many low-carbon projects. Second, carbon finance only incentivizes generation of carbon offsets; consequently, emission reductions achieved in non-Annex I countries can only compensate for insufficient reduction effort in Annex I countries (the buyers of carbon offsets). Third, Annex I countries' future demand for CDM carbon offsets may fall off, partly as a consequence