



# Carbon Finance for Sustainable Development 2008

scale ► impact



Carbon Finance



at the World Bank

## carbon finance mission statement



Our mission is to catalyze a global carbon market that supports sustainable development, reduces transaction costs and reaches and benefits the poorest communities of the developing world.

This report on the carbon funds and facilities managed by the World Bank covers the period from October 1, 2007 through December 31, 2008. An online version of this report is available on the carbon finance website: [www.carbonfinance.org](http://www.carbonfinance.org)

Notes: All \$ = U.S. dollars (unless otherwise indicated). The U.S. dollar/euro exchange rate used in this report = 1.39. One ton = 1000 kilograms (one metric tonne). All greenhouse gas emission reductions are measured in tons of carbon dioxide equivalent (tCO<sub>2</sub>e).

This report is provided for informational purposes only. The carbon funds and facilities reported on are not legal partnerships. No warranties or representations are made as to the accuracy, reliability, or completeness of any information herein.

Cover photos:

Top: Lacandon Maya Boy paddling a dugout canoe, Naha Village, Chiapas, Mexico © Robert Leon / [www.robertleon.com](http://www.robertleon.com)

Bottom: Geothermal Power Station, Tuscany, Italy © [istockphoto.com](http://istockphoto.com)



“ This is a critical year for carbon markets. The risks from climate change are now well recognized—they must be reduced. We need to unify carbon market instruments to overcome problems across fragmented and less efficient markets. A deep and global carbon market can deliver significant benefits to all participants, including by expanding low-cost abatement options and helping set effective carbon price signals. It will also bring opportunities for deepening sustainable development, which we can support through enhanced technical and financial cooperation. Building on the lessons of the first decade of carbon markets, the World Bank’s two new carbon partnership facilities aim to provide continuity and scaled-up engagement with programmatic and sectoral approaches across a range of sectors, from improving energy efficiency to reducing emissions from deforestation and forest degradation. It is important that they succeed. ”

A handwritten signature in black ink that reads "Robert B. Zoellick". The signature is written in a cursive style with a large, looping 'Z' at the end.

Robert B. Zoellick,  
President,  
The World Bank Group

# **Carbon Finance for Sustainable Development 2008**

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An aerial, black and white photograph of a tropical cyclone, showing a well-defined eye and concentric cloud bands over a dark ocean. The image is used as a background for the text.

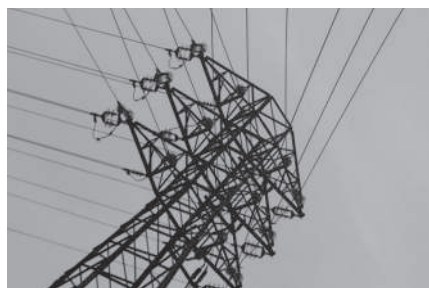
**“climate change is the world’s priority...  
the greatest threat  
hanging over humanity”**

Yvo de Boer, UNFCCC Executive Secretary

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# Carbon Funds and Facilities at a Glance



## Prototype Carbon Fund (PCF)

The PCF has pioneered the market for project-based greenhouse gas emission reductions while promoting sustainable development.

Fund capital (US\$ million)	219.8
Date operational	April 2000
Participants	23
Private % (by capital invested)	57.6
MtCO <sub>2</sub> e† under contract (ERPAT† signed)	31



## Community Development Carbon Fund (CDCF)

The CDCF provides carbon finance to projects that combine community development benefits with investment in clean energy in poorer areas of the developing world.

Fund capital (US\$ million)	128.6
Date operational	March 2003
Participants	25
Private % (by capital invested)	45.1
MtCO <sub>2</sub> e† under contract (ERPAT† signed)	9.4



## BioCarbon Fund (BioCF) Tranche 1

The BioCF Tranche 1 focuses on projects that sequester or conserve carbon in forest and agro-ecosystems, while promoting biodiversity conservation and poverty reduction. It has also piloted some projects on reducing emissions from deforestation and forest degradation (REDD).

Fund capital (US\$ million)	53.8
Date operational	May 2004
Participants	14
Private % (by capital invested)	51
MtCO <sub>2</sub> e† under contract (ERPAT† signed)	5.7



## Danish Carbon Fund (DCF)

The DCF purchases emission reductions that generate potential credits under the Clean Development (CDM) and Joint Implementation (JI) mechanisms of the Kyoto Protocol.

Fund capital (€ million)	90
Date operational	January 2005
Participants	5
Private % (by capital invested)	78
MtCO <sub>2</sub> e† under contract (ERPAT† signed)	7.7



## Spanish Carbon Fund (SCF)

The SCF promotes low-carbon development utilizing the Kyoto mechanisms through projects dealing with energy efficiency and renewable energy.

TRANCHE 1	
Fund capital (€ million)	220
Date operational	March 2005
Participants	13
Private % (by capital invested)	22.7
MtCO <sub>2</sub> e† under contract (ERPAT† signed)	19.8
TRANCHE 2	
Fund capital (€ million)	70
Date operational	April 2008



## Umbrella Carbon Facility (UCF)

The UCF is an aggregating facility that pools funds from World Bank-managed carbon funds and other participants to purchase emission reductions. Tranche 1 is purchasing emission reductions generated by two large projects in China (through decomposition of HFC-23).

Fund capital (€ million)	799.1*
Date operational	August 2006
Participants	16
Private % (by capital invested)	75
MtCO <sub>2</sub> e† under contract (ERPAT† signed)	129.3



† Million tons of carbon dioxide equivalent

†† Emission reductions purchase agreement

\* Includes €224.54 million total participation of PCF, NCDMF, ICF, DCF and SCF

\*\* Not publicly available

\*\*\*13 financial contributors and 25 REDD country participants



### Netherlands CDM Facility (NCDMF)

The NCDMF supports projects in developing countries that generate potential credits under the Clean Development Mechanism of the Kyoto Protocol.

Fund capital (US\$ million)	**
Date operational	May 2002
Participants	1
Private % (by capital invested)	0
MtCO <sub>2</sub> e† under contract (ERPAt† signed)	**



### Netherlands European Carbon Facility (NECF)

The NECF purchases emission reductions from Joint Implementation projects located in countries with economies in transition.

Fund capital (US\$ million)	**
Date operational	August 2004
Participants	1
Private % (by capital invested)	0
MtCO <sub>2</sub> e† under contract (ERPAt† signed)	**



### Italian Carbon Fund (ICF)

The ICF integrates an environmental dimension into development strategies by stimulating partnerships between the private and public sectors in Italy through investments in project-based opportunities that generate cost effective emission reductions.

Fund capital (US\$ million)	155.6
Date operational	March 2004
Participants	7
Private % (by capital invested)	30.2
MtCO <sub>2</sub> e† under contract (ERPAt† signed)	16.3



### BioCarbon Fund (BioCF) Tranche 2

The BioCF Tranche 2 focuses on projects that sequester or conserve carbon in forest and agro-ecosystems, while promoting biodiversity conservation and poverty reduction. It will also pilot projects that conserve carbon in soils, as well as REDD.

Fund capital (US\$ million)	38.1
Date operational	March 2007
Participants	7
Private % (by capital invested)	47
MtCO <sub>2</sub> e† under contract (ERPAt† signed)	0



### Carbon Fund for Europe (CFE)

The CFE is designed to help European countries meet their commitments under the Kyoto Protocol and purchase assets compatible with the European Union Emissions Trading Scheme (EU ETS).

Fund capital (€ million)	50
Date operational	March 2007
Participants	5
Private % (by capital invested)	20
MtCO <sub>2</sub> e† under contract (ERPAt† signed)	2.9



### Forest Carbon Partnership Facility (FCPF)

The FCPF is a unique global partnership designed to reduce emissions from deforestation and forest degradation (REDD) in developing countries.

Fund capital (US\$ million)	155
Date operational	June 2008
Participants***	38
Private % (by capital invested)	3.2
MtCO <sub>2</sub> e† under contract (ERPAt† signed)	0

## From the World Bank



While the global financial crisis continues to dominate news headlines, we should not forget other major international challenges of our time, with climate change foremost among them. The latest available data on greenhouse gas emissions from industrialized countries show that emissions continue to rise, underscoring the urgent need for action. Addressing climate change is critical to development and poverty reduction: the poorest people are the ones most at risk from the impacts of climate change, such as diminished agricultural productivity, increased incidence of disease, rising sea-level and extreme weather events.

At the World Bank, we continue to broaden and deepen our involvement in climate change mitigation and adaptation. Our aim is to help countries cope with climate change while also achieving their overall goals of strengthening economic growth, reducing poverty and meeting the Millennium Development Goals. A new Strategic Framework for Development and Climate Change outlines our approach, under which we have launched or strengthened a series of initiatives over the past year that ramp up our work and expand and extend our partnerships with other agencies.

Among these initiatives, our Carbon Finance Unit remains a leader in climate-change action, beginning with a single fund established in 2000 and reaching the end of 2008 with 11 funds and facilities and over \$1.8 billion in emission reductions purchase agreements. Our funds and facilities continue to pioneer in the carbon market, increasing the scale, scope and duration of carbon finance.

This has been a banner year for carbon funds and facilities administered by the World Bank. We invite you to look through this report to see what has been achieved so far in both carbon finance and sustainable development. And as you read about our future plans, we hope you, too, can see their potential to contribute to sustainable development and poverty reduction.

A handwritten signature in black ink, appearing to read 'Katherine Sierra'.

Katherine Sierra  
Vice President, Sustainable Development  
The World Bank

## From the Vice-chair of the Host Country Committee



More than 10 years have passed since the last major agreement on climate change, the period being marked by terrible events affecting ecosystems and mankind. Floods, droughts, forest fires, melting of glaciers and catastrophic weather-related events have made us all reconsider our societies regardless of the level of development. However, good things have happened also.

Climate change has become a major issue, no longer a concept owned by scientists. Climate change has moved into our daily lives as more and more people become concerned with the complexity of this issue. Fortunately, some of us are also looking for solutions.

The first step was to put a price on carbon by establishing a carbon market. Based on some words crafted in Kyoto and lots of ingenuity, the market has expanded tremendously in less than 10 years and reached more than \$120 billion in 2008.

Speaking of 2008, it is worth mentioning that we have passed the first milestone: we are officially in the Kyoto Protocol first commitment period. Progress is evident in some areas but much work has to be done in others. We have come a long way from Kyoto on the way to Copenhagen—stopping for refueling in Marrakech, Montreal and Bali. We still have some crucial months to finish our work and we should not allow ourselves to miss the most important goal of 2009: a new agreement in Copenhagen.

As a member of the Host Country Committee (HCC) for a long time, I understand, as do my other colleagues in this group, the importance of the HCC to the World Bank's carbon finance operations, especially in relations with the host countries.

The HCC still has an important role and should continue to exist and be considered by the World Bank as an important ally in strengthening the carbon market.

I wish all of us wisdom and success in 2009.

A handwritten signature in black ink, appearing to read 'V. Trusca'.

Vlad Trusca, Vice-chair  
Host Country Committee

# The Road to Copenhagen and Beyond

## International Cooperation on Climate Change: the Urgency of Immediate Action

Global climate change threatens to roll back or even derail development progress for many countries. Reconciling the double challenge of mitigating and adapting to climate change, while also supporting the growth priorities of developing nations, is a major test for the international community. This demands unprecedented global cooperation, involving concerted action by countries at different development stages supported by “measurable, reportable and verifiable” transfer of finance and technology from developed to developing countries. Such concerted action, taken immediately, is our best opportunity to step back from the brink of a runaway climate system with irreversible consequences.

► The United Nations Framework Convention on Climate Change (UNFCCC) is the international agreement that sets out a framework for action to avoid “dangerous anthropogenic interference” with the climate system.

► The Kyoto Protocol of the UNFCCC calls on industrialized countries and countries with economies

in transition to reduce their overall emissions of six greenhouse gases by an average of 5.2% below 1990 levels. The first legally binding commitment period for signatory countries is 2008 to 2012.

► Kyoto obligations can be met by reducing domestic emissions or using one of the three Kyoto flexible mechanisms: trading emissions permits, purchasing emission reduction credits through Clean Development Mechanism (CDM) projects in developing countries, or purchasing emission reduction credits through Joint Implementation (JI) projects in countries with economies in transition.

► At the 13th Conference of the Parties (COP 13) in 2007 in Bali, Indonesia, negotiators agreed on the “Bali Action Plan” in order to enhance the implementation of the Convention and negotiate long-term cooperative action. The plan calls for enhanced action on mitigation and adaptation, the development and transfer of technology and provision of financial resources and investment to support these actions.

## NOT A MOMENT TO SPARE

Climate change is a development reality. The fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) reaffirmed the unequivocal evidence of a warming climate system, with empirical records in the last century of widespread increases in observed air and sea temperatures, sea-level rise, melting sea-ice and glaciers and reduction of snow cover. This has been accompanied by observed trends of extreme weather patterns including more intense and longer droughts, increased extreme precipitation and more hot days and heat waves. The anticipated impacts of climate change, which could begin to occur within the next two to three decades, include floods, storms, water stress and decline in agricultural productivity and food security. In some countries, yields from rain-fed agriculture could be reduced by up to 50% by 2020 (IPCC 2007). This could lead to population displacement, migration and potential conflicts. An effective response to climate change must combine both mitigation—to avoid the unmanageable—and adaptation, to manage the unavoidable.

Most of the warming trend observed since the mid-20th century is attributed to an increase in anthropogenic greenhouse gas concentrations, particularly of carbon dioxide (CO<sub>2</sub>) caused by fossil fuel use and land use changes. While these activities have already likely committed the Earth to a level of warming within 2 degrees Celsius, the challenge remains to curtail global emissions to “manage the unavoidable” without incurring costs and impacts of a catastrophic magnitude. A delay in reducing these emissions significantly constrains opportunities to achieve lower greenhouse gas atmospheric concentration stabilization levels and is likely to increase the risk of severe—and possibly irreversible—impacts and the cost of adapting to them.



## Carbon Markets and the 2008 Financial Crisis

Carbon markets have experienced recent fluctuations concurrent with the global financial crisis. As energy prices have fallen, prices for certified emission reductions have fallen too. It is also possible that there will be a decline in both demand and supply related to the limited time available to enter into new contracts for the first commitment period. However, prices for voluntary emission reduction credits remain higher than in mid-2008, mainly due to increased demand in the United States. Overall, the global carbon market is forecast to grow by 20% in terms of volume in 2009, despite falling value.

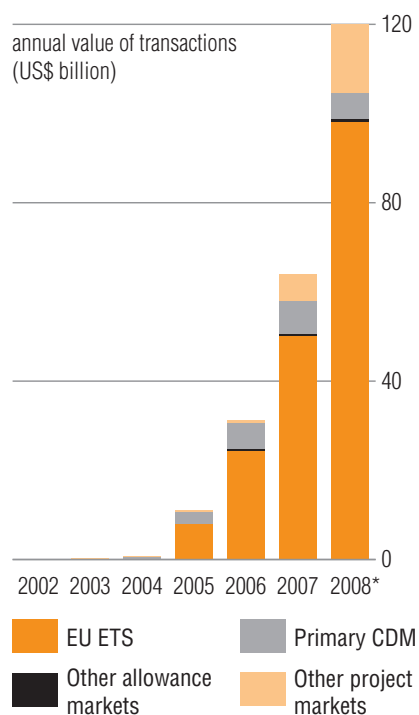
## More Optimistic Times

There is scope for continued cautious optimism. The development of emissions trading in the United States has begun, with policy-makers moving forward on mandatory emissions reporting, and on comprehensive future legislation for a cap-and-trade system.

Such a scheme could give rise to a large carbon market, quickly on par with the EU ETS, though maybe not with as significant an impact on international offsets (depending on legislators' views on CDM and REDD assets). A shared vision on international offsets—especially their role, type and volume—will likely be among major areas to consider in integrating upcoming U.S. carbon markets with markets around the world.



A fast-growing market, dominated by EU ETS as primary CDM stalls



## STATE AND TRENDS OF THE CARBON MARKET 2008

Over the past two years, the carbon market has continued to grow, each year doubling in value and reaching about \$120 billion in 2008 (over 12 times its 2005 value). Representing close to three-quarters of market volume and value, transactions of allowances and derivatives under the European Union Emissions Trading Scheme (EU ETS) dominated the market. Ranking second, the secondary market for certified emission reductions (CERs) experienced the biggest growth in activity over the period. The primary CER market leveled off, reflecting concerns about inefficiencies and bottlenecks in the Clean Development Mechanism regulatory system as well as limited expectations from the continuation to 2020 of the EU ETS—the major source of demand so far. The year 2008 also saw pioneer transactions of Assigned Amount Units (AAUs) and first trades in emerging compliance markets. Observers expect the implications of the financial crisis as well as developments on the post-2012 front to be major drivers of the carbon market through 2009.

\* Preliminary data for 2008 are based on a literature review (Point Carbon, New Carbon Finance).

# The World Bank: Building the Impact of Carbon Finance



“Our Strategic Framework for Development and Climate Change focuses on six action areas that include mitigating greenhouse gas emissions, helping countries adapt at all levels from regional to local, increasing access to concessional funding and new financing, fast-tracking development and adoption of new technologies, meeting the energy needs of the world’s poor, and fostering market-based financing and leveraging private-sector resources.”

**Warren Evans,**  
**Director of Environment,**  
**The World Bank**

From gas-flaring reductions in Russia to clean energy in Sub-Saharan Africa and renewable energy in Latin America, carbon finance has been integrated into all the regions where the World Bank operates. The aim is to broaden the World Bank’s response to climate change, and help poor countries adapt to climate change while achieving economic growth and reducing poverty.

The two newest carbon finance facilities, the Forest Carbon Partnership Facility and the soon-to-be-launched Carbon Partnership Facility, are helping to lead the way forward for the world to prepare for carbon finance after 2012. They will scale up from individual projects

to sector-wide, programmatic interventions. The Forest Carbon Partnership Facility will broaden carbon finance beyond the land use, land-use change and forestry sector, with the potential to make significant gains in reducing emissions from deforestation and forest degradation.

## **Integrating Carbon Finance into the Development Work of the World Bank**

Initially, the World Bank’s role was to catalyze the global market for carbon emission reductions. Carbon finance as a tool for climate change mitigation is becoming integrated into the development work and assistance programs of the World Bank in all the regions.

## **SENEGAL: EFFICIENT LIGHTING PROGRAM IN RURAL AREAS**

Tens of thousands of rural households in Senegal will benefit from the Senegalese Rural Electrification Agency (ASER) Rural Area Energy Efficient Lighting Program, which is a component of a rural electrification plan that will provide affordable access to power for Senegal’s rural communities—the equivalent of about 365,000 rural households within five years. The Energy Efficient Lighting Program will provide about 1.5 million compact fluorescent lamps that will be installed instead of incandescent light bulbs at the time of electricity connection in Senegal’s rural areas. These energy-efficient light bulbs can work up to five or six times longer than a conventional light bulb and will result in savings for households on their power bills because they use much less electricity than an ordinary bulb. Because they draw less power, there will be fewer greenhouse gas emissions. ASER will sell 120,000 tons of carbon dioxide equivalent emission reductions to the **Community Development Carbon Fund**, a partnership of nine governments and 16 companies.



### East Asia and Pacific

“In 2008, the World Bank’s carbon finance portfolio in East Asia and Pacific (EAP) increased to approximately 200 million tons of emission reductions. Carbon finance provides significant support to 46 environmentally friendly projects that reduce greenhouse gas emissions throughout the East Asia and Pacific region. Carbon finance supports major investment programs and provides key technical assistance activities. We also keep expanding our carbon finance operations to new areas such as transport and urban development. Clearly, carbon finance has become part and parcel of EAP’s development dialogue with our client countries. We are now preparing to fully integrate carbon finance and other climate and non-climate related funding sources into a support structure for clients seeking our help in addressing climate change.”

**Jim Adams, Vice President,  
East Asia and Pacific Region, the World Bank**

### Europe and Central Asia

“Reducing the emissions of greenhouse gases in our client countries remains a major goal for the years to come. The region has leveraged carbon finance in our work programs as part of the Bank’s climate change mitigation strategy in partnership with our client countries and other development partners. Notably, in 2008 the World Bank, as the Trustee for the Carbon Fund for Europe, Danish Carbon Fund, Italian Carbon Fund and Spanish Carbon Fund, signed a significant emission reductions purchase agreement (ERPA) with NK Rosneft, a major Russian oil and gas company, to purchase about 5.3 million tons of carbon dioxide equivalent emission reductions to reduce gas flaring. Further negotiations have been initiated to engage in international emissions trading—purchasing at least a million or more Assigned Amount Units (AAUs) from each of the following countries: Hungary, Czech Republic and Poland. Revenues from such transactions would support a pipeline of ‘green’ projects. In parallel, the Europe and Central Asia region has been providing technical assistance to Latvia, under a fee-for-service arrangement, to support their implementation of a scheme to green their AAUs and engage in international emissions trading.”

**Shigeo Katsu, Vice President,  
Europe and Central Asia Region, the World Bank**

### RUSSIA: ASSOCIATED GAS RECOVERY PROJECT FOR THE KOMSOMOLSKOYE OIL FIELD

Flaring of associated petroleum gas contributes significantly to global emissions of greenhouse gases. According to the Global Gas Flaring Reduction Partnership—a World Bank-led initiative—about 150-170 billion cubic meters of gas have been wasted during the last decade, equivalent to emissions of about 400 million tons of carbon dioxide. The Associated Gas Recovery Project involves processing of the gas that would otherwise be flared at the Komsomolskoye oil field near Gubkinsky City in the Yamal-Nenets Autonomous District in Western Siberia. The project is expected to deliver about two billion cubic meters of consumer-grade dry gas per year to Gazprom, plus about 23,000 tons of petroleum liquids. With revenues provided by the **Carbon Fund for Europe**, the **Danish Carbon Fund**, the **Italian Carbon Fund**, and the **Spanish Carbon Fund**, the project developer will be able to implement a costly technological solution allowing full utilization of the previously flared gas. One of the first JI projects in Russia aimed at reducing gas flaring, the project is expected to deliver emission reductions of 6.6 million tons of carbon dioxide equivalent between 2010 and 2012. The four funds will purchase 5.3 million tons of emission reductions.



### Middle East and North Africa

“The World Bank is actively helping countries in the Middle East and North Africa to explore Clean Development Mechanism opportunities. With 11 carbon offset projects, including four signed emission reductions purchase agreements, we are reducing greenhouse gas emissions, and also contributing to the sustainable development of host countries. We are also working in seven countries to enhance their capacity to engage in carbon finance. These technical assistance programs can help to scale up carbon finance across several sectors, and increase its impact on economic development.”

**Daniela Gressani, Vice President,  
Middle East and North Africa Region,  
the World Bank**

### Africa

“Our African clients have a strong interest in carbon finance as a tool for sustainable development in such key sectors as agriculture, forestry, energy and waste management. But we have to support them to sustain this interest by highlighting the opportunities in carbon finance and how these will benefit the poor. Only one in four Africans has access to electricity, even as the continent’s vast hydropower resources remain largely undeveloped. By taking advantage of carbon credits, Africa will be able to maximize its natural resource endowments as it can leverage its vast potential to contribute to clean development.”

**Obiageli (“Oby”) Ezekwesili, Vice President,  
Africa Region, the World Bank**

## JORDAN: AMMAN LANDFILL GAS PROJECT

Collaboration between the Greater Amman Municipality (GAM) and the World Bank in municipal solid waste disposal constitutes an important step towards a greener society, through the implementation of the first commercial-scale project converting landfill gas to energy at the Ghabawi Sanitary Landfill site, located 40 kilometers east of the center of Amman, Jordan. One of the main objectives of this project is to avoid methane emissions from the landfill by installing a plant for environmentally friendly landfill gas collection and electricity generation. Methane is a greenhouse gas with a global warming potential 21 times higher than carbon dioxide, the main contributor to global warming. Even though there are no regulatory or legislative requirements for recovering landfill gas in Jordan, the government is committed to reducing the landfill’s methane emissions. The electricity delivered to the grid replaces electricity produced from power plants using heavy fuel oil, which means that in addition to the methane emission reductions at the landfill there will be carbon dioxide emission reductions from the power plant. Under the agreement with GAM, the **Carbon Fund for Europe** will purchase emission reductions of 900,000 tons of carbon dioxide equivalent through 2014.





### Latin America and the Caribbean

“Climate change is already a reality. This is evidenced by the acceleration of global temperature increase, the melting of glaciers and rising sea level. Latin American and Caribbean countries are not exempt from these trends. While not a significant cause of the problem, the region has a real possibility to become an active part of the solution. Latin America and the Caribbean is one of the most active regions of the World Bank on carbon finance, with 44 projects currently in the portfolio (13 under development and 31 already under supervision). The Bank’s due diligence work significantly improves project quality and encourages other parties—such as financial institutions—to become involved in these projects. Now is the time to scale up these efforts into programmatic actions. By supporting countries to unlock their full mitigation potential in a sustainable manner, we are helping the region enhance its efforts to combat climate change while continuing to grow and reduce poverty. Going forward, we will need to ensure support for the development of improved policy and regulatory frameworks in order for these efforts to have an increased impact on the global climate change agenda.”

**Pamela Cox, Vice President,  
Latin America and Caribbean Region,  
the World Bank**

### South Asia

“South Asia is particularly vulnerable to the impacts of climate change: with an estimated 600 million people subsisting on less than \$1.25 a day, even small climate variations can cause irreversible losses and push large numbers of people into poverty. As the region strives to meet its development goals, the likelihood of further growth in emissions is enormous. How the region meets future demands for energy and economic prosperity will have far-reaching consequences on global greenhouse gas emissions. In 2008, the World Bank signed several emission reductions purchase agreements in South Asia, including two projects in Pakistan and a project which will purchase emission reductions from up to one million new solar home systems in Bangladesh. We look forward to continuing the support for the delivery of carbon market benefits to our clients, as well as assisting under-served market segments to access the international carbon market through existing instruments and new products.”

**Isabel Guerrero, Vice President,  
South Asia Region, the World Bank**

## PAKISTAN: LAHORE COMPOSTING PROJECT

Pakistan is the most urbanized country in South Asia, with 35% of the population living in urban areas. Solid waste is a major environmental and health hazard in Pakistan. As cities’ economies grow quickly, business activities and consumption patterns are driving up the quantity of solid waste. But less than 50% of the waste generated is collected, and even then it is disposed of at dumps or roadsides. About 6,000 tons of municipal waste are generated daily in Lahore; more than half is organic content that could be reduced substantially by large-scale composting. The project consists of establishing a composting plant at a landfill in the Mehmood Booti area of Lahore city, which will avoid methane emissions and significantly decrease the amount of waste by applying a simple aerobic-type composting technology. The **Danish Carbon Fund** will purchase emission reductions of over 300,000 tons of carbon dioxide equivalent over a six-year period. Further benefits will include reduction of waste-related health hazards, improvement of cultivated land by use of the compost and recycling of valuable materials.



## From the Manager of the Carbon Finance Unit



We've come a long way since the first of the World Bank's carbon funds, the Prototype Carbon Fund, was conceived in the late 1990s. Carbon finance has entered a stage of maturity after more than a decade of operations by the World Bank's carbon funds and facilities. We now have 11 well-established funds and facilities, with another to be launched in 2009. Our carbon funds have been about learning by doing—learning new lessons from new experiences, but also applying the lessons of the past. A collaborative and inclusive approach with fund participants, donors, and host countries, always including and sharing knowledge with the private sector and civil society, is key to building our partnerships.

We have learned a great deal to bring us to this point, and to carry us to the next stage—the post-2012 commitments that will be negotiated in Copenhagen in 2009—we have set up two new carbon facilities. The Forest Carbon Partnership Facility will give us the opportunity to use carbon finance to help address the enormous challenges in the field of climate change and land use. The new agenda for reducing emissions from deforestation and forest degradation offers reasons to

be hopeful, and focuses renewed attention and financial resources to address the root causes of these problems. The Carbon Partnership Facility to be launched in 2009 will target large-scale programs for clean technology.

In our vision for the future, carbon markets will help catalyze the shift to low-carbon economies. Carbon markets thus have the potential to become instruments of a much broader-scale response targeted at national, programmatic and sector-wide levels, as well as at the individual project level. Our new Forest Carbon Partnership Facility and the soon-to-be-launched Carbon Partnership Facility are squarely in position to help broaden the scope and extend the duration of carbon finance to ensure that it will be a viable tool to combat climate change.

A handwritten signature in black ink that reads "J. Chassard". The signature is fluid and cursive.

Joëlle Chassard  
Manager, Carbon Finance Unit  
The World Bank

# Carbon Finance Highlights 2008



The **Prototype Carbon Fund (PCF)** now has 19 out of 24 projects delivering emission reductions. In 2008, the PCF agreed to accept additional capital (an additional \$39.8 million), allowing the PCF to secure possibilities of late vintage emission reductions from projects in the portfolio, which also benefit project entities.



The **Community Development Carbon Fund (CDCF)** now has 28 emission reductions purchase agreements with a value of \$89.3 million. Fifty percent of this value is committed to the poorest countries. An additional 14 projects are in the CDCF pipeline, of which seven are at the carbon finance document stage—an advanced project development phase with detailed project description and financials.



The **BioCarbon Fund (BioCF)** Tranche 1 has signed contracts for 16 projects involving afforestation and reforestation (A/R), and for three projects involving reduced emissions from forest degradation and deforestation (REDD). BioCF Tranche 2 is now fully capitalized at \$38.1 million. In addition to A/R and REDD projects, Tranche 2 will explore carbon payments for changes in agricultural practices that lead to soil improvement.



The **Netherlands Clean Development Mechanism Facility (NCDMF)** has a mature portfolio which includes the first project ever registered under the CDM. The NCDMF portfolio includes a significant number of registered projects and others with signed emission reductions purchase agreements that are in the process of being registered.



The **Netherlands European Carbon Facility (NECF)**, managed cooperatively with the International Finance Corporation (IFC), is a Joint Implementation facility which supports operations in Ukraine, Russia and Poland. The facility closed its portfolio on June 30, 2008.



With a total capitalization of \$155.6 million, the **Italian Carbon Fund (ICF)** has signed seven emission reductions purchase agreements. The portfolio includes both CDM and JI projects on four continents, totaling more than 16 million tons of carbon dioxide equivalent.



By the end of 2008, the **Danish Carbon Fund (DCF)** had signed seven emission reductions purchase agreements with reductions of nearly eight million tons of carbon dioxide equivalent. The fund has an additional six projects in the pipeline, equivalent to another five million tons of carbon dioxide equivalent.



The portfolio of the **Spanish Carbon Fund (SCF)** includes 11 emission reductions purchase agreements signed, which account for almost 70% of the €220 million of the total capitalization. A second tranche of €70 million was established by the Spanish Government in 2008, focusing on projects that generate emission reductions and on Green Investment Scheme initiatives.



Tranche 1 of the **Umbrella Carbon Facility (UCF)** includes participants from five carbon funds administered by the World Bank and 11 from the private sector. The capital of the facility is €799.1 million; three-quarters of it comes from the private sector. In 2008, the facility delivered 13.1 million tons of certified emission reductions, for a total of 36.1 million tons so far.



The total capitalization of the **Carbon Fund for Europe (CFE)** stands at €50 million and the CFE has been able to sign four emission reductions purchase agreements for a value of €30.1 million. An additional nine projects are in the CFE pipeline, of which five projects are at the carbon finance document stage.



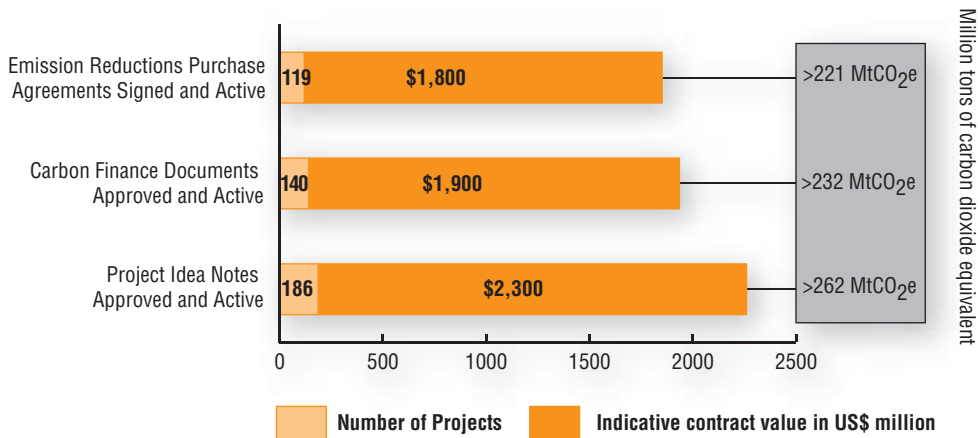
The **Forest Carbon Partnership Facility (FCPF)** became operational in June 2008 and stands at \$155 million. It will build the capacity of developing countries in tropical and subtropical regions to reduce emissions from deforestation and forest degradation and to tap into any future system of positive incentives for REDD.

# Report on Carbon Finance Operations

## World Bank Carbon Finance Projects

As of December 31, 2008, the World Bank-managed carbon funds and facilities have 186 projects in their portfolio with an estimated carbon asset value of more than \$2.3 billion. Out of these, 119 projects have signed emission reductions purchase agreements with a value of over \$1.8 billion, and the participants have approved another 21 projects that are at an advanced carbon finance document stage.

World Bank Carbon Finance Project Status (cumulative)

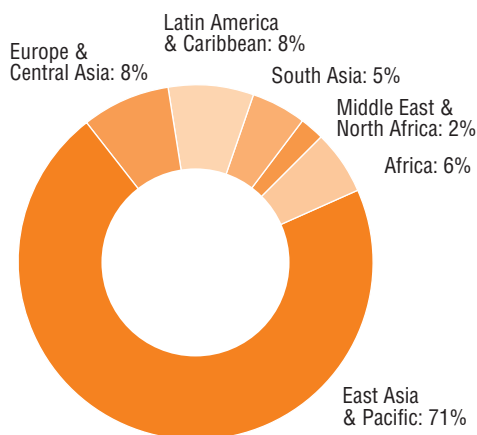


Note: The above figures exclude options purchases.



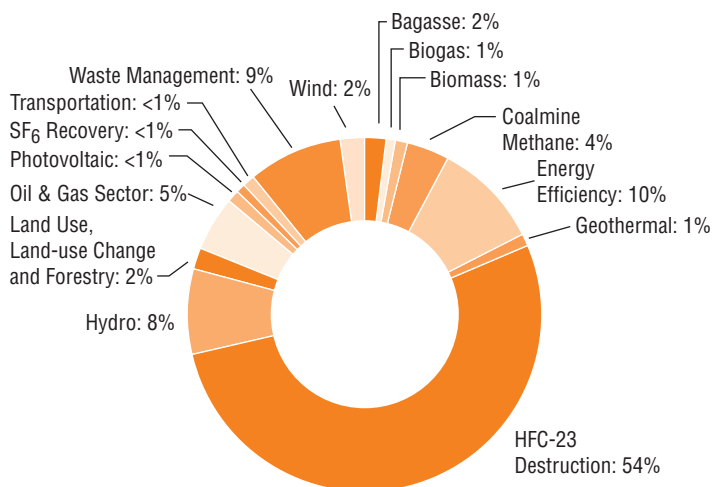
## Geographic Distribution\*

The East Asia and Pacific region—in particular China—with a total emission reduction value of over \$1.3 billion, makes up the largest share of all active projects. Latin America and the Caribbean and Europe and Central Asia have the second and the third largest share of the portfolio as a result of several renewable energy, waste management and oil and gas sector projects. Besides these, there were 10 purchase agreements signed in the Africa region, many of them for renewable energy projects—once again reflecting the emphasis that has been placed on the region by the World Bank.



## Technology Distribution\*

HFC-23 projects account for the largest share, 54% of the portfolio, but that share has been consistently decreasing due to the inclusion of projects belonging to other sectors such as renewable energy, energy efficiency and waste management. Much of the value of the agreements signed in the last reporting period was in the renewable energy sector, which now has more than \$300 million worth of carbon assets, followed by the energy efficiency sector, while the waste management sector accounted for about 9% of the total.



\*Charts are based on total emission reductions \$ value of projects at emission reductions purchase agreement and carbon finance document stage.

### CHINA: GUANGDONG HUIZHOU LIQUID NATURAL GAS POWER GENERATION PROJECT

The project is located near the South China Sea in the Daya Bay Economic and Technical Development Zone, 48 kilometers from Huizhou City in Guangdong Province, China. The project consists of a highly efficient power-generation plant with a combined-cycle gas turbine that burns liquid natural gas, which is the least environmentally damaging form of power production from fossil fuels. Liquid natural gas

is natural gas that has been processed to remove impurities and heavy hydrocarbons and then compressed to liquid, a low-volume form that is easy to ship. When it is burned in the combined-cycle turbine, it rotates a generator to produce electricity. Next, a second phase recovers the heat remaining in the spent fuel to produce steam powering a steam turbine, resulting in thermal efficiency of over 50%. The electricity generated by the project will displace power in the Southern China Power Grid, where more than half the power comes from coal-fired power plants. Resulting emission reductions will be purchased by the **Netherlands CDM Facility**, for a total of nearly 4.8 million tons during the five-year crediting period.



# Scaling Up Greenhouse Gas Mitigation Efforts

**The World Bank's Carbon Finance Unit (CFU) is exploring opportunities to combine its extensive experience with CDM and JI projects and programs, with the World Bank's core poverty alleviation objectives to promote the scaling up of mitigation efforts and sustainable development.**

The urgent need for scaling up mitigation efforts is widely accepted. Approaches to scale up successfully are expected to include a combination of policy-based and technological interventions to be defined by country-specific circumstances and capacities. The success of such approaches will be enhanced by simplified methodologies for estimating low greenhouse gas (GHG) trends rather than measuring each ton of GHG, and by streamlined program designs, which intrinsically ensure environmental integrity of the emission reductions.

Strategically aggregated programs could become good vehicles to scale up system, subsector or sector-wide mitigation efforts. Aggregation is widely practiced in investment-focused programs by financial institutions in the form of lines of credit, and by government agencies as sector-specific funds and budgetary allocations. Natural aggregators can be mandated by law (e.g., public agencies), by stakeholders (e.g., industry associations) or by institutional goals (e.g., non-governmental organizations, private sector).

The Carbon Finance Unit has been actively exploring various scale-up opportunities. These can broadly be categorized as four types of interventions, as shown in the box to the right. Experience with developing large-scale interventions indicates the need to simplify application of methodologies; build financial, legal and implementation capacity of the aggregators; and evolve systems to enable participation of a broad range and large number of stakeholders in order to accelerate the scaling up and outreach of the GHG mitigation interventions.

## ▶ Technology-specific intervention

- Compact fluorescent light bulb market transformation activity coordinated by energy agencies
- Energy agency-led program to help achieve national geothermal development target

## ▶ GHG-specific intervention

- Collaborative efforts on HFC reduction in air-conditioning and refrigeration sectors in parallel with HCFC phaseout with the World Bank's Montreal Protocol operations team
- Programs by rural development agencies to accelerate deployment of household bio-digesters to capture and utilize methane emissions from animal waste

## ▶ Industry-specific intervention

- Reduction of gas flaring by petroleum industry led by public-private partnerships
- Technology upgrade and re-tooling of production facilities by bus manufacturers

## ▶ System-wide intervention

- Coordinated city-wide GHG mitigation activities across waste, transport and energy end-use sectors, led by municipalities
- Promotion of efficiency of district heating systems led by energy suppliers and agencies



# The Human Face of Carbon

## Carbon Finance's Contribution to Poverty Reduction and Sustainable Development

### Investing in People

The Community Development Carbon Fund (CDCF) supports projects for energy efficiency, conversion of solid waste to energy and renewable energy. Its unique feature is that these projects also provide significant and measurable development benefits to poor communities in the immediate project vicinity, or with a historical, cultural, or economic affiliation with the project. These communities are empowered to play an active role in the delivery of social services and economic infrastructure that help improve their livelihoods and thus reduce poverty. Each CDCF project strives to ensure that the different social groups within a community have equal access to benefits, and that the benefits yield maximum and sustainable results, with desired outputs and, wherever possible, measurable outcomes.

CDCF project benefits range from welfare improvement through better energy infrastructure, to educational and health benefits including construction of schools and health centers. Benefits often include increased social empowerment of women and marginalized communities, as well as income from short- and long-term employment.

For communities involved in the **Nepal Biogas Project**, waste management, indoor air quality and time management were among the biggest concerns. Since 2004, some 110,000 biogas plants have been installed. The project has improved waste management by increasing the number of household latrines connected to the biogas digester, reduced air pollution by introducing biogas-fueled stoves, and reduced the workload of women who would otherwise spend significant time collecting firewood for their household activities.

The CDCF has also funded several small hydropower projects, such as the **Santa Rosa Bundled Small Hydro Project** in Peru. This project not only provides electricity to the national grid, it also gives free electricity to a local orphanage in the village of La Merced. Furthermore, the project has shared with the village part of the income from the sale of emission reductions. Villagers used the proceeds for local infrastructure improvements and a new community center for more than 500 families.



### Building Capacity of Forest-dependent People

The Forest Carbon Partnership Facility (FCPF) will specifically target indigenous peoples and other forest dwellers for a program to enhance their capacity to participate in activities that reduce deforestation and forest degradation (REDD). The objective of the capacity-building program is to make forest dwellers knowledgeable and aware of REDD, in order to enhance their understanding and allow them to engage more meaningfully in the implementation of REDD activities.

The capacity-building program will be funded under the FCPF Readiness Mechanism and will focus on building awareness and understanding of the technicalities of REDD and the role of forest dwellers in REDD implementation, promoting the active participation of local communities in identifying local solutions and strategies for REDD, and strengthening their role in decision-making and planning.

Through the FCPF capacity-building program it is envisaged that indigenous peoples and other forest-dependent people will be able to participate more fully in the development and implementation of their local and national REDD programs.

# Financial Performance

Overall funds contributed by participants in the World Bank's carbon funds and facilities increased to \$2.3 billion\* as of December 31, 2008. As part of the strategy to optimize the opportunities within project portfolios and to manage under-delivery risk, several funds have decided to increase their capitalization to allow for additional emission reductions to be purchased or projects contracted. In addition, during the reporting period the Forest Carbon Partnership Facility was made operational and the capitalization target was increased by \$50 million to \$350 million. A second tranche of the Spanish Carbon Fund with capital of €70 million was established and the Carbon Partnership Facility was opened for contributions. To date contributions of €72 million have been committed to the CPF.

The value of emission reductions purchase agreements signed by December 31, 2008, for all funds and facilities is more than \$1.8 billion, with more than 221 million tons of carbon dioxide equivalent contracted.

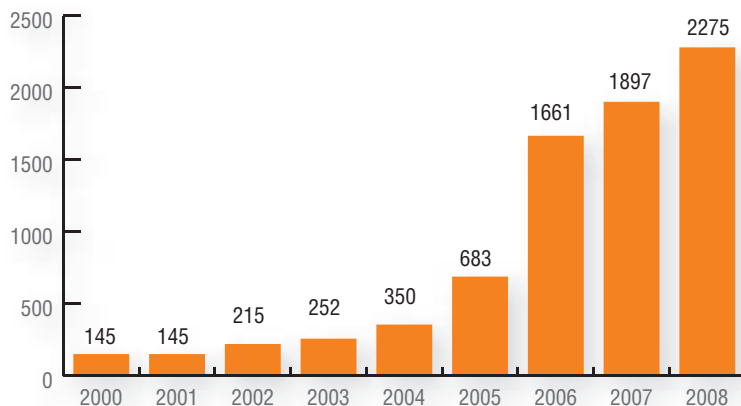
2008 was a tumultuous year in the financial markets, and the carbon markets have not escaped unscathed from the global credit crunch. After several years of rising prices for primary certified emission reductions—following the trend in the allowance market and secondary certified emission reductions market—retrenchment of primary certified emission reductions prices is likely for emission reductions purchase agreements concluded in the months ahead.

In the 15 months to December 31, 2008, 21.2 million tons of greenhouse gas emission reductions were delivered from project entities. Total payments for these assets, net of all cost recoveries, amounted to \$192.8 million. During the reporting period 57 participants were registered with the UNFCCC to receive assets from 26 projects and as of December 31, 2008, 15 million tons have been forwarded to national registries.

In June 2008, the Carbon Finance Unit went live with its Carbon Asset Reporting System, which manages asset allocations to participants and forwarding to national registries. This system provides online access for fund participants to allow them to check balances and the status of delivered emission reductions. Work continues in streamlining processes as the Carbon Finance Unit enters the delivery phase for many of its funds.

Over the next 18 months the system's infrastructure will be further enhanced, with particular focus on day-to-day emission reductions purchase agreement management and automation of the payment processing workflow. The contracting and management of the Designated Operational Entities—who perform the project validation and emission reductions verification work—has been centralized, with a dedicated staff overseeing this core process.

Funds and Facilities Under Management (in US\$ million)\*



\* Funds and facilities under management, excluding NCDMF and NECF



# Expanding the Scope and Reach of Capacity Building

Carbon Finance Assist (CF-Assist) is the flagship capacity-building program for carbon finance at the World Bank, and its basic objective is to ensure that developing countries and countries with economies in transition are able to participate fully in the flexible mechanisms defined under the Kyoto Protocol. CF-Assist has made substantial progress during 2008 in terms of expanding its reach, and launching innovative initiatives in technical assistance. In three years of its implementation, CF-Assist has worked in nearly 60 countries, including several new countries in 2008—Mauritania, Tanzania, Sierra Leone, Vietnam, Yemen, Syria and The Gambia. Some of the key accomplishments of CF-Assist during 2008 are as follows:

- ▶ Has provided through its various programs, exposure to over 5,000 stakeholders from around the world;
- ▶ Helped identify over 200 potential carbon mitigation projects in over 16 countries;
- ▶ Co-organized highly successful regional carbon forums in Africa, Latin America and South Asia;
- ▶ Conducted sector-specific regional capacity building programs in the lighting sector in East Africa and the financial sector in West Africa;
- ▶ Helped create new Designated National Authorities (DNA) in Sierra Leone, Botswana and Syria;

- ▶ Along with the Carbon Finance Unit, successfully co-hosted the fifth Carbon Expo;
- ▶ Facilitated the participation of 50 host countries at Carbon Expo; and
- ▶ Played an active role in the Nairobi Framework—the multi-agency coordination mechanism for carbon finance capacity building in Sub-Saharan Africa—and implemented complementary programs with other partners such as UNEP, UNDP and Centre d'Etudes Financières Economiques et Bancaires.

In addition to its regular capacity-building activities described above, CF-Assist is developing learning programs on carbon finance, which will be delivered through online e-learning courses, distance learning and direct training programs. Two such courses—one on CDM/JI and another on clean energy technologies—are expected to be ready by June 2009.

CF-Assist also launched a special capacity-building program focusing on urban areas, given the growing role of cities in fighting climate change. This program aims, over the next three years, to provide capacity-building services to at least 15-20 cities in developing countries, to help them develop significant mitigation activities using tools such as Programme of Activities.

## CARBON EXPO

Carbon Expo, the World Bank's knowledge sharing event on the international greenhouse gas market, has been organized in partnership with the International Emissions Trading Association (IETA) and the Cologne Trade Fair (Koelnmesse) on an annual basis since 2004. For the fifth edition in May 2008, a record number of over 3,000 international participants visited from 115 countries (up from 2,400 participants in 2007, and 700 visitors at the first Expo), and more than 250 exhibitors (first Expo in 2004: 50 exhibitors) presented their products and services and showcased their carbon project portfolios and climate initiatives.

A unique feature of Carbon Expo is its truly global scope based on an active and broad participation of CDM/JI host countries' delegates and stakeholders in the conference and fair program. The World Bank Institute's CF-Assist supports and facilitates participation of high-level government representatives and technical missions from developing countries and countries with economies in transition at the Expo (2008: delegates from 50 CDM/JI host countries), and coordinates exhibition facilities for regional pavilions and national stands of client countries that are active in the CDM/JI market segment (2008: 40 exhibiting host countries).



In some countries **yields from**  
**rain-fed agriculture** could be  
**reduced by up to 50%** by 2020

Intergovernmental Panel on Climate Change (IPCC)



## Report on Business

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55	Spanish Carbon Fund (SCF)
60	Carbon Fund for Europe (CFE)
64	Forest Carbon Partnership Facility (FCPF)



## From the Chair of the PCF Participants' Committee

By entering the implementation phase, the PCF started delivering rewards to the participants. The first batches of certified emission reduction forwarding transactions have been

completed. The management focus shifted from project assessment and closing emission reductions purchase agreements during the allocation phase to monitoring project implementation and contract fulfillment. New challenges now are delivery and forwarding of emission rights, the procedures to register PCF participants and addressing a number of fund-related financial and administrative issues to mitigate future risks. We are convinced that the procedures developed for timely performance and accurate recording, tracking, allocation and final distribution of emission rights to the fund participants will maintain a high level of transparency and contribute to the success of the implementation phase.



Hans-Georg Adam  
RWE

## The Prototype Carbon Fund (PCF): Rewards and Challenges of the Implementation Phase

The PCF was approved by the World Bank's Board of Executive Directors in July 1999. It was formally launched in January 2000 and its first closing occurred a couple of months later. The PCF has been structured as a public-private partnership of six governments and 17 companies\* with an initial capitalization of \$180 million. From its inception, the PCF was designed as a learning-by-doing instrument to demonstrate that carbon finance can be a powerful tool for financing sustainable development projects in developing countries and in countries with economies in transition, while reducing (or sequestering) greenhouse gas emissions that are responsible for climate change.

In 2007, the PCF reached an important milestone and closed its portfolio to new projects, enabling it to move from the allocation (of fund resources to carbon purchases) phase to the implementation phase. The PCF portfolio consists of 16 projects\*\* in non-Annex I countries and eight projects in Annex I countries. In 2008, the PCF agreed to accept additional capital (\$39.8 million) to maximize opportunities offered by the PCF portfolio, allowing the PCF the possibility of securing late vintage emission reductions from projects in the portfolio, which will also benefit project entities. Twenty-two out of the 24 PCF projects are operational and 19 PCF projects have started to deliver emission reductions. Addressing operational issues and converting these emission reductions into Kyoto-compliant assets is now the main focus of PCF activities. As of December 31, 2008, seven of the PCF's CDM projects have been issued certified emission reductions (CERs). More are expected in 2009. The PCF will also be working in 2009 to transfer to participants the first Kyoto assets from its projects in Annex I countries. The learning by doing continues.

\*As of February 2009, there are 16 companies, as one novated its PCF participation to another PCF participant.

\*\*The PCF's participation in the World Bank Umbrella Carbon Facility is counted here as one PCF project.



# Prototype Carbon Fund Participants

## Canada

GOVERNMENT OF CANADA  
[www.cdm-ji.ca](http://www.cdm-ji.ca)



THE CHUGOKU ELECTRIC POWER CO., INC.  
[www.energia.co.jp/e/index.html](http://www.energia.co.jp/e/index.html)



NORSK HYDRO  
[www.hydro.no/en](http://www.hydro.no/en)



GOVERNMENT OF FINLAND  
[www.formin.finland.fi/english](http://www.formin.finland.fi/english)



DEUTSCHE BANK  
[www.db.com](http://www.db.com)

## ROBECO

ROBECO  
[www.robeco.com](http://www.robeco.com)



JAPAN INTERNATIONAL COOPERATION AGENCY  
[www.jica.go.jp](http://www.jica.go.jp)



ELECTRABEL  
[www.electrabel.com](http://www.electrabel.com)



RWE  
[www.rwe.com](http://www.rwe.com)



GOVERNMENT OF THE NETHERLANDS  
[www.cdminfo.nl](http://www.cdminfo.nl)



FORTUM  
[www.fortum.com/sustainability](http://www.fortum.com/sustainability)



SHIKOKU ELECTRIC POWER CO., INC.  
[www.yonden.co.jp/english/index.html](http://www.yonden.co.jp/english/index.html)



GOVERNMENT OF NORWAY  
[www.carbonneutralnorway.no](http://www.carbonneutralnorway.no)



GDF SUEZ  
[www.gdfsuez.com](http://www.gdfsuez.com)

## StatoilHydro

STATOILHYDRO ASA  
[www.statoilhydro.com](http://www.statoilhydro.com)



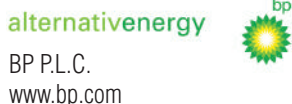
GOVERNMENT OF SWEDEN  
[www.environment.ministry.se](http://www.environment.ministry.se)



KYUSHU ELECTRIC POWER CO., INC.  
[www.kyuden.co.jp/en\\_index](http://www.kyuden.co.jp/en_index)



TOHOKU ELECTRIC POWER CO., INC.  
[www.tohoku-epco.co.jp/index-e.htm](http://www.tohoku-epco.co.jp/index-e.htm)



BP P.L.C.  
[www.bp.com](http://www.bp.com)



MITSUBISHI CORPORATION  
[www.mitsubishicorp.com/en/index.html](http://www.mitsubishicorp.com/en/index.html)



TOKYO ELECTRIC POWER COMPANY (TEPCO)  
[www.tepco.co.jp/en/index-e.html](http://www.tepco.co.jp/en/index-e.html)



CHUBU ELECTRIC POWER CO., INC.  
[www.chuden.co.jp/english/index.html](http://www.chuden.co.jp/english/index.html)



MITSUI & CO., LTD.  
[www.mitsui.co.jp/en/index.html](http://www.mitsui.co.jp/en/index.html)

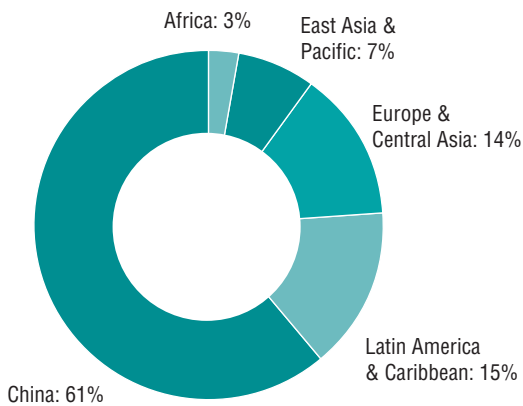
# Prototype Carbon Fund Status

Country/Project Name		Project Description	PCF Contract ERs (tCO <sub>2</sub> e)
<b>Emission Reductions Purchase Agreements Signed</b>			
1	Brazil: Alta Mogiana Bagasse Cogeneration	Increase efficiency in manufacturing processes and install new facilities to generate surplus electricity to be commercialized	110,000
2	Brazil: Lages Cogen Facility	Installed capacity of 28 megawatt electricity plus 25 tons per hour of steam, fueled by wood waste from the sawmill industries in the region	750,000
3	Brazil: Plantar Sequestration and Biomass Use	Charcoal production from sustainably harvested plantation, replacing coke for pig iron manufacture	1,514,286
4	Bulgaria: Pernik District Heating	District heating system upgrades for the city of Pernik	157,000
5	Bulgaria: Sofia District Heating	District heating system upgrades for the city of Sofia	1,084,000
6	Bulgaria: Svilosa Biomass	11 megawatt biomass-based boiler to utilize wood waste produced at the Svilosa pulp and cellulose plant, to replace coal	450,000
7	Chile: Chacabuquito Hydro	26 megawatt run-of-river hydro to replace coal or gas in the grid	1,000,000
8	China: HFC-23 Destruction (co-purchase)	Installation of an incineration facility to decompose HFC-23 generated by the existing HCFC-22 manufacturing facility into carbon dioxide and hydrogen fluoride	5,000,000
9	China: Huitengxile Wind Farm	Construct and operate a 100 megawatt wind farm in Inner Mongolia in China. The project consists of around 50 to 100 wind turbines of one to two megawatt capacity with a net annual generation of 245 gigawatt-hours per year	1,600,000
10	China: Jincheng CMM (co-purchase)	Capture of coal mine methane (CMM) associated with coal mining operation and utilization of the gas to generate power through a 120 megawatt combined cycle power plant	5,050,000
11	China: Xiaogushan Hydropower	98 megawatt run-of-river hydroelectric plant located on the Heihe River in the Sunan Yugur province to replace coal in the grid	3,000,000
12	Colombia: Jeparachi Wind Farm	19.5 megawatt wind farm in the northern part of Colombia to displace a mix of coal- and gas-based power generation	433,694
13	Costa Rica: Cote Hydro	6.8 megawatt hydro to be supplied to the national grid	172,120
14	Czech Republic: CEA Energy Efficiency (Umbrella)	Energy efficiency measures and renewables through the Ministry of Industry and Trade; 18 sub-projects make up the umbrella project which includes two district heating projects and 16 mini hydro projects	500,000
15	Guatemala: El Canada Hydro	43 megawatt run-of-river hydroelectric plant on the west coast of Guatemala to displace energy produced from thermal power plants	1,724,400
16	Hungary: Pannonpower Pécs Fuel Conversion	Conversion of Pécs Power plant's existing coal-fired boilers to biomass	1,193,000
17	Indonesia: Indocement Sustainable Cement Production	Energy efficiency measures in Indocement plants by reducing clinker content in the produced cement; burning alternative fuels for clinker formation; utilizing heat power generation in three locations at Citeureup, Cirebon and Tarjun	2,424,678
18	Latvia: Liepaja Solid Waste Management	Methane capture and utilization from waste management providing electricity to the national grid	387,933
19	Moldova: Soil Conservation	Afforestation of 20,000 hectares of degraded and eroded state-owned and communal agricultural lands throughout Moldova	1,300,000
20	Philippines: NorthWind Bangui Bay Project	Construction and operation of 25 megawatt capacity wind farm on a strip of land on the foreshore of Bangui Bay in Ilocos Norte	356,000
21	Poland: Stargard Geothermal	District heating system to utilize geothermal energy to replace coal in the city of Stargard	240,000
22	Romania: Afforestation of Degraded Agricultural Land	Afforestation of 6,852 hectares of public land	854,985
23	South Africa: Durban Municipal Solid Waste	Collection and generation of electricity at two landfill sites. Initially electricity generation of one megawatt (0.5 megawatt at each site) with the potential to expand to two megawatts	700,000
24	Uganda: West Nile Electrification	Two 1.75 megawatt hydros to replace a number of diesel generator sets in the West Nile region. The project is also installing a 1.5 megawatt generator	509,947

# Prototype Carbon Fund Status

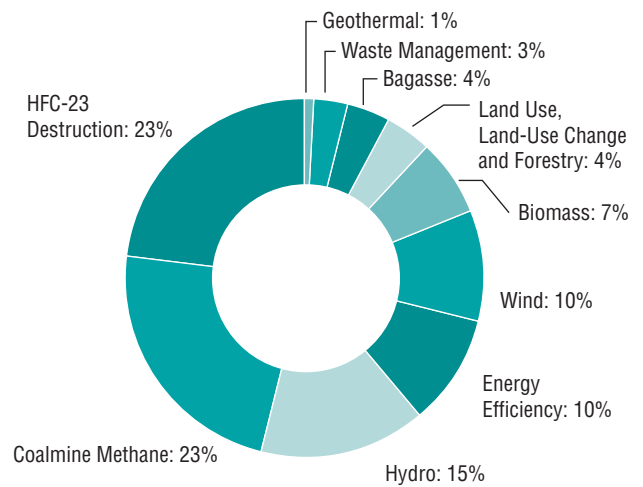
## PCF Geographic Distribution\*

The PCF sought to diversify its portfolio and succeeded in having projects all over the world, in both developing countries and countries with economies in transition. In terms of value, China accounts for the largest share of the portfolio, representing 61% of total portfolio value. The Latin America and Caribbean region represents the second largest share, accounting for 15% of the total portfolio value. The Europe and Central Asia region accounts for 14%, composed mainly of Joint Implementation projects.



## PCF Technology Distribution\*

As a prototype fund, the PCF has a vastly diverse portfolio in terms of technology distribution. Renewable energy projects—including wind, hydro, geothermal, bagasse and biomass—dominate the portfolio, representing 37% of the value of the PCF’s emission reduction purchases. The portfolio also includes emission reduction purchases from projects involved in HFC-23 destruction, coalmine methane, energy efficiency, waste management and land use, land-use change and forestry (LULUCF).



\*Charts are based on total emission reductions \$ value of projects at emission reductions purchase agreement stage.

## GUATEMALA: EL CANADA HYDROELECTRIC PROJECT

The El Canada Hydroelectric Project consists of a run-of-river hydroelectric plant on the Samala River on the west coast of Guatemala, near the town of Santa Maria de Jesus. The western Guatemala region has 350 megawatts of demand but only 31 megawatts of installed capacity, to which the project adds 43 megawatts. Since construction was completed in 2003, the plant has been producing an annual average of 175 gigawatt-hours of electricity, which is sold to Guatemala’s largest commercial distributor, COMEGSA. The power supplied by the project to the local grid improves stability and uses a cleaner energy source, thus generating emission reductions of 124,000 tons per year of carbon dioxide equivalent, 1.7 million tons of which are purchased by the **Prototype Carbon Fund** over the contract period. The project also works with neighboring communities to conserve subsurface water, reforest land and create jobs.





## From the Chair of the CDCF Participants' Committee

During the past year, the Community Development Carbon Fund (CDCF) continued to focus its activity on small-scale projects in poor countries and in the poor areas of

developing countries. The CDCF has committed to buy emission reductions and tackle the CDM-related investment gap, particularly in Africa, where projects often fail to materialize as they lack supportive national CDM approval systems. The CDCF has maintained its focus on bringing important social benefits to communities all around the world. Energy efficiency projects have also introduced innovative technologies that reduce energy consumption. This year's challenges will be completing the portfolio of projects and improving the monetizing of certified emission reductions to operators' trading accounts.

A handwritten signature in black ink.

Toni Hemminiki  
Vice President, Energy and Environment  
Rautaruukki Oyj

## The Community Development Carbon Fund: Commitment to the Poorest

The Community Development Carbon Fund (CDCF) is committed to tackle the CDM related investment gap for smaller projects in the poorer countries. Indeed, these countries are likely to be bypassed as they lack supportive national CDM approval systems and have significantly higher business costs and risks. Most such countries also suffer from an overall lack of investment in the energy, industrial and waste sectors with the result that even the lowest cost carbon mitigation projects have difficulty raising underlying financing.

The CDCF has currently committed 50% of its funds to buy emission reductions from small-scale projects located in priority countries. These countries are defined as Least Developed Countries and International Development Association borrowing countries, out of which a majority of projects are located in the Africa and South Asia regions. One of the latest emission reductions purchase agreements signed is for a project located in Senegal, the first CDM project to be signed in this country.

## More is Better

One of the characteristic features of CDCF is its work on building capacity in communities in order to involve them in the process of bundling small-scale projects that would otherwise not be cost effective. A recent example is the Solar Home Systems project in Bangladesh which will install a little over one million solar panels.





# Community Development Carbon Fund Participants



GOVERNMENT OF AUSTRIA  
www.ji-cdm-austria.at



REGIONAL GOVERNMENT OF BRUSSELS-CAPITAL  
www.bruxelles.irisnet.be



RÉGION WALLONNE  
GOVERNMENT OF THE WALLOON REGION (BELGIUM)  
www.wallonie.be

**Canada**

GOVERNMENT OF CANADA  
www.cdm-ji.ca



GOVERNMENT OF DENMARK  
www.um.dk



GOVERNMENT OF ITALY  
www.minambiente.it



LE GOUVERNEMENT  
DU GRAND-DUCHÉ DE LUXEMBOURG  
Ministère de l'Environnement

GOVERNMENT OF LUXEMBOURG  
www.environnement.public.lu/air\_bruit/dossiers



Ministry of Housing, Spatial  
Planning and the  
Environment

GOVERNMENT OF THE NETHERLANDS  
www.cdminfo.nl



GOVERNMENT OF SPAIN  
Ministry of Environment, and Rural and Marine  
Affairs: www.mma.es  
Ministry of Economy and Finance: www.meh.es



The Chemical Company

BASF  
www.basf.com



DAIWA SECURITIES SMBC PRINCIPAL  
INVESTMENTS CO., LTD.  
www.daiwasmbc.co.jp/english/  
www.daiwasmbcpi.co.jp/english/index.html



ELECTRICIDADE DE PORTUGAL (EDP)  
www.edp.pt



ENDESA  
www.endesa.es



FUJIFILM CORPORATION  
www.fujifilm.com



GAS NATURAL SDG, SA  
www.gasnatural.com



GÖTEBORG ENERGI AB  
www.goteborgenergi.se



HC ENERGIA  
www.hcenergia.com



IDEMITSU KOSAN CO., LTD.  
www.idemitsu.co.jp/e/index.html



KFW BANKENGRUPPE  
www.kfw.de/carbonfund



NIPPON OIL CORPORATION (NOC)  
www.eneos.co.jp/english



THE OKINAWA ELECTRIC POWER COMPANY,  
INC. (OEPC)  
www.okiden.co.jp



RAUTARUUKKI OYJ  
www.ruukki.com



STATKRAFT CARBON INVEST AS  
www.statkraft.com



STATOILHYDRO ASA  
www.statoilhydro.com

Swiss Re



SWISS RE  
www.swissre.com

# Community Development Carbon Fund Status

	Country/ Project Name	Project Description	Community Benefits	CDCF Contract ERs (tCO <sub>2</sub> e)
<b>Emission Reductions Purchase Agreements Signed</b>				
1	Argentina: Olavarría Landfill Gas Recovery	Capture methane and carbon dioxide at Olavarría municipal landfill; use methane for rural electricity supply	A potable water distribution network connecting 80% of the homes and a pilot solar water heating system at the municipal hospital in rural Espigas; gastrointestinal disease and high energy costs reduced	131,000
2	Argentina: Salta Solid Waste Management	Install gas collection and flaring system for the landfill site in the municipality of Salta	Improved infrastructure and working conditions for 100 people separating, classifying, storing and recycling inorganic components of municipal waste	60,000
3	Bangladesh: Solar Home Systems	Install Solar Home Systems (sizes 30 – 85 watt-peak), and replace kerosene for household lighting	Better quality of lighting and electricity for other appliances such as a television; a new industry of solar home installation, with rural women as technicians	372,700
4	Bangladesh: IDCOL Solar Home Systems	Install Solar Home Systems (sizes 30 – 85 watt-peak), and replace kerosene for household lighting	Better quality of lighting and electricity for other appliances such as a television; a new industry of solar home installation, with rural women as technicians	192,000
5	Bolivia: Urban Wastewater Gas Capture	Cover anaerobic lagoons of a wastewater treatment facility in Santa Cruz; collect and flare methane gas	A sewage system in the north of Santa Cruz (pop. 5,000) to improve public health	200,000
6	China: Guangrun Hydropower Development	Construct and operate three hydropower plants with total capacity of 28 megawatts on the Guangrun River	One-fifth of carbon revenue for a poverty alleviation fund used by the county government. Other benefits include increased water supply, upgraded flood control, and water for 1,000 hectares of farmland	485,000
7	China: Hubei Ecofarming Biogas	Change traditional manure management and recover methane for household cooking and lighting needs by developing biogas digesters	Biogas burners for household cooking and heating will reduce indoor pollution and respiratory diseases. Improved manure management will reduce water contamination. Biogas recovery will diversify energy sources and reduce deforestation	370,000
8	China: Shandong Poultry Manure Biogas	Anaerobic digestion and biogas capture to generate electricity from five million chickens	Construction of 6.3 kilometers of rural highways, and an irrigation and drinking water project in the village of Qujiagou. Free fertilizer and training for community households to increase income by using new fertilizer	465,000
9	Colombia: Furatena Energy Efficiency and Rural Development	Energy efficiency improvements in the collection and processing of “panela” (brown sugar panels) at 120 small, family-owned manufacturing facilities	Increased farm income, training of at least 300 farmers in improved production; managerial training for 120 small rural farms; 300 hectares to pilot organic production; a land-use environmental plan; biomass as the plant’s main fuel	60,000
10	Colombia: Rio Frio Waste Water Treatment	Collect methane and nitrous oxide from waste water treatment plant of Rio Frio	Reduction of local air pollution by biogas capture and effluent treatment. River water-quality improvements. A social program to address health conditions (including HIV/AIDS) among the poorest youth	236,000
11	Georgia: Small Hydro Rehabilitation	Install at least 15 megawatts additional power through rehabilitation and construction of small hydropower stations	A potable water supply system to benefit 45 households and schools; rehabilitation of three small bridges, and construction of a social center, where one of the small hydropower stations is located	114,000
12	Guyana: Skeldon Bagasse Cogeneration	Use bagasse as high-efficiency fuel for a sugar factory and excess electricity for the national grid	Improved electrical service; at least 10 megawatts of electricity produced by GuySuCo for the national grid; job creation and improved economic activity	165,000

# Community Development Carbon Fund Status

	Country/ Project Name	Project Description	Community Benefits	CDCF Contract ERs (tCO <sub>2</sub> e)
<b>Emission Reductions Purchase Agreements Signed</b>				
13	Honduras: La Esperanza Hydroelectric	Install 12.7 megawatt run-of-river hydropower plant	Improved electricity service in the town of La Esperanza (pop.10,000). Employment for 148 people during construction. Planting of 25,000 seedlings for reforestation	310,000
14	India: FaL-G Brick Units in Micro Sector	200 brick production units with FaL-G technology saving energy and nitrous oxide emissions	Personal accident insurance and health insurance for workers. Reduced air pollution compared with traditional kilns	600,000
15	India: VSBK Kiln Cluster	Use energy efficient Vertical Shaft Brick Kiln (VSBK) technology for fired clay brick production, saving 30% in coal consumption	Joint bank account for women. Possible life and health insurance with the premiums paid by the fund for 40 persons at each site. Hand pumps for clean drinking water, a day-care center for children under five and community stoves	396,053
16	Kenya: Olkaria II Geothermal Expansion	Expansion of geothermal plant from 70 megawatts to 105 megawatts	Water lines and storage tanks for clean water. Construction of classrooms, administration blocks, boarding facilities, health centers, cattle dips. Upgrading of rural roads	900,000
17	Kenya: Optimization of Kiambere Hydro Power Station	Expansion of hydropower station by upgrading turbines to increase output by 20 megawatts	The community benefits plan is intertwined with the Kenya Olkaria II Geothermal Expansion and the Redevelopment of Tana Power Station through an overarching community benefits scheme	215,000
18	Kenya: Re-development of Tana Power Station	Expansion of a hydropower station by constructing two 4.3 megawatt and two 5.5 megawatt run-of-river dams	The community benefit plan is intertwined with the Kenya Olkaria II Geothermal Expansion and the optimization of Kiambere Hydro Power Station projects	226,000
19	Moldova: Biomass Heating and Energy Conservation	Improve quality and efficiency in the supply and distribution of heat in almost 150 public buildings in 33 districts	Improved heating service, increased number of days buildings are heated, and decrease in cost of heat. Heating improvements and energy efficiency reduce forest degradation for fuelwood	348,502
20	Nepal: Biogas Support Program	Commercial dissemination of 200,000 household biogas plants using animal waste in rural Nepal	Reduced kitchen smoke; reduced drudgery of women and children. Better sanitation by connection of latrines to biogas plants; increased enrollment in schools. Creation of 12,000 rural jobs. Savings of 2,600 kilograms of firewood per household annually	1,000,000
21	Nepal: Village Micro-hydro	Installation of micro-hydro power plants (5 – 500 kilowatts) with cumulative capacity of 15 megawatts	Replace diesel power for agro-processing mills and 142,000 households. Reduction in batteries for radio and flashlights, and reduced environmental chemical pollution	191,220
22	Nigeria: Aba Cogeneration	Install gas-fired cogeneration system for electricity and heat. Sell system's carbon dioxide to breweries	Reliable electricity for street lighting. New one kilometer asphalt access road to the local community. Health center staffed with one medical doctor and one senior nurse; nursery and primary school for up to 200 students	1,145,000
23	Pakistan: Community Based Renewable Energy Development in Northern Areas and Chithral	Install 12 micro-hydro plants in northern Pakistan with a total capacity of 4.5 megawatts. The electricity will displace fossil fuels and fuel wood	Power for community energy needs while substituting the use of diesel fuel	360,000
24	Peru: Santa Rosa Hydroelectric	Three run-of-river hydro projects in Lima, Peru in the Santa Rosa irrigation area (4.1 megawatts total)	A trash rack cleaner for agricultural wastewater. During construction 125 direct new jobs, and 15 new jobs during operation. A new fence for the school, two new classrooms, a computer room (with 10 computers), and a community center for La Merced	88,300

# Community Development Carbon Fund Status

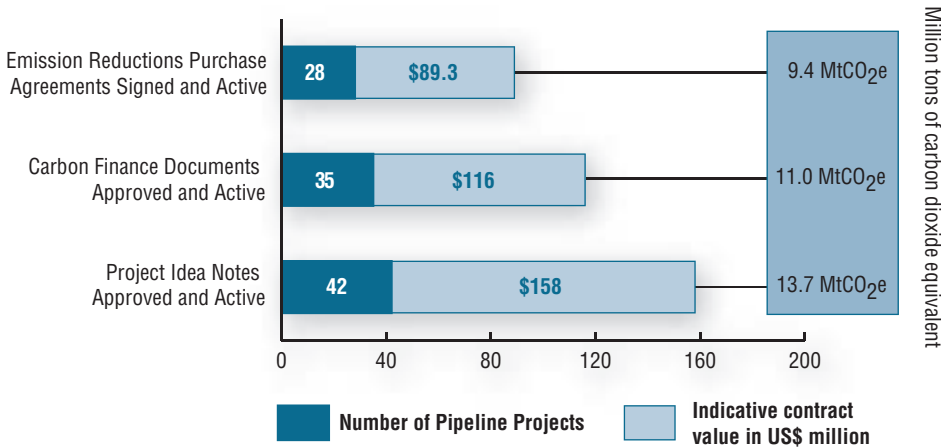
Country/ Project Name	Project Description	Community Benefits	CDCF Contract ERs (tCO <sub>2</sub> e)	
<b>Emission Reductions Purchase Agreements Signed</b>				
25	Philippines: Laguna de Bay Watershed Community Carbon	Solid waste and waste water management small-scale projects in Laguna de Bay watershed	Reduced pollution in rivers and lakes from better wastewater and solid waste management. Currently no wastewater treatment and limited treatment of pig-farm and industrial waste	40,614
26	Senegal: Lighting Energy Efficiency in Rural Electrification Program	Low-energy-consumption compact fluorescent bulbs instead of incandescent bulbs for domestic lighting	Compact fluorescent bulbs instead of kerosene lamps and batteries. Electricity for productive uses, social services, and schools	120,000
27	Thailand: AES Livestock Waste Management	Covered lagoons to capture and utilize methane for power generation	Lighting on streets, access to safe drinking water, scholarships for poor students, mosquito spray equipment, working capital for the community cooperative shop, and capacity-building	230,000
28	Uganda: Kakira Sugar Works Cogeneration	Expand existing sugar crushing and cogeneration plant to 21 megawatts, with 12 megawatts for national grid	Installation of a fuel station for farmers supplying sugarcane. Capacity-building plan for community organizations benefiting 4,000 farmers. Enhanced living standards of project entity's workers	342,000



# Community Development Carbon Fund Status

Over this reporting period, the CDCF continued to place its emphasis on small projects in developing countries. With \$89.3 million now committed, the CDCF has been able to sign 28 emission reductions purchase agreements. An additional 14 projects are in the CDCF pipeline, of which seven are at the carbon finance document stage.

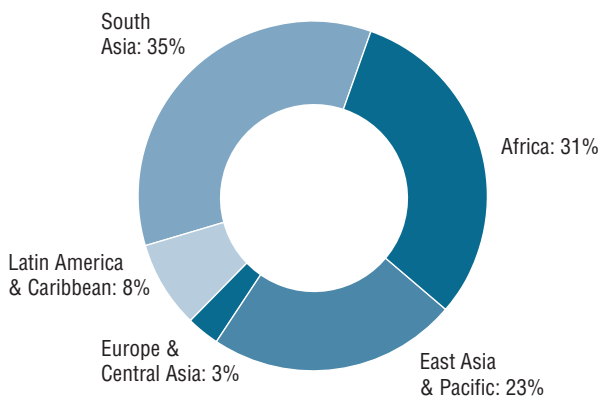
## CDCF Project Status (cumulative)



Note: The above figures exclude options purchases.

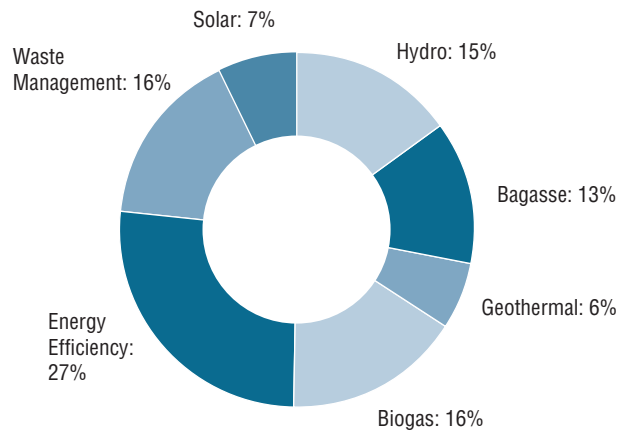
## CDCF Geographic Distribution\*

CDCF continues to be successful in fulfilling one of its key mandates, to commit a minimum of 25% of its total capitalization to purchasing emission reductions generated from projects located in priority countries. Currently, 50% of the value of the emission reductions purchase agreements is committed to projects located in these countries, of which almost half are located in Africa. In addition, it is worthwhile to mention that the past year has seen a notable increase in projects located in the East Asia and Pacific region with almost a four-fold increase.



## CDCF Technology Distribution\*

The range of technologies on which CDCF has focused its attention is bringing important benefits to communities all around the world. For example, through the use of compact fluorescent light bulbs, the Lighting Energy Efficiency in Rural Electrification program in Senegal is promoting energy efficiency on the demand side. In addition, biogas projects have increased two fold and solar technology has been introduced into the portfolio—the Solar Home Systems project in Bangladesh aims to install solar home systems which would replace kerosene and diesel for household electricity requirements.



\*Charts are based on total emission reductions \$ value of projects at emission reductions purchase agreement and carbon finance document stage.

# Community Development Carbon Fund

## THAILAND: AEP LIVESTOCK WASTE MANAGEMENT PROJECT

Livestock production is an important element of the Thai economy. However, livestock waste causes major health and environmental impacts, and also contributes to the country's annual greenhouse gas emissions. The Thai government encourages reducing emissions by utilizing manure to generate electricity.

Under the Thailand AEP Livestock Waste Management Project, a system to process livestock waste will be installed at 10 pig farms in Chon Buri and Ratchaburi Provinces, located near the Mae Klong and Tha Chin river basins. Together these farms own a total of 131,000 pigs, producing a significant amount of swine manure each day. From the waste, biogas will be produced and used to generate electricity for the farms.

This is a unique project because it enables smaller pig farms to take part in the CDM by bundling the carbon emission reductions of all 10 farms, then selling it as one unit in the carbon market. The project will displace 6,250 megawatt-hours of electricity from the grid and reduce carbon dioxide emissions by 58,000 tons annually. These emission reductions are marketable as carbon credits to be purchased by the **Community Development Carbon Fund**.

In addition, the project's community benefits plan will bring change. Street lights and a facility to produce clean drinking water will be installed. Poor students will get scholarships. A pilot project to help villagers increase their income and improve living conditions will also be developed and implemented by the villagers themselves.





## From the Chairs of the BioCarbon Fund Tranches 1 and 2

The BioCF continues to pave the way for project-based bio-carbon sequestration. This coming year should see an increase in activity on the regulated market as projects advance in the CDM pipeline. The BioCF also is pioneering activities currently not permitted under the CDM and is developing methodologies for REDD and soil carbon, as well as developing tools to assist project developers



in this sector. This is an exciting year in the run-up to Copenhagen where more inclusive forestry activities and more streamlined approaches to the CDM are being discussed.

We commend the World Bank's BioCarbon Fund team's steadfast commitment to the pioneering role of the BioCF.

François Falloux, Chair of Tranche 1, Eco-Carbone

Ana Arriaga, Chair of Tranche 2, Davorina Limited (Consensus Business Group)

## What is the BioCarbon Fund?

The BioCarbon Fund fosters the role of land use, land-use change and forestry (LULUCF) in the carbon market and CDM. It seeks to extend the benefits of the carbon market to the rural, poorest areas and to the local environment. The first tranche closed in August 2005 and the second tranche, opened in response to continued demand by participants and project developers, closed in March 2008.

The BioCarbon Fund targets projects that conserve or sequester greenhouse gases in forests and agro-ecosystems in order to mitigate climate change. Both tranches of the BioCarbon Fund test and demonstrate how LULUCF activities can generate high-quality emission reductions with environmental and livelihood benefits that can be measured, monitored and certified under the CDM. Tranche 1 and Tranche 2 also test the benefits of reducing emissions from deforestation and forest degradation (REDD), which accounts for approximately 20% of total global greenhouse gas emissions. Tranche 2 is also exploring innovative approaches to carbon payments due to changes in agricultural practices that lead to soil improvements. Through these myriad activities, the BioCarbon Fund offers participants the opportunity to purchase emission reductions from both the voluntary carbon market and the Kyoto compliance-based market.

In addition, the BioCarbon Fund strives to facilitate knowledge sharing and learning by doing through a variety of activities, including the development of new forestry methodologies and tools that are available for free public use.



# BioCarbon Fund Tranche 1 Participants

## Canada

GOVERNMENT OF CANADA  
[www.cdm-ji.ca](http://www.cdm-ji.ca)



ECO-CARBONE  
[www.eco-carbone.com](http://www.eco-carbone.com)

## SUMITOMO CHEMICAL

SUMITOMO CHEMICAL CO., LTD.  
[www.sumitomo-chem.co.jp/english/index.html](http://www.sumitomo-chem.co.jp/english/index.html)



GOVERNMENT OF ITALY  
[www.minambiente.it](http://www.minambiente.it)



IDEMITSU KOSAN CO., LTD.  
[www.idemitsu.co.jp/e/index.html](http://www.idemitsu.co.jp/e/index.html)



SUMITOMO JOINT ELECTRIC POWER CO., LTD.  
[www.sumikyo.co.jp](http://www.sumikyo.co.jp)



LE GOUVERNEMENT  
DU GRAND-DUCHÉ DE LUXEMBOURG  
Ministère de l'Environnement

GOVERNMENT OF LUXEMBOURG  
[www.environnement.public.lu/air\\_bruit/dossiers](http://www.environnement.public.lu/air_bruit/dossiers)



JAPAN IRON & STEEL FEDERATION (JISF)  
[www.jisf.or.jp/en/index.html](http://www.jisf.or.jp/en/index.html)

## SUNTORY

SUNTORY  
[www.suntory.com](http://www.suntory.com)



GOVERNMENT OF SPAIN  
Ministry of Environment, and Rural and Marine  
Affairs: [www.mma.es](http://www.mma.es)  
Ministry of Economy and Finance: [www.meh.es](http://www.meh.es)



JAPAN PETROLEUM EXPLORATION CO., LTD.  
[www.japex.co.jp/english/index.html](http://www.japex.co.jp/english/index.html)



TOKYO ELECTRIC POWER COMPANY (TEPCO)  
[www.tepco.co.jp/en/index-e.html](http://www.tepco.co.jp/en/index-e.html)



AGENCE FRANÇAISE DE DÉVELOPPEMENT  
[www.afd.fr](http://www.afd.fr)



THE OKINAWA ELECTRONIC POWER  
COMPANY, INC. (OEPC)  
[www.okiden.co.jp](http://www.okiden.co.jp)



# BioCarbon Fund Tranche 1 Status

Country/ Project Name	Project Description	Main Environmental Benefits	Main Social Benefits	BioCF Contract ERs (tCO <sub>2</sub> e)		
				Afforestation/ Reforestation	REDD	
<b>Emission Reductions Purchase Agreements Signed (Tranche 1)</b>						
1	Albania: Assisted Natural Regeneration	Afforest/reforest 5,700 hectares of highly degraded communal forest and pastureland to develop a multi-functional native broadleaf and mixed broadleaf forest	Creation of habitat for native flora and fauna; enrichment of species diversity; reduced soil erosion; and reduced siltation of watercourses	Short- and mid-term employment; stimulation of the local industry; reduced maintenance costs of irrigation and drainage infrastructure; sustainable timber and non-timber products	230,360	
2	China: Pearl River Watershed Management	Reforest 4,000 hectares of shrub/grassland, and demonstrate watershed management	Biodiversity corridors; reduced soil erosion; improved regulation of hydrological flows and reduced flooding and drought	Local employment; timber and non-timber products; and sustainable livelihoods	462,014	
3	Colombia: San Nicolás Agroforestry	Afforest and reforest 2,500 hectares of abandoned pasture; avoid deforestation and induce regeneration of 7,300 hectares	Natural habitat and corridors for the conservation of biodiversity; sustainable watershed management	Employment for the local communities; increased food supply and safety; community training	119,999	76,693
4	Colombia: Caribbean Savannah	Pilot the use of carbon sinks through silvopastoral and reforestation systems, to arrest the process of land degradation in 2,200 hectares	Enhance productivity; increased habitat for biodiversity; rehabilitated local ecosystems; reduced soil erosion	Local employment; sustainable income from wood harvesting; improved livestock productivity; training in silvopastoral management	246,992	
5	Costa Rica: Coopeagri Forestry	Extend the scope of national program of payments for environmental services through agroforestry, natural regeneration and commercial reforestation in 4,140 hectares of degraded land	Natural habitat for biodiversity protection; increased water retention and regulation of hydrological flows; reduced land erosion	Local employment; increased incomes from payment for environmental services; additional income from forest production agroforestry; training of farmers	557,942	
6	Ethiopia: Humbo Community Managed Natural Regeneration	Restore 2,428 hectares of biodiverse natural forest with the farmer managed natural regeneration technique	Reduction of soil erosion and local flooding; reduced sediment runoff currently threatening Lake Abaya	Employment, and new sustainable income and food sources. Investments in local infrastructure and food security activities. Community training	165,000	
7	Honduras: Pico Bonito Forestry	Agroforestry systems for small-scale producers, reforestation for conservation, commercial plantations and avoided deforestation on 3,000 hectares in national park buffer zone	Biodiversity conservation; protection of water catchments; stabilized landscapes; rebuilt topsoils; and enhanced water supply and hydrological flow	Local employment; sustainable sources of income; training of communities; and on-farm technical assistance	450,082	397,702
8	India: Improving Rural Livelihoods	Afforest/reforest 3,500 hectares as tree plantations on poor farmers' lands in Orissa and Andhra Pradesh	Reduced erosion; protection of biodiversity and water sources; reduced dependence of the paper industry on natural forests	Increased income; local employment; additional sources of income from intercropping and sustainable fuelwood production	276,000	
9	Kenya: Greenbelt Movement	Pay community forest associations to reforest 4,000 hectares of degraded public and private land	Reduced erosion; protection of water catchments; and regulation of hydrological flows	Increased income from sale of forest products; sustainable livelihood from fodder and non-timber products	375,000	

# BioCarbon Fund Tranche 1 Status

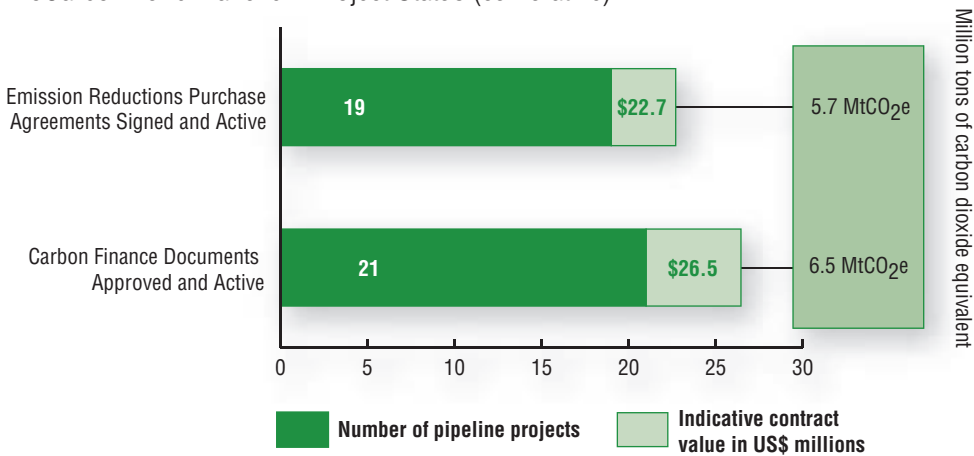
Country/ Project Name	Project Description	Main Environmental Benefits	Main Social Benefits	BioCF Contract ERs (tCO <sub>2</sub> e)		
				Afforestation/ Reforestation	REDD	
<b>Emission Reductions Purchase Agreements Signed (Tranche 1)</b>						
10	Madagascar: Andasibe-Mantadia Biodiversity Corridor	Restore forest corridors linking fragmented habitats. Establish sustainable fruit gardens and pilot avoided deforestation activities	Biodiversity corridors; increased viability of native species; restoration of degraded soils and lands, and stabilized hydrological flows	Local employment; sources of income from sale of timber and non-timber products; and increased ecotourism from landscape rehabilitation	200,000	430,000
11	Mali: Acacia Plantation	Develop 6,000 hectares of degraded natural dry forest into acacia plantations, intercropped with cultivated species	Increased natural habitat; soil regeneration and fertilization; raised water table; reduced erosion; wind and sun protection	Local employment for project implementation; training of employees; revenues generated by arabic gum, grains and forage	190,000	
12	Moldova: Soil Conservation	Afforest/reforest 20,000 hectares of degraded state-owned and communal agricultural lands	Restoration of habitats to increase native biodiversity; erosion reduction; improved hydrological regime	Local employment; income from sale of timber and non-timber products; prevention of future land degradation	600,000	
13	Nicaragua: Precious Woods	Reforestation on 1,500 hectares of degraded pasture with teak and valuable native wood species	Restoration of ecological forest functions such as prevention of erosion, groundwater protection, soil regeneration	The project will provide some employment for seasonal tasks such as planting, weeding, pruning and thinning and harvesting	174,796	
14	Niger: Acacia Community Plantations	Develop up to 22,800 hectares of acacia plantations on degraded land, mostly managed by local communities. Intercropping with groundnuts and cowpeas	Soil regeneration and erosion control; increased natural habitat; dune fixing; wind and sun protection; rehabilitation of degraded land	Local employment; income from arabic gum sale; fuelwood and animal forage; and training of communities	500,000	
15	Philippines: Watershed Rehabilitation	Implement small-scale community-based rehabilitation subprojects including streambank rehabilitation, reforestation of upland areas and agroforestry	Increased natural habitat for native species; reduced erosion and landslides; and increased groundwater recharge	Local employment; community training; reduction in river sedimentation and topsoil erosion	32,325	
16	Uganda: Nile Basin Reforestation	Establish 2,000 hectares of pine and mixed native species plantation to expand national wood resources and support communities for tree-planting	Creation of natural habitat; reduced pressure on natural forests; reduced frequency of fires; and reduced land degradation and erosion	Local employment; source of income from private woodlots; fuelwood; improved local public infrastructure; and stimulation of secondary industries	220,000	

# BioCarbon Fund Tranche 1 Status

## Tranche 1 Project Status

Tranche 1 closed with contributions of \$53.8 million from 14 governments and companies. The first tranche consists of 18 afforestation/reforestation transactions at an advanced stage of preparation, 16 of which have signed an emission reductions purchase agreement. The first tranche also contains three transactions for REDD, all of which have signed emission reductions purchase agreements additional to previously existing projects.

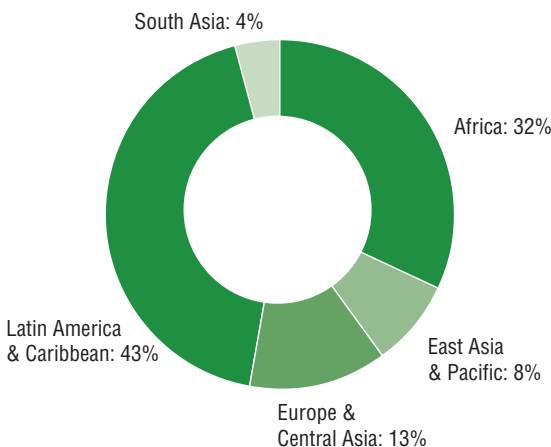
### BioCarbon Fund Tranche 1 Project Status (cumulative)



Note: The above figures exclude options purchases.

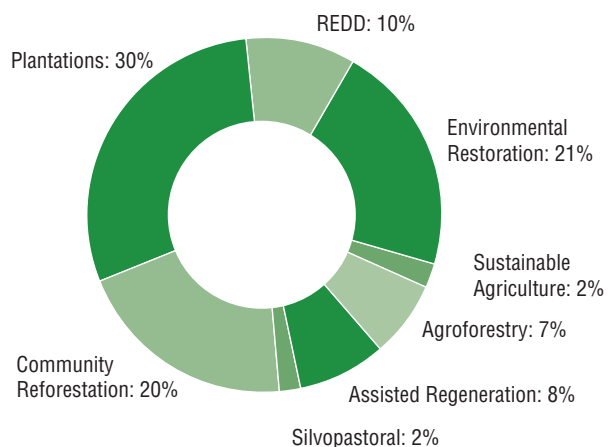
## BioCF Geographic Distribution (Tranche 1)\*

The BioCF Tranche 1 portfolio is distributed throughout the world. An important feature is that about 32% of assets support projects in Sub-Saharan Africa, a region that represents a very small percentage of the global carbon market. Thus, the BioCF is helping to extend the benefits of the carbon market to less affluent communities that have historically received fewer investments in non-forestry projects.



## BioCF Technology Distribution (Tranche 1)\*

Most BioCF Tranche 1 projects deal with afforestation and reforestation (A/R), primarily focused on community reforestation, environmental restoration and commercial plantation activities, which together account for 71% of the Tranche 1 portfolio. Other A/R activities include sustainable agriculture, agro-forestry, assisted regeneration, and silvo-pastoral activities. Finally, 10% of the portfolio is dedicated to REDD.



\*Charts are based on total emission reductions \$ value of projects at emission reductions purchase agreement and carbon finance document stage.

## BioCarbon Fund Tranche 1

### ETHIOPIA: HUMBO ASSISTED NATURAL REGENERATION PROJECT (TRANCHE 1)

The project aims to restore 2,428 hectares of critically endangered Ethiopian montane grasslands and woodlands and Ethiopian montane forest in southwestern Ethiopia, near the town of Humbo. The area contains a number of endemic species of various taxonomic groups, and offers a significant opportunity to realize meaningful biodiversity gains in addition to climate protection. The community-owned land in the project area had been cleared by overgrazing and fuelwood collection, and is now almost barren and subject to severe erosion and flooding.



The project developer, World Vision, a nongovernmental organization, has experience in community capacity building and in restoring and protecting forest utilizing widespread community participation. The project will mainly use the technique of farmer-managed natural regeneration, in which existing tree and shrub root material in the soil is identified, selected, pruned and managed to enable regrowth. The project has established seven community cooperative societies with representatives from a diverse group of land users in the Humbo region. These cooperatives will manage the long-term implementation of the project. The carbon sinks created by regeneration of the native forest will remove nearly 350,000 tons of carbon dioxide equivalent, of which 165,000 tons will be purchased by the **BioCarbon Fund**, and provide habitat for many endangered and endemic species. Further environmental benefits will stem from the reduction of soil erosion and local flooding.

## BioCarbon Fund Tranche 2 Participants



DEPARTMENT OF THE ENVIRONMENT,  
HERITAGE AND LOCAL GOVERNMENT,  
IRELAND  
[www.environ.ie/en/Environment/Atmosphere/  
ClimateChange](http://www.environ.ie/en/Environment/Atmosphere/ClimateChange)



AGENCE FRANÇAISE DE DÉVELOPPEMENT  
[www.afd.fr](http://www.afd.fr)



NATSOURCE BIOCF II INVESTMENTS  
CORPORATION  
[www.natsource.com](http://www.natsource.com)



DAVORINA LIMITED (CONSENSUS BUSINESS  
GROUP)  
[www.consensusbusiness.com](http://www.consensusbusiness.com)



SYNGENTA FOUNDATION FOR SUSTAINABLE  
AGRICULTURE  
[www.syngentafoundation.org](http://www.syngentafoundation.org)



GOVERNMENT OF SPAIN  
Ministry of Environment, and Rural and Marine  
Affairs: [www.mma.es](http://www.mma.es)  
Ministry of Economy and Finance: [www.meh.es](http://www.meh.es)



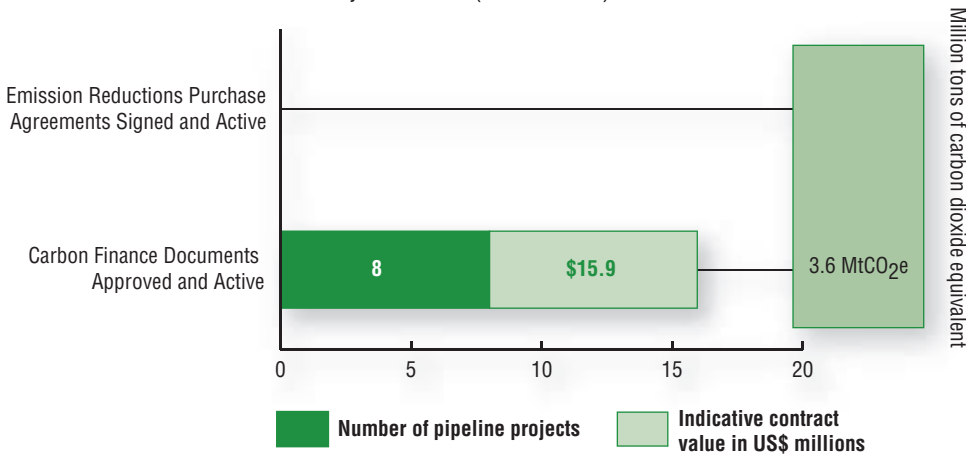
ZEROEMISSIONS  
[www.zeroemissions.com](http://www.zeroemissions.com)

# BioCarbon Fund Tranche 2 Status

## Tranche 2 Project Status

BioCF Tranche 2 closed participation in March 2008, with contributions of \$38.1 million from seven governments and companies. Tranche 2 consists of eight afforestation/reforestation projects at advanced stages of preparation. Carbon finance for these projects is expected to total \$15.9 million and generate 3.6 million tons of carbon dioxide equivalent emission reductions.

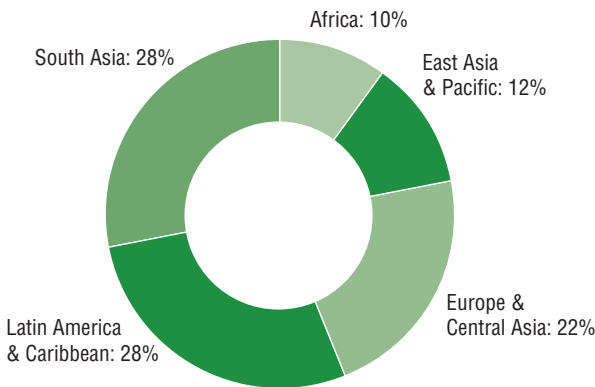
BioCarbon Fund Tranche 2 Project Status (cumulative)



Note: The above figures exclude options purchases.

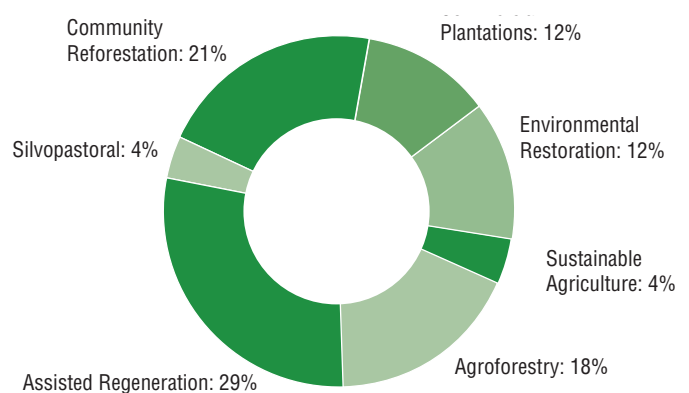
## BioCF Geographic Distribution (Tranche 2)\*

The BioCF Tranche 2 portfolio is geographically diverse, with the largest share of projects in the Latin America and Caribbean and South Asia regions. This diversity enhances the ability of Tranche 2 to contribute to the carbon market through knowledge-sharing and learning-by-doing activities around the globe.



## BioCF Technology Distribution (Tranche 2)\*

As of the end of 2008, all BioCF Tranche 2 projects focus on afforestation and reforestation (A/R) activities, primarily assisted regeneration, community reforestation and agroforestry, which together account for 68% of the Tranche 2 portfolio. In 2009, Tranche 2 will invest in soil carbon and REDD activities in Sub-Saharan Africa.



\*Charts are based on total emission reductions \$ value of projects at emission reductions purchase agreement and carbon finance document stage.

## MOLDOVA: SOIL CONSERVATION PROJECT (TRANCHES 1 AND 2)\*

Soil erosion and landslides are major environmental problems that affect land productivity in several regions of the Republic of Moldova. Soil erosion can also account for carbon losses of up to 50 tons per hectare per year in areas with severe wind and water erosion. The Moldova Soil Conservation Project is reforesting 20,290 hectares of degraded and eroded state-owned and communal agricultural lands spread throughout the country. The project's multiple objectives aim to restore degraded lands through improvement in vegetative cover, sustainably enhance supplies of forest products for local communities, and promote greenhouse-gas removal by soil and biomass carbon pools. Since the project was initiated in 2002, planting has been completed using a mix of indigenous species such as oaks (*Quercus*) and semi-exotic naturalized species, depending on soil conditions.



The **BioCarbon Fund** will purchase emission reductions of 600,000 tons of carbon dioxide equivalent; the **Prototype Carbon Fund** has also purchased emission reductions under a separate agreement. The main environmental benefits from the project will be prevention of soil erosion, restoration of the degraded land and increased productivity. Biodiversity benefits are expected from improvements in ecological succession and restoration of habitats of endangered species of flora and fauna. The newly forested area will also produce fuelwood, timber and non-timber products to meet the needs of rural communities.

Given the success of this project, the World Bank is preparing a follow-up project—the Moldova Community Forestry Development Project, which aims to reforest 8,157 hectares of eroded and unproductive land with the same implementation technology. The second project is expected to sequester about one million tons of carbon dioxide equivalent by 2017.

*\*As the annual report was going to press, the Tranche 1 Moldova project was registered by the Executive Board of the Clean Development Mechanism. It is the second such project in the world to be registered.*



## From the Ministry of Housing, Spatial Planning and the Environment (VROM)

For many years the Netherlands has been actively working on climate change issues, through constructive participation in climate change negotiations,

establishing carbon funds at several banks, and broadening and deepening implementation-related policies and rules through participation in the CDM Executive Board, among others.

The International Bank for Reconstruction and Development (IBRD, the World Bank), through the Netherlands CDM Facility (NCDMF), has contracted a considerable part of the government's obligation to demonstrate compliance with the Kyoto Protocol. We are happy to see, and the Bank can be proud of, the contribution of the NCDMF projects to sustainable development in the countries concerned.

Some market players have expectations of ever increasing prices for certified emission reductions. In these turbulent times of economic crisis, sellers of certified emission reductions to the NCDMF can be assured of doing business with stable and reliable parties—the World Bank and the Dutch government, both triple-A rated.

Now the challenge is gradually shifting toward delivery of the credits. We are confident that this phase will also be successfully concluded by the World Bank, and together we are preparing for the post-Kyoto period and the challenges lying ahead.

Lex de Jonge  
Head of CDM Division  
Ministry of Housing, Spatial Planning and the Environment (VROM)



# Netherlands CDM Facility Participant



Ministry of Housing, Spatial  
Planning and the  
Environment

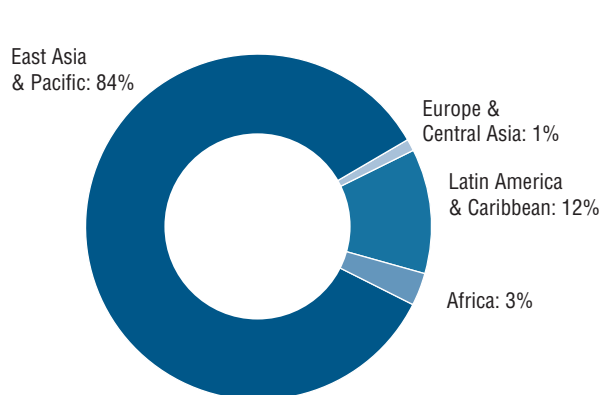
MINISTRY OF HOUSING, SPATIAL PLANNING AND THE ENVIRONMENT  
(VROM)  
[www.cdminfo.nl](http://www.cdminfo.nl)

## Netherlands CDM Facility Status

The NCDMF portfolio is spread across several regions, including Africa, Asia, Central Europe and Latin America. The portfolio has purchased emission reductions both from heavy greenhouse gas mitigation projects (including HFC-23 destruction, coal-mine methane capture and landfill gas capture) as well as from projects improving energy efficiency and generating renewable energy (hydro and geothermal). In volume terms, both the geographic and technological distributions are skewed by large projects, which tend to be in China and involve industrial gases. However, in terms of the number of projects, renewable energy and projects in Latin America and Southeast Asia dominate. This portfolio diversity helps to promote the full potential of the CDM, while ensuring delivery of emission reductions to VROM.

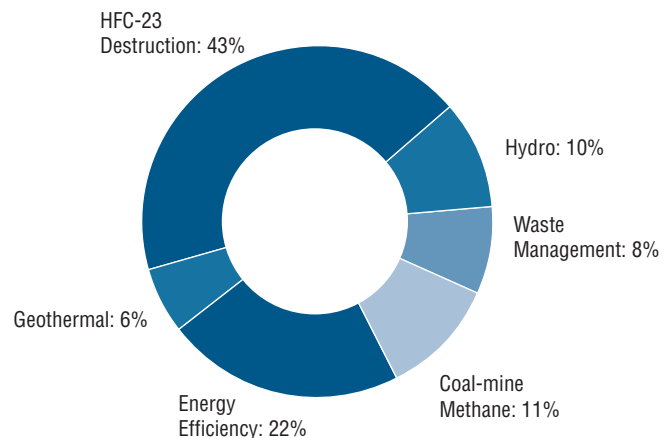
### NCDMF Geographic Distribution\*

In value terms, the portfolio is skewed towards the East Asia and Pacific region, which accounts for 84% due to a few larger projects in China; Indonesia and the Philippines together account for 9% of the NCDMF portfolio. Latin America has a large number of relatively small projects, which together make up nearly 12% of the portfolio. Africa accounts for about 3% and Europe and Central Asia about 1% of the total.



### NCDMF Technology Distribution\*

The facility requirement to purchase emission reductions only through 2012 has shaped the technical composition of the NCDMF portfolio, with considerable emphasis on projects for mitigation of heavy greenhouse gases—industrial gases, 43%, coal-mine methane capture, 11%, and landfill gas capture, 8%. A large number of smaller renewable energy projects (hydro and geothermal) together make up 16%, while energy efficiency projects collectively amount to 22% of the total active portfolio.



\*Charts are based on total emission reductions \$ value of projects at emission reductions purchase agreement and carbon finance document stage.



## CHILE: HORNITOS HYDROELECTRIC PROJECT

The Hornitos Hydroelectric Project consists of a run-of-river power plant that utilizes the swift-flowing waters of the Aconcagua River in a small valley in the Andes, approximately 100 kilometers northeast of Santiago, Chile. The project uses well-proven technologies for run-of-river power generation, and has been developed by the project operator Hidroeléctrica Guardia Vieja in cascade with three existing plants downstream, which have been successfully operated for years. The power plant's 55 megawatt capacity will use renewable energy to displace thermal power generation by coal and natural gas in Chile's Central Interconnected System, and will generate annual average emission reductions of 110,000 tons of carbon dioxide equivalent. The total of approximately 600,000 tons of carbon dioxide emission reductions will be purchased by the **Netherlands CDM Facility**.





### From the Ministry of Economic Affairs

The Dutch Government has played a pioneering role in the creation of an international market for carbon credits. Since 2000, the Ministry of Economic Affairs has been active in implementing Joint Implementation (JI) projects

in Eastern European countries. In close partnership with the World Bank Group, the Netherlands has worked to develop procedures and guidelines in the challenging area of JI, and has been involved in institution building in Eastern European countries.

In August 2004, the Ministry of Economic Affairs agreed with the World Bank Group to develop JI projects for the Netherlands through creation of the Netherlands European Carbon Facility (NECF). The Facility has been implemented with a unique co-management arrangement between the IBRD (the World Bank) and the IFC. During the past year, the NECF reached an important milestone, by closing its portfolio of emission reductions purchase agreements. Going forward, the emphasis will be on translating the portfolio commitments into delivery of high-quality emission reductions.

Bert de Vries  
Deputy Director-General for  
Energy and Telecommunications  
Ministry of Economic Affairs, the Netherlands



# Netherlands European Carbon Facility Participant



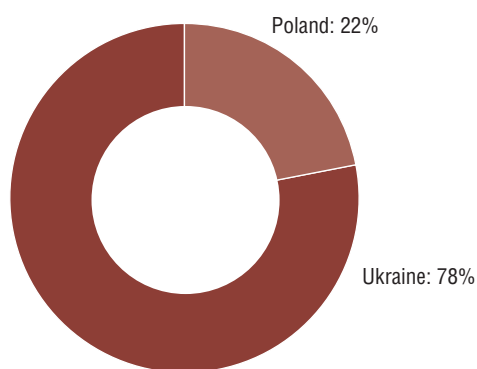
MINISTRY OF ECONOMIC AFFAIRS  
www.ez.nl

## Netherlands European Carbon Facility Status

The Netherlands European Carbon Facility (NECF) is managed under one agreement by both the IBRD (the World Bank) and the IFC. In this report, only the World Bank component of the portfolio is shown.

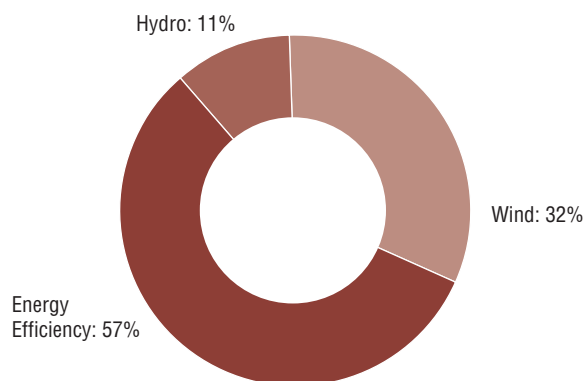
### NECF Geographic Distribution\*

Because Joint Implementation projects are located in countries with economies in transition, all of the portfolio projects are located in Eastern Europe. The NECF portfolio managed by the World Bank is dominated by Ukraine at 78%, with some projects in Poland accounting for 22%.



### NECF Technology Distribution\*

From a technological perspective, the composition of the NECF portfolio managed by the World Bank is fairly evenly split. Renewable energy projects (hydro and wind) make up 43%, while industrial (supply-side) energy efficiency projects make up 57% of total value.



\*Charts are based on total emission reductions \$ value of projects at emission reductions purchase agreement and carbon finance document stage.

## UKRAINE: REVAMPING AND MODERNIZATION OF THE ALCHEVSK STEEL MILL PROJECT

The city of Alchevsk is one of the biggest industrial centers in Lugansk Oblast, Eastern Ukraine. The Alchevsk Iron and Steel Works is the fifth largest integrated iron and steel plant in Ukraine and is owned by the Industrial Union of Donbass (IUD). Although one of the more modern steel works in Ukraine, the facilities were mainly built in the 1950s and 1960s, including the sinter plant, lime kilns, four blast furnaces and four open hearth furnaces, ingot casting, blooming mill and several other mills. IUD is implementing a capital investment program of \$1.5 billion to modernize operations in Alchevsk and another plant, with the goals of applying more energy-efficient technology, improving environmental performance and increasing capacity (nearly doubling steel production) and therefore competitiveness. The possibility of using Joint Implementation provided the incentive to invest in new technology. The **Netherlands European Carbon Facility** will purchase emission reductions of approximately one million tons of carbon dioxide equivalent generated in the first five years.





## From the Italian Government

Climate change is recognized as an unprecedented challenge by the Italian Government, and with the need for all major emitting countries, in both the developed and developing world, to move to a lower-carbon economy, the sustainable

management of natural and energy resources has become a long-term priority for the international community and the EU.

The Italian Carbon Fund (ICF) has achieved the goals of its mission by creating a diversified project pipeline that pays attention to the objective of reducing greenhouse gas emissions, as well as to eradicating poverty worldwide. Italy and other countries of the EU are convinced that, in the near future, they have

to bear high costs to further upgrade energy efficiency. Therefore, carbon finance will play an important role in the achievement of the Italian targets up to and beyond 2012. The ICF is becoming a model for developing a strategic partnership and for bringing together the private and public sectors to finance mechanisms integrating environmental considerations.

Regarding the fast-growing and challenging carbon market, we are grateful to the World Bank and the ICF members. We also believe that there are several benefits in taking forward the ICF work in such a collaborative and fruitful manner, with a vision of making an important contribution to the resolution of the climate change crisis over the next decades.

A handwritten signature in black ink, likely belonging to Corrado Clini.

Corrado Clini  
Director General  
Italian Ministry for the Environment, Land and Sea



## Italian Carbon Fund Participants



ITALIAN MINISTRY FOR THE ENVIRONMENT,  
LAND AND SEA  
www.minambiente.it



ENEL TRADE S.P.A.  
www.enel.it



IRIDE MERCATO S.P.A.  
www.iride-mercato.it



CEMENTERIE ALDO BARBETTI S.P.A.  
www.barbetti.it



ERG S.P.A.  
www.erg.it



ITALCEMENTI GROUP  
www.italcementigroup.com



E.ON ITALIA S.P.A.  
www.eonitalia.it

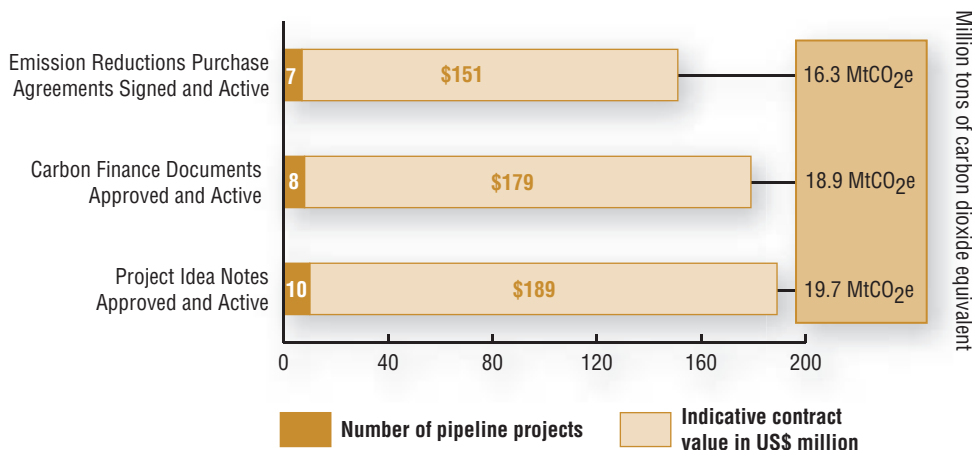
## Italian Carbon Fund Status

Country/Project Name	Project Description	ICF Contract ERs (tCO <sub>2</sub> e)
<b>Emission Reductions Purchase Agreements Signed</b>		
1	China: HFC-23 Destruction (co-purchase)	5,999,616
2	China: Nanjing Steel Converter Gas Recovery	1,293,495
3	China: Yunnan Whitewaters Hydropower Development	2,200,000
4	India: Allain Duhangan Hydro	2,820,250
5	Russia: Associated Gas Recovery for the Komsomolskoye Oil Field	900,000
6	Tunisia: Djebel Chekir Landfill Gas Recovery and Flaring	1,930,000
7	Tunisia: Gas Recovery and Flaring for Nine Landfills	1,120,000

## Italian Carbon Fund Status

As of the end of December 2008, the Italian Carbon Fund had signed seven emission reductions purchase agreements including participating in the HFC-23 investment with other funds for a total of 16.3 million tons of carbon dioxide equivalent. In spite of having fully committed its capital, an additional project remains in the pipeline to hedge against the possibility of under-delivery. The ICF also has two project idea notes representing emission reductions of 800,000 tons of carbon dioxide equivalent.

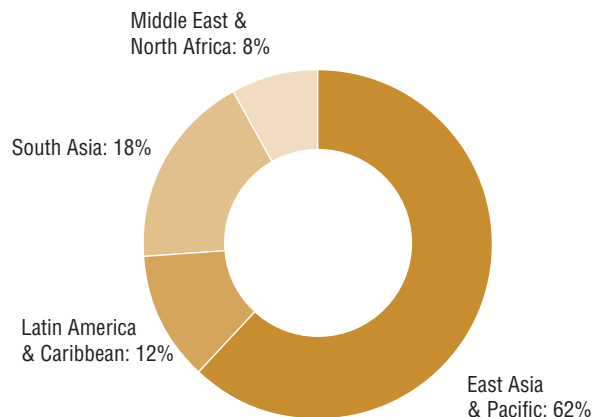
### Italian Carbon Fund Project Status (cumulative)



Note: The above figures exclude options purchases.

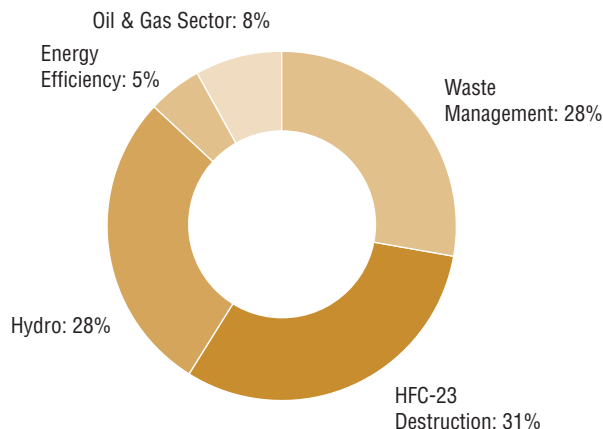
### ICF Geographic Distribution\*

ICF projects at the emission reductions purchase agreement and carbon finance document agreement stage are mainly concentrated in the East Asia and Pacific region, 62%, with the remainder located in Latin America and the Caribbean, 12%, the Middle East and North Africa, 8%, and South Asia, 18%.



### ICF Technology Distribution\*

A wide range of technologies are covered by ICF projects, including HFC-23 destruction, 31%, waste management, 28%, hydropower, 28%, oil and gas sector, 8%, and energy efficiency, 5%.



\*Charts are based on total emission reductions \$ value of projects at emission reductions purchase agreement and carbon finance document stage.

## TUNISIA: DJEBEL CHEKIR LANDFILL GAS RECOVERY AND FLARING PROJECT

The Djebel Chekir Landfill is the only landfill that receives the municipal waste of the Tunisian capital, Tunis. It receives 700,000 tons of waste per year and emits large amounts of methane.

The purpose of the project is to implement an efficient gas recovery and flaring system in the landfill. It will install and operate a gas collection network over the whole landfill area and maximize the landfill gas flaring potential. The design of the system and the current operating conditions of Djebel Chekir are inappropriate for any landfill gas collection and destruction. The **Italian Carbon Fund** is purchasing emission reductions of 1.9 million tons of carbon dioxide equivalent. After implementation, the project will lead to a substantial lowering of methane emissions by the landfill through 2015.



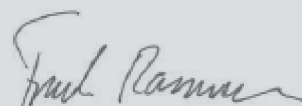




## From the DCF Chair

The Danish Carbon Fund (DCF) was formed in 2005 and consists of representatives of Danish industry together with the Danish Energy Agency. The DCF is an important part of the effort to reach Denmark's emission

reduction targets. I am pleased that the DCF portfolio has progressed during 2008 and that the fund is almost fully committed. The participants are well prepared for the opportunities in a continued carbon market after 2012.



Frank Rasmussen  
Dong Energy



## The Danish Carbon Fund: Adapting and Making Progress

The DCF became officially operational in January 2005. The make-up of the DCF has changed over the years, as two of the original participants merged into a larger company (DONG Energy) and the original two participating government ministries assigned their participation to the newly created Danish Ministry of Climate and Energy. Partly as a means of hedging against risks of under-delivery of Kyoto-compliant assets from the projects in its portfolio, the DCF agreed in 2008 to increase its capitalization from \$80.6 million to \$125.1 million. This additional capital provides the DCF with added possibilities. It also postpones the date of fully committing the available capital to contract emission reductions.

In 2008, the DCF made significant progress toward signing emission reductions purchase agreements, including its first for a Joint Implementation project—an important milestone for the fund. It also signed two other purchase agreements—in China and in Pakistan—bringing it closer to the goal of fully committing its capital. 2009 looks very promising in this respect. Like other players in the carbon market, the DCF is having to weather the regulatory changes and delays in the CDM which are unfortunately affecting expected deliveries of certified emission reductions. The DCF is reacting swiftly and adapting to these realities.

## Danish Carbon Fund Participants



GOVERNMENT OF DENMARK  
www.kemin.dk



MAERSK OLIE OG GAS A/S  
www.maerskoil.com



AALBORG PORTLAND A/S  
www.aalborgportland.com



NORDJYSK ELHANDEL A/S  
www.nordjysk-elhandel.dk



DONG ENERGY  
www.dongenergy.com

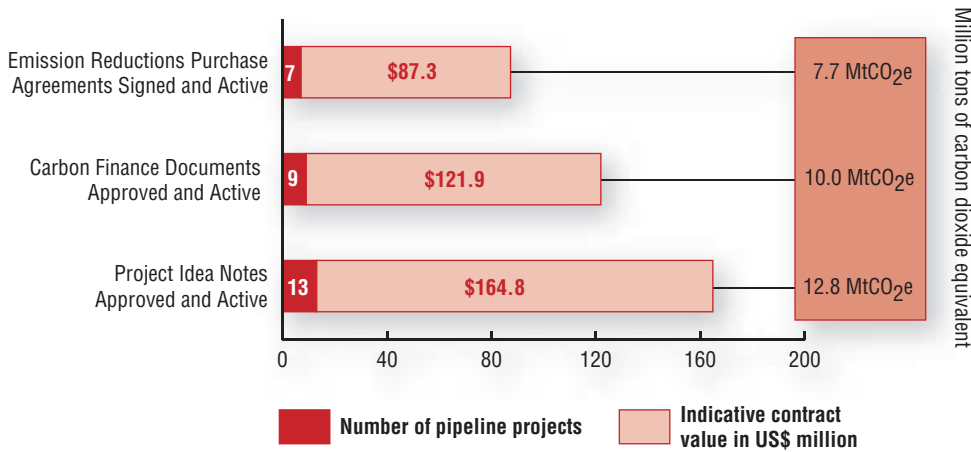
## Danish Carbon Fund Status

Country/Project Name	Project Description	DCF Contract ERs (tCO <sub>2</sub> e)
<b>Emission Reductions Purchase Agreements Signed</b>		
1	China: Baotou Energy Efficiency The project has two components. The first component uses coke dry quenching to recover sensible heat from red-hot coke ovens. The recovered waste heat is used to generate electricity and to supply additional heat, thereby displacing coal-fired power generation for the grid and coal-fired boilers in the plant. The second component involves the installation of dry type dust removal equipment in the blast furnace gas to increase the recovered gas pressure for power generation in the top-gas recovery turbine	900,000
2	China: HFC-23 Destruction Installation of an incineration facility to decompose HFC-23 generated by the existing HCFC-22 manufacturing facility into carbon dioxide (CO <sub>2</sub> ) and hydrogen fluoride (HF)	2,000,000
3	Kenya: Sondu Miriu Hydro The project will construct a hydropower generation units, with run-of-river diversion from on the Sondu Miriu River	1,295,000
4	Mexico: Monterrey II Landfill Gas Captured landfill gas will be flared and used in power generation, thereby reducing methane emissions	1,000,000
5	Nigeria: SF <sub>6</sub> Reduction Reduce emissions of sulfur hexafluoride (SF <sub>6</sub> )—a greenhouse gas with a global warming potential 23,000 higher than carbon dioxide—from Nigeria's electricity grid. The project will improve the maintenance of breakers and switch gear to reduce the leakage of SF <sub>6</sub> from insulators. The project will transfer technology and knowledge, and carbon revenues will contribute to upgrading Nigeria's power supply	602,000
6	Pakistan: Lahore Composting The project constructs and operates a waste processing and composting plant in Lahore, Pakistan	300,049
7	Russia: Associated Gas Recovery for the Komsomolskoye Oil Field Construction of a booster compressor station with a gas conditioning unit and a gas pipeline to the national gas transmission system, which will result in recovery of gas currently burnt during flaring	1,620,000

# Danish Carbon Fund Status

The Danish Carbon Fund became operational in January 2005. Taking into account the risks involved in developing and delivering carbon finance projects, the DCF has a large pipeline compared to what is needed to fill the portfolio. As of the end of 2008, the DCF had seven projects with signed agreements and an additional six projects in the pipeline. The fund is well on its way to committing all its capital in 2009.

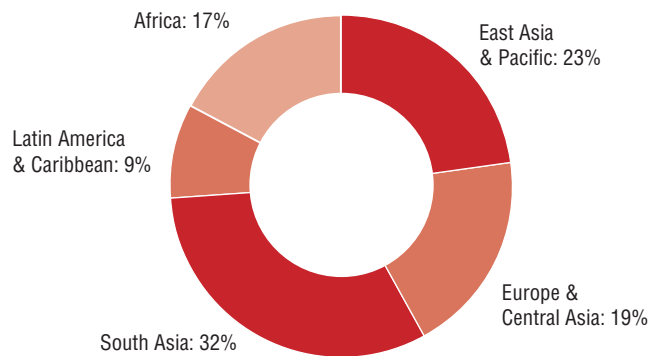
## Danish Carbon Fund Project Status (cumulative)



Note: The above figures exclude options purchases.

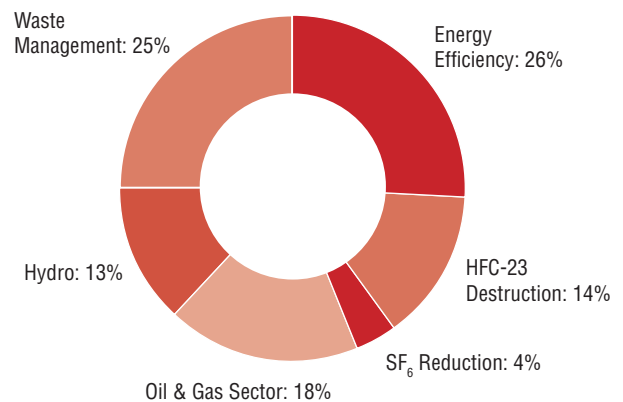
## DCF Geographic Distribution\*

The Danish Carbon Fund continues to contribute to the carbon market through the diverse geographical distribution of its portfolio.



## DCF Technology Distribution\*

The DCF also seeks to create a portfolio that is technologically diversified. Of the projects at an advanced stage of preparation, energy efficiency and waste management constitute the largest share, each representing a quarter of the portfolio value. The oil and gas sector, renewable energy and HFC-23 destruction also make up a significant portion of the portfolio value.



\*Charts are based on total emission reductions \$ value of projects at emission reductions purchase agreement and carbon finance document stage.

## MEXICO: MONTERREY II LANDFILL GAS TO ENERGY PROJECT

The project seeks reductions in greenhouse gas emissions from 162 hectares of a city landfill in Monterrey, in the northeastern state of Nuevo Leon, Mexico. The landfill began operations in 1999, and accepts mostly non-hazardous domestic and commercial waste as well as some non-hazardous hospital and industrial waste. Seven cells in the landfill have been closed so far: the landfill gas collection system will initially be installed in these seven, with other cells connected later after they close. A landfill gas and extraction system, using wells connected to pumps and a gas cleaning system, will produce fuel that can be used in gas engines to generate power. The project activity will sustain generator capacity of 5.3 megawatts, with a possible increase up to 13 megawatts, to supply renewable energy to the grid. In addition, the project will transfer clean technology, improve waste management practices and prevent environmental pollution. It will generate an estimated one million tons of carbon dioxide equivalent emission reductions purchased by the **Danish Carbon Fund**.



Mexico's President Calderón at landfill inauguration on December 17, 2008





## From the Government of Spain

The Spanish Government considers the Kyoto Protocol's flexible mechanisms to be key to address the huge challenge of mitigating climate change by promoting transfer of clean technologies and private investment to

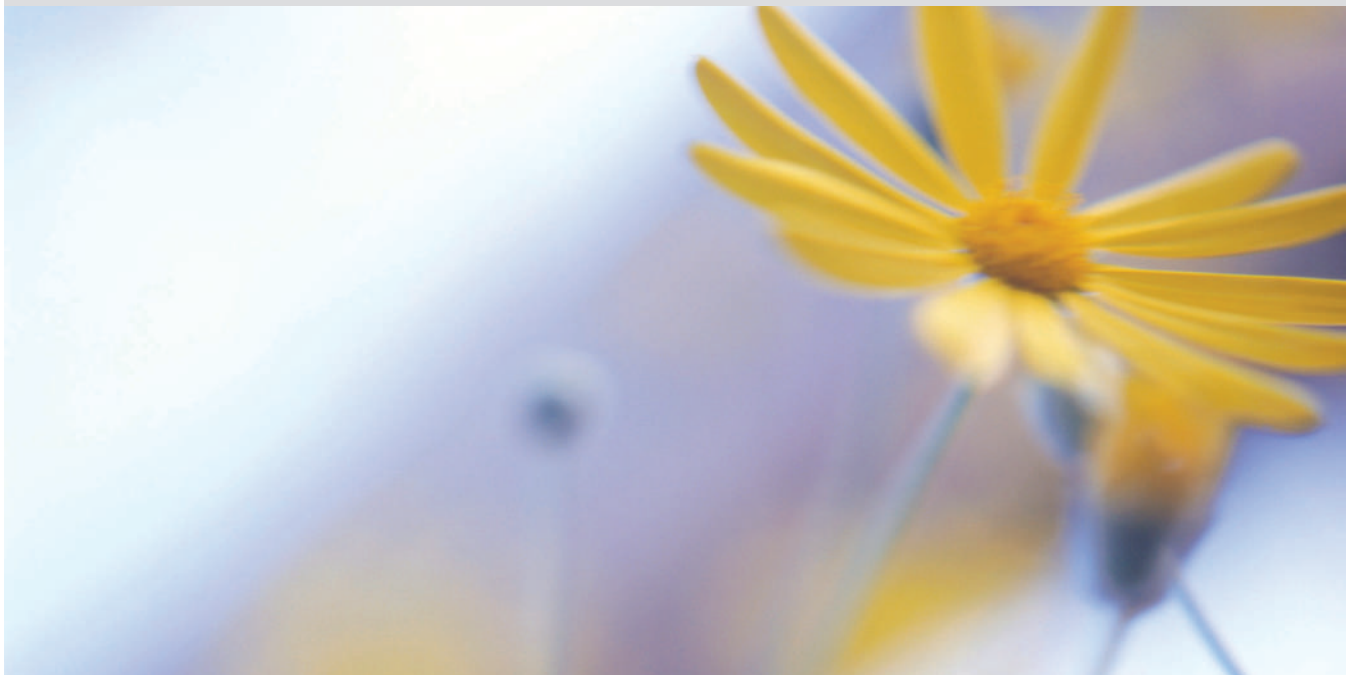
developing countries and by reinforcing these countries, commitment to low carbon development.

With that aim, the Spanish Carbon Fund (SCF) was created with contributions from the public sector and relevant Spanish companies. The fund has contributed to develop CDM projects in different regions around the world, from Latin America to Asia to North Africa, and to mobilize financial flows to these regions that contribute to achieve cost-effective emission reductions.

Carbon markets will be an essential element of the future climate change regime to be agreed in Copenhagen in December 2009. Measures will be taken to ensure that both environmental integrity and sustainable development are reached through this mechanism. The Spanish Government is already working with this aim through the Spanish Carbon Fund and decided, in 2008, to launch a second tranche of the Fund. This second tranche is conceived as a vehicle to promote large scale mitigation initiatives, particularly in the framework of programmatic CDM. Thus, the Spanish Carbon Fund is in line with other World Bank initiatives, such as the Carbon Partnership Facility. With this second tranche, the Spanish Government has set up a valuable tool to facilitate the transition from the pre-2012 to the post-2012 regime and to provide a stable framework for clean investments in the short and medium term.



Alicia Montalvo  
General Director, Bureau for Climate Change  
Ministry of Environment



# Spanish Carbon Fund Participants



GOVERNMENT OF SPAIN  
Ministry of Environment, and Rural  
and Marine Affairs: [www.mma.es](http://www.mma.es)  
Ministry of Economy and Finance: [www.meh.es](http://www.meh.es)



AZULIBER 1, S.L.  
[www.azuliber.com](http://www.azuliber.com)



CEMENTOS PORTLAND VALDERRIVAS  
[www.valderrivas.es](http://www.valderrivas.es)



CEPSA  
[www.cepasa.com](http://www.cepasa.com)



ENDESA  
[www.endesa.es](http://www.endesa.es)



E.ON GENERACIÓN  
[www.eon-espana.com](http://www.eon-espana.com)



GAS NATURAL SDG, SA  
[www.gasnatural.com](http://www.gasnatural.com)



HC ENERGIA  
[www.hcenergia.com](http://www.hcenergia.com)



IBERDROLA  
[www.iberdrola.es](http://www.iberdrola.es)



oficemen  
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OFICEMEN  
[www.oficemen.com](http://www.oficemen.com)



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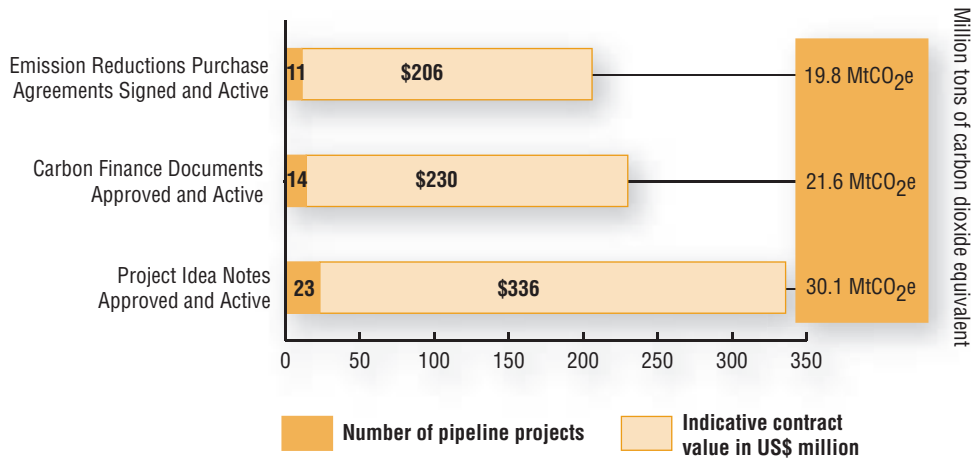
## Spanish Carbon Fund Status

Country/Project Name		Project Description	SCF Contract ERs (tCO <sub>2</sub> e)
<b>Emission Reductions Purchase Agreements Signed</b>			
1	Brazil: Nova Gerar Carbon Finance and Waste Management II	This umbrella project involves three landfills from the metropolitan area of Rio de Janeiro and one from the metropolitan area of Recife. Three of the projects are new sanitary landfills; the fourth landfill is an operation that will stop receiving waste by 2010 at which point a program will be implemented to support the local waste pickers. Landfill gas will be collected from all four landfills. Electricity might be generated as a result	1,000,000
2	China: HFC-23 Destruction	Installation of an incineration facility to decompose HFC-23 generated by the existing HCFC-22 manufacturing facility into carbon dioxide and hydrogen fluoride	8,503,401
3	China: Luojing COREX	The project will use COREX technology to deoxidize iron ore to high-quality hot metal by coal instead of coking coal. It lessens energy consumption and carbon dioxide emissions, and also skips the traditional stages of coking and sintering, thereby further reducing carbon dioxide emission	3,000,000
4	China: Meishan Coke Dry Quenching	The project recovers the waste heat of the hot coke from the coke-oven in the Meishan Iron & Steel plant by introducing advanced coke dry-quenching technology to replace the wet-quenching process. The recovered heat will be used for electricity generation and heat supply	750,000
5	China: Tianjin Landfill Gas Recovery and Utilization	Construction of a landfill gas utilization system to generate electricity for landfill operations and to feed to the power grid of Tianjin City. The project will be implemented on the Shuangkou municipal landfill. The Shuangkou landfill is a sanitary landfill that was partially financed by the World Bank under the Tianjin Urban Development and Environment Project	635,000
6	Egypt: Alexandria Onyx Landfill Gas Capture and Flaring	Installation of new landfill gas collection systems to collect gas emissions from the Borg el Arab and El Hammam landfill sites in Alexandria. The project collects residual emission gas, which Onyx does not currently have an obligation to treat	1,100,000
7	Mexico: La Venta II	An 85 megawatt wind project in the south region of the Isthmus of Tehuantepec, in the Mexican state of Oaxaca	1,800,000
8	Mexico: Mexico City Transport	Activities will promote a shift toward low-polluting modes of transportation (primarily articulated buses) via the development of surface mass transport corridors and traffic management measures that integrate with the existing metro infrastructure. High-polluting colectivo buses will be scrapped	354,606
9	Mali/Mauritania/Sénégal: OMVS Félou Hydroelectric	Construction and operation of a run-of-river hydroelectric installation on the Sénégal River. The project will deliver electricity to national power utilities in the sub-region (Mali, Mauritania, and Sénégal) through the creation of an additional 59 to 62 megawatts of installed hydropower generation capacity at an existing weir	280,000
10	Russia: Associated Gas Recovery for the Komsomolskoye Oil Field	Construction of a booster compressor station with a gas conditioning unit and a gas pipeline to the national gas transmission system, which will result in recovery of gas currently burnt during flaring	1,400,000
11	Uruguay: Montevideo Landfill Gas Recovery	The Montevideo Landfill Gas Recovery Project consists of the design, implementation, and monitoring of a landfill gas extraction, treatment, and flaring facility at the Montevideo landfill. Such a facility will allow the capture and destruction of methane generated through the anaerobic decomposition of organic matter disposed of in the landfill	1,000,000

# Spanish Carbon Fund Status

As of December 2008, the Spanish Carbon Fund had signed 11 emission reductions purchase agreements, including participation in the HFC-23 investment with other funds, for a total of 19.8 million tons of carbon dioxide equivalent. Twelve projects complete the pipeline: three projects at carbon finance document stage, totaling 1.8 million tons of carbon dioxide equivalent; six projects corresponding to 7.1 million tons of carbon dioxide equivalent have signed letters of intent; and three projects totaling 1.4 million tons of carbon dioxide equivalent remain at the project idea note stage.

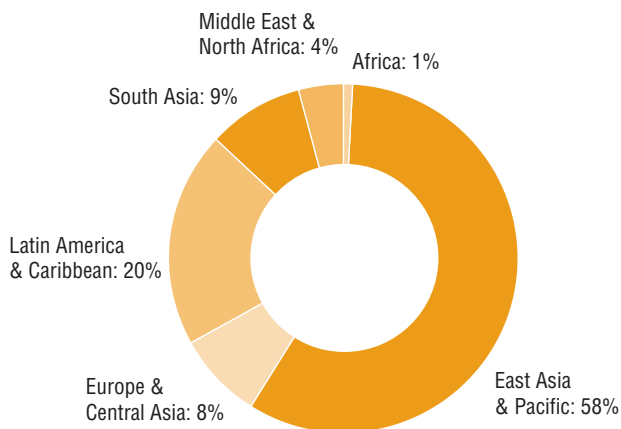
## Spanish Carbon Fund Project Status (cumulative)



Note: The above figures exclude options purchases.

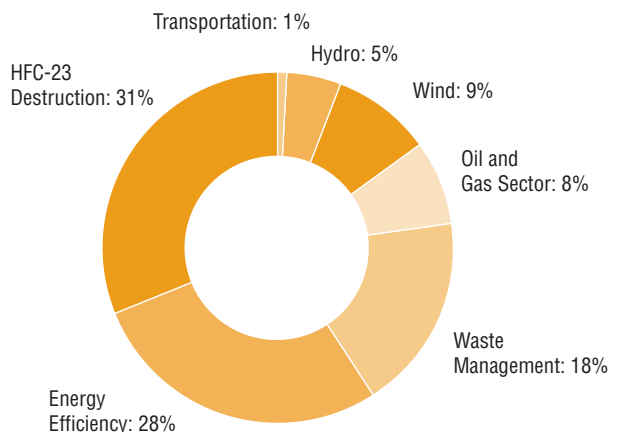
## SCF Geographic Distribution\*

Projects with emission reductions purchase agreements and carbon finance document agreements are mainly located in the East Asia and Pacific region, 58%, followed by Latin America and the Caribbean, 20%, Europe and Central Asia, 8%, and South Asia, 9%. The remaining percentage is split between the Middle East and North Africa, 4%, and South Asia, 9%. The remaining percentage is split between the Middle East and North Africa, 4%, and the Africa region, 1%.



## SCF Technology Distribution\*

The SCF has sought diversification in its portfolio, and the projects included in the fund encompass a wide range of technologies such as HFC-23 destruction, 31%, energy efficiency, 28%, hydropower, 5%, windpower, 9%, oil and gas, 8%, transportation, 1%, and waste management, 18%.



\*Charts are based on total emission reductions \$ value of projects at emission reductions purchase agreement and carbon finance document stage.



### MEXICO: LA VENTA II WIND POWER PROJECT

The La Venta II wind farm project, consisting of 98 wind turbine generators in the southern state of Oaxaca, serves as a national demonstration project for clean, renewable electricity. It is Mexico's first large-scale wind-power plant, and generates nearly 308,000 megawatt-hours annually for the Interconnected Mexican National Grid. The project is expected to displace close to 1.8 million tons of carbon dioxide equivalent, with emission reductions purchased by the **Spanish Carbon Fund**. La Venta II contributes to sustainable development by generating energy without greenhouse gas emissions, thus displacing power generation fired by expensive heavy fuel, diesel, coal and gas, all of which would release carbon dioxide. Plant construction and management have employed local labor from the Ejido La Venta community where the project is located.





## From the Chair of the CFE Participants' Committee

Operated by the World Bank in partnership with the European Investment Bank, the Carbon Fund for Europe (CFE) has been operational for 21 months. With more than half

its resources committed, the CFE has made steady progress toward meeting its purchasing targets, and toward its objective of helping developing countries and countries with emerging economies achieve sustainable low-carbon development through clean technology projects.

CFE participants are all European compliance buyers—four governments and one company—with a strong commitment to meeting their Kyoto and European emissions trading systems targets up to 2012.

But climate policy will need to be deepened, and in that regard, all eyes are on the international discussions on the post-2012 climate agreement to be reached later this year in Copenhagen. These ongoing discussions show strong support for the continued role of market mechanisms beyond 2012 as a key instrument for achieving ambitious climate policies.

The CFE will undoubtedly contribute further to strengthening these markets and supporting clean development.

Nuno Lacasta  
Director, Portuguese Carbon Fund

## The Carbon Fund for Europe: Linking Carbon Finance Mechanisms

The CFE began operations in March 2007 and was established as a trust fund administered by the World Bank, in cooperation with the European Investment Bank. The CFE is co-managed by both institutions. Through this partnership, the European Investment Bank offers its deep knowledge of the European economy and a large project pipeline in developing countries, while the World Bank brings its expertise and experience in the carbon market.

The CFE purchases credits from projects eligible under the Kyoto Protocol's CDM and JI mechanisms. It is specifically directed towards the European Union Member States and the European private sector, and aims to facilitate the participation of private companies with European Union emission reduction requirements by purchasing assets that will be compatible with the European Union Emissions Trading Scheme (EU ETS), and favoring projects with relatively short lead times.

After almost two years of operations, the CFE has already committed more than half of its capital by signing four emission reductions purchase agreements. Building on a dynamic pipeline of projects in a diverse set of technologies, the fund will continue supporting the advancement of developing countries toward sustainable development by complementing private sector development in the emerging carbon market, and seeking ways to support essential private carbon market development.



# Carbon Fund for Europe Participants



Comhshaoil, Oidhreacht agus Rialtas Aitiúil  
Environment, Heritage and Local Government

DEPARTMENT OF THE ENVIRONMENT,  
HERITAGE AND LOCAL GOVERNMENT,  
IRELAND

[www.environ.ie/en/Environment/  
Atmosphere/ClimateChange](http://www.environ.ie/en/Environment/Atmosphere/ClimateChange)



FLEMISH GOVERNMENT  
[www.vlaanderen.be](http://www.vlaanderen.be)

## FONDO PORTUGUES DE CARBONO

FONDO PORTUGUES DE CARBONO,  
PORTUGAL



LE GOUVERNEMENT  
DU GRAND-DUCHÉ DE LUXEMBOURG  
Ministère des Finances

GOVERNMENT OF LUXEMBOURG  
[www.environnement.public.lu/air\\_bruit/dossiers](http://www.environnement.public.lu/air_bruit/dossiers)



STATKRAFT CARBON INVEST AS  
[www.statkraft.com](http://www.statkraft.com)

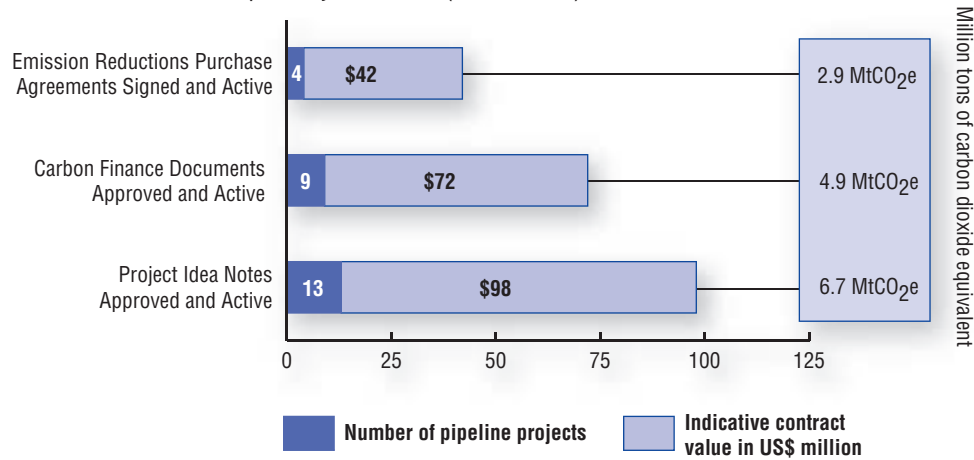
# Carbon Fund for Europe Status

Country/Project Name		Project Description	CFE Contract ERs (tCO <sub>2</sub> e)
<b>Emission Reductions Purchase Agreements Signed</b>			
1	Egypt: Landfill and Processing Services for Southern Zone in Cairo	Reduction of methane gas emissions by diverting high organic waste from direct disposal at a landfill to a composting plant. Of the revenues generated from the sale of emission reductions, 6% will be used to implement social services projects. The compost will be sold to farmers at current market prices	325,480
2	Jordan: Amman Landfill Gas	The project objective is to avoid methane emissions from the Ghabawi Sanitary Landfill by installing a plant for landfill gas collection and electricity generation. This will introduce environmentally friendly technology, generating electricity from the landfill gas. The electricity is delivered to the grid and replaces electricity produced from power plants using heavy fuel oil, which means that in addition to the methane emission reductions on the landfill there will also be carbon dioxide emission reductions from the power plant	900,000
3	Malaysia: Kota Kinabalu Composting	Reduction of methane gas emissions by diverting high organic waste from direct disposal at a landfill to a composting plant. The sorting facility currently employs 89 workers, about 30 of whom were former local waste pickers at the landfill. The labor force is expected to expand by 19 employees with commissioning of the composting plant. The project will also promote technology transfer and capacity building of local staff in solid waste management	340,000
4	Russia: Associated Gas Recovery for the Komsomolskoye Oil Field	Construction of a booster compressor station with a gas conditioning unit and a gas pipeline to the national gas transmission system, which will result in recovery of gas currently burnt during flaring	1,400,000

# Carbon Fund for Europe Status

In its second year the total capitalization of the Carbon Fund for Europe (CFE) stands at €50 million (\$69.5 million) and the CFE has been able to sign four emission reductions purchase agreements valued at €30.1 million (\$42 million). An additional nine projects are in the CFE pipeline, of which five are at the carbon finance document stage.

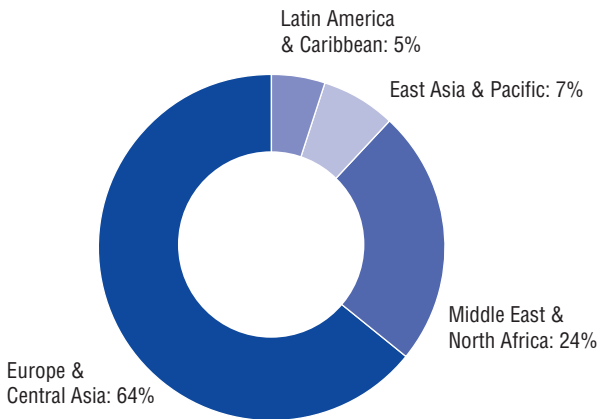
## Carbon Fund for Europe Project Status (cumulative)



Note: The above figures exclude options purchases.

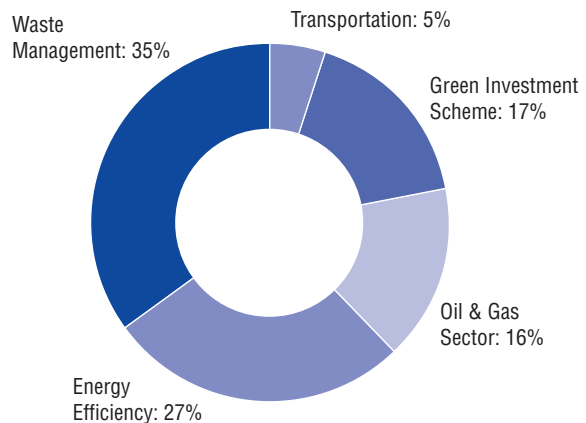
## CFE Geographic Distribution\*

The CFE portfolio chart covering emission reductions purchase agreements signed and projects at the carbon finance document stage is currently dominated by the Europe and Central Asia region, 64%, followed by the Middle East and North Africa region, 24%. The Middle East and North Africa region accounts for two projects with emission reductions purchase agreements signed, while the Europe and Central Asia region and the East Asia and Pacific region hold one project each with an emission reductions purchase agreement signed.



## CFE Technology Distribution\*

Currently, of the four projects with signed emission reductions purchase agreements, three projects use waste management technology, representing the largest share of the portfolio, 35%; one project involves energy efficiency technology and accounts for 27% of the portfolio. Projects at the carbon finance document stage include oil and gas, transport, and waste management technologies. The CFE also expects to sign an emission reductions purchase agreement for a Green Investment Scheme project in the coming year.



\*Charts are based on total emission reductions \$ value of projects at emission reductions purchase agreement and carbon finance document stage.

## MALAYSIA: KOTA KINABALU COMPOSTING PROJECT

A collaboration between the State of Sabah and MS Smart Recycling, a private-sector company, has resulted in Kota Kinabalu's first commercial-scale municipal solid waste sorting and composting plant at the Kayu Madang Sanitary Landfill site. The plant is located near the town of Telipok, approximately 30 kilometers northeast of the city of Kota Kinabalu.

The project objective is to avoid methane emissions from the landfill by diverting 500 tons of Sabah's daily waste to a sorting and composting plant, which will recover the recyclable portion and convert the highly biodegradable portion into marketable compost. Aerobic decomposition of the organic portion of municipal solid waste into reusable compost generates carbon dioxide instead of the methane otherwise emitted from anaerobic decomposition. This will extend the landfill's lifetime three-fold, introduce environmentally friendly technology and establish a market for compost. Under the agreement with MS Smart, the **Carbon Fund for Europe** will purchase emission reductions for 340,000 tons of carbon dioxide equivalent up to the end of 2014. Without the carbon finance revenues, the private operator would have financial difficulties due to the lack of a mature compost market in Malaysia, as well as the high costs of operating a facility for solid waste management.





## From the Chair of the Forest Carbon Partnership Facility (FCPF)

The Forest Carbon Partnership Facility, announced during the climate change negotiations in Bali in December 2007, is a unique

global partnership designed to reduce emissions from deforestation and forest degradation (REDD) in developing countries. Initially, we thought that having 20 REDD Country Participants in the FCPF would be a reasonable target. Today, more than 45 countries have expressed interest in participating.

The challenge is considerable: with about 13 million hectares of forest lost every year, deforestation is a major contributor to global warming. The REDD agenda, however, offers reasons for hope. Renewed attention and financial resources, including incentive

payments, will help to address the root causes of deforestation and forest degradation, and to promote biological carbon sequestration in forests and agro-ecosystems in general.

The FCPF was conceived as both a facility and a partnership—its impact ought to go much beyond its capitalization target of \$350 million. More to the point, the FCPF must produce results that can inform the negotiations of the parties to the United Nations Framework Convention on Climate Change. We are committed to this objective. At the same time, speed must not come at the expense of inclusion and sharing benefits with civil society, indigenous and other forest-dependent peoples.



Katherine Sierra  
FCPF Chair and Vice President,  
Sustainable Development, the World Bank



## Forest Carbon Partnership Facility

### What is the FCPF?

Developing and industrialized countries asked the World Bank to develop a framework for piloting activities to reduce carbon dioxide emissions from deforestation and forest degradation (REDD). In the summer of 2006, the World Bank began consultations with a number of countries and organizations, including environmental nongovernmental organizations (NGOs). These consultations highlighted the value of developing the facility in partnership with a broad range of actors—an approach that can balance the interests of potential donors and buyers, recipients and sellers and other stakeholders.

The Forest Carbon Partnership Facility was announced at the 13th Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) in Bali in December 2007, and became operational on June 25, 2008.

The two-part facility—made up of a Readiness Mechanism and a Carbon Fund—serves to build capacity in developing countries while providing technical assistance for REDD in World Bank member countries in the tropics—across Africa, East Asia and the Pacific, South

Asia, and Latin America and the Caribbean. As part of “REDD readiness,” countries will prepare their national reference scenarios for emissions from deforestation and forest degradation, adopt national strategies for stemming deforestation and forest degradation, and design national monitoring, reporting and verification systems for REDD.

The initial meetings of the FCPF witnessed rich knowledge exchange among countries relevant to REDD, the election of the first Participants Committee, and the selection by the Participants Committee of 25 countries on the basis of review of their Readiness Plan Idea Notes by a Technical Advisory Panel of independent experts. There continues to be very strong demand from developing countries for this unique partnership. In late 2008, the FCPF re-opened the period for submissions, and more countries will be selected for the Readiness Mechanism in 2009.

It is expected that around five countries that make significant progress towards REDD readiness will also participate in the Carbon Fund and receive performance-based payments for verifiably reducing emissions from deforestation and forest degradation. The structure of these payments will build on the options for REDD that are currently being discussed in the UNFCCC process.

## Forest Carbon Partnership Facility Financial Contributors

Thirteen industrialized countries, entities and NGOs have formalized their participation in the Forest Carbon Partnership Facility by committing to contribute resources in order to work together to test approaches to reduce emissions from deforestation and forest degradation. They include:



Agence Française de Développement (AFD)  
European Commission  
Government of Australia  
Government of Finland  
Government of Germany  
Government of Japan  
Government of Norway  
Government of Switzerland  
Government of the Kingdom of the Netherlands  
Government of the United Kingdom (DFID & DECC)  
Government of the United States  
Kingdom of Spain  
The Nature Conservancy

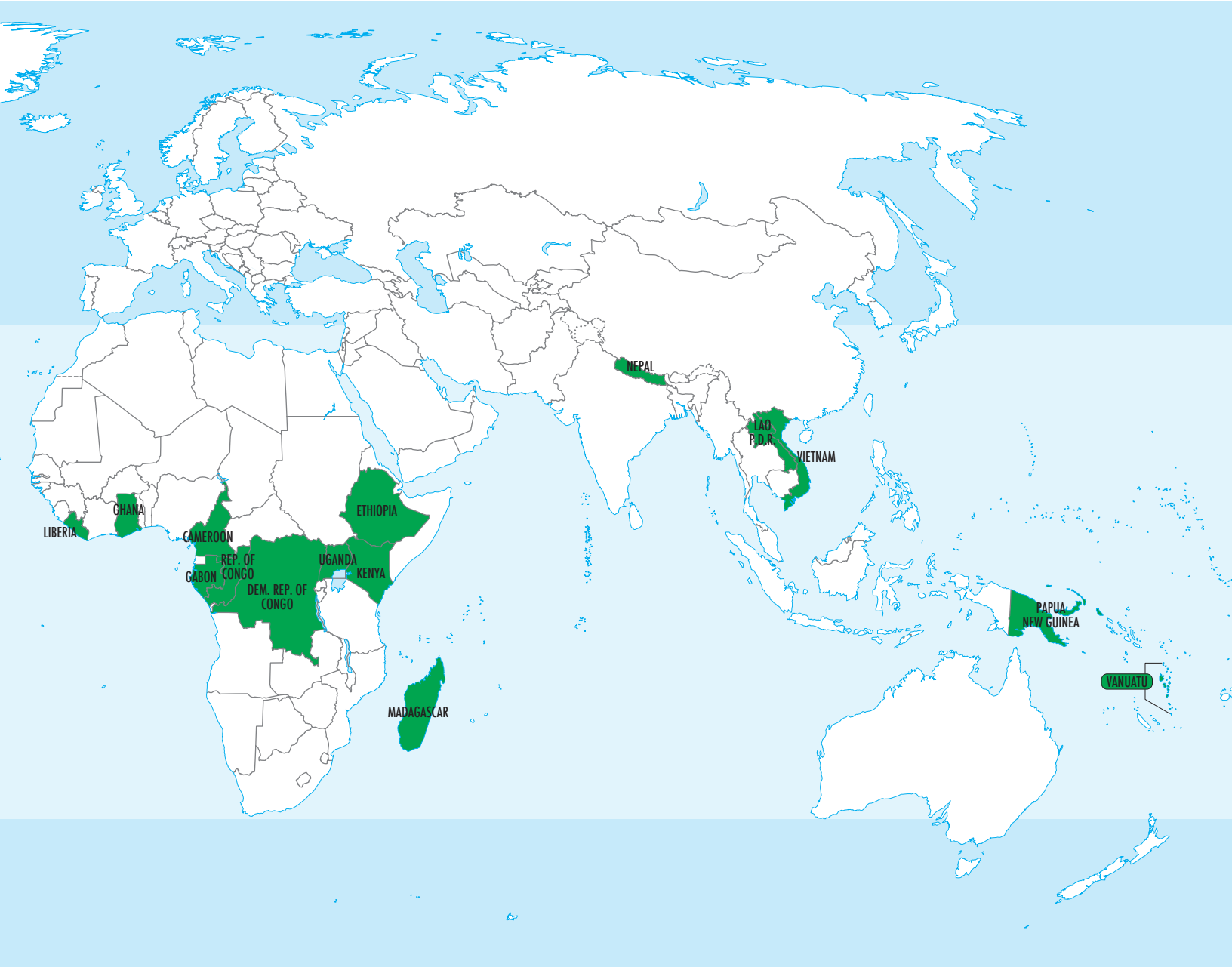
# Forest Carbon Partnership Facility REDD Country Participants

The map shows the 25 tropical and subtropical developing countries selected by the Participants Committee of the Forest Carbon Partnership Facility as of the end of 2008. They will be assisted in their efforts to reduce emissions from deforestation and forest degradation by providing value to standing forests.

## REDD COUNTRY PARTICIPANTS

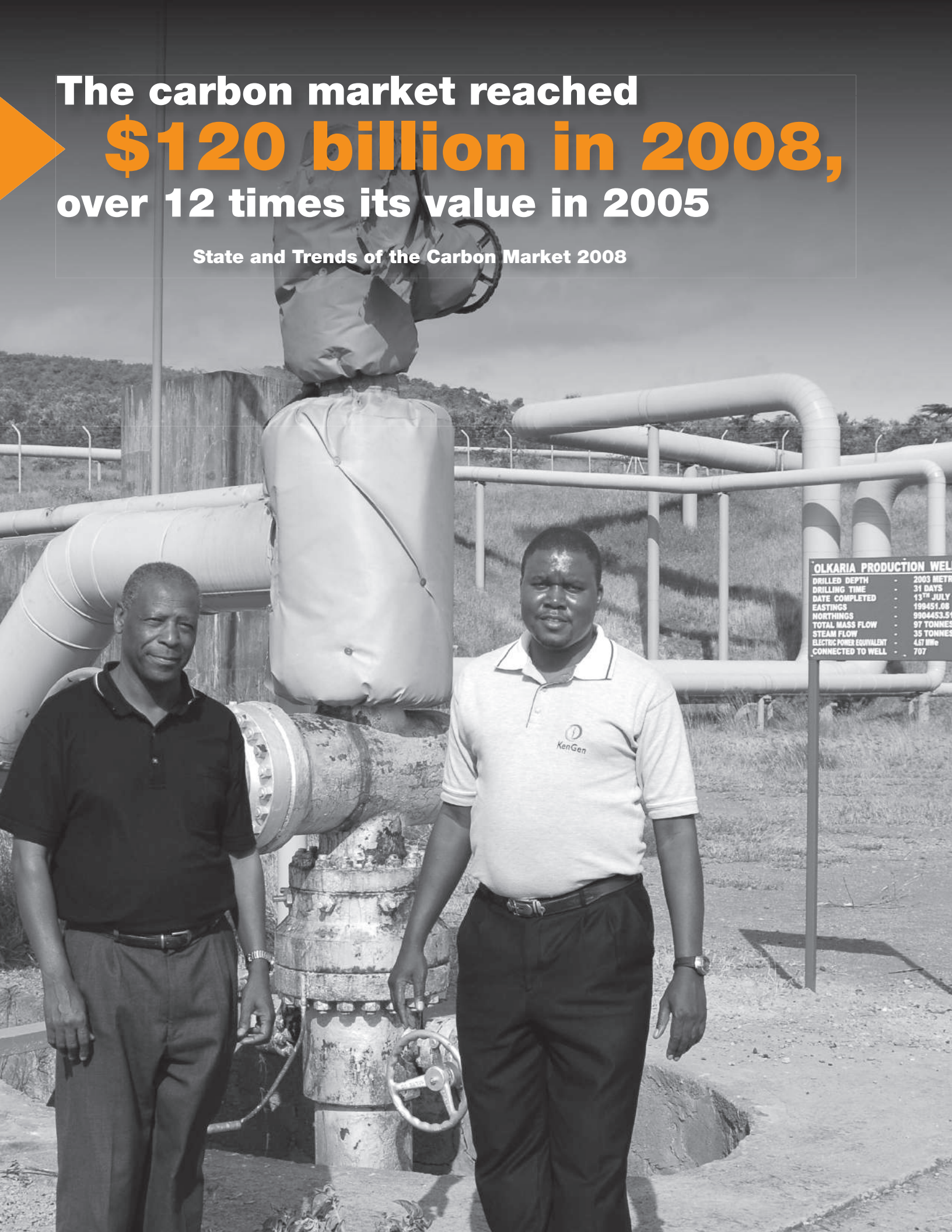






# The carbon market reached **\$120 billion in 2008,** over 12 times its value in 2005

State and Trends of the Carbon Market 2008



OLKARIA PRODUCTION WELL	
DRILLED DEPTH	- 2093 METRE
DRILLING TIME	- 31 DAYS
DATE COMPLETED	- 13 <sup>TH</sup> JULY
EASTINGS	- 199451.08
NORTHINGS	- 990463.51
TOTAL MASS FLOW	- 97 TONNES
STEAM FLOW	- 35 TONNES
ELECTRIC POWER EQUIVALENT	- 4.57 MW <sub>e</sub>
CONNECTED TO WELL	- 707

## The Way Forward

# The Way Forward: Larger-Scale and Longer-Term

## Global Emissions

Globally, a lower-carbon development path is essential to help stop greenhouse gas concentrations in the atmosphere from rising to levels that could precipitate dangerous climate impacts. According to recent calculations (2005) emissions stood at 45 billion tons of carbon dioxide equivalent per year. The latest UNFCCC data (2006), show that annual emissions of Annex 1 countries alone stand at 20.5 billion tons of carbon dioxide equivalent. To hold the temperature increase at two degrees Celsius—above which the world would be facing potentially catastrophic impacts—Intergovernmental Panel on Climate Change (IPCC) scientific models show that atmospheric carbon dioxide would have to be stabilized at 450 parts per million. That would mean emissions must drop to less than 10 billion tons per year by 2050.

Historically, carbon dioxide emissions from developing countries have been much lower than those from industrialized countries. But according to scenarios projected in the IPCC Special Report on Emissions Scenarios, they could be equal to, and even surpass, those of high-income countries by 2035. That makes the next two to three decades critical for moving development into low-carbon pathways to bring annual emissions down sufficiently by 2050. Indeed, most of the necessary technologies and systems are already available. Our

window of opportunity for broad intervention is now, and it calls for actions of a scale and impact that can only be found in long-term initiatives applied in many sectors.

## Potential of Carbon Markets to Reduce Emissions

Lower carbon trajectories are essential for sustaining future development. A variety of ways and means can help—for example, standards and regulations, incentives for clean technology, and research and development of new technologies. In addition to such policy-type approaches, there are carbon taxes and cap-and-trade arrangements.

Carbon finance, if used strategically to be larger-scale and longer-term, could be key to lowering emission trajectories. By means of technical and financial cooperation, the investments brought in by the carbon market can potentially establish low-carbon sustainable development. The carbon market now stands at almost five billion tons per year, but there is plenty of room for carbon markets to grow to help meet the emission reductions necessary to hold the global temperature increase to two degrees celsius. Under some scenarios, carbon markets could account for 25% of the actions needed to stabilize emissions (Stern, 2006).



## What's Needed

To play such a role, carbon finance needs to scale up from the project to the program level, broaden its scope in new sectors and lengthen its duration so as to provide long-term market certainty. It is already clear that there are many cost-effective opportunities for program approaches in key development sectors such as energy efficiency, power, waste management, transport, urban development and industry. The upcoming UNFCCC initiative for reducing emissions from deforestation and forest degradation (REDD) will broaden carbon finance even further. That will allow many more developing countries to participate—especially those whose main resources are standing tropical forests.

## Role of the World Bank

For the World Bank, climate change is a development and economic issue as well as an environmental issue, and carbon finance offers outstanding opportunities to address development and mitigation together. The World Bank has taken on a leadership role in the next-generation carbon markets of the post-2012 period. In 2008, the World Bank set up its two newest carbon facilities—the Forest Carbon Partnership Facility (FCPF) for REDD, and the Carbon Partnership Facility (CPF) for programmatic and sector-based interventions. These two facilities aim to provide continuity well beyond 2012, scale up with program-level approaches to transform emissions-intensive sectors, involve the international community in REDD and leverage new private-sector financing for developing countries.

Both new facilities are based on a partnership approach where both developed and developing country governments and companies participate in the implementation and governance of the facility.

## Forest Carbon Partnership Facility

### Why Forests?

Forests are a crucial component of the Earth's web of life as we know it. Half of the Earth's species of plants and animals live in tropical forests, which are found in some 60 countries. Worldwide about 1.2 billion people rely on forests to greater or lesser degrees for food, shelter, economic needs and continuation of cultural and spiritual traditions. Forests influence climate by absorbing atmospheric carbon and replacing oxygen. In fact, 80% of the Earth's above-ground terrestrial carbon and 40% of below-ground terrestrial carbon, is contained in forests. They also maintain soil and water resources by absorbing rainfall and regulating stream flows, thus reducing flooding and landslides. But when forests are destroyed, the lands remaining are impoverished and can no longer support the same environmental functions, or absorb carbon dioxide on a global scale.

### 20% of the Problem, 20% of the Solution

Deforestation is the second leading cause of greenhouse gas emissions, resulting in almost 20% of emissions. Leaving forests standing is one of the most cost-effective ways to lower global emissions. The land use, land-use change and forestry (LULUCF) sector has been barely visible in the CDM, accounting for only 0.7% of projects so far. The prospects of financing through REDD will recognize the carbon value of standing forests and reduced deforestation in climate change mitigation, regardless of the type of financing mechanism that is put in place—market or fund.

### The World Bank and Sustainable Forests

The World Bank has become increasingly involved in sustainable management of forests over the past decade. That share of the World Bank's project portfolio has increased from \$149 million in fiscal year 2001 to \$540 million in fiscal year 2007. Other relevant Bank initiatives include the Forest Investment Program, now in the design process, in addition to numerous carbon finance projects that focus on land use, land-use change and forestry.



The FCPF builds on the Carbon Finance Unit's expertise with the BioCarbon Fund, which has implemented 19 individual projects and facilitated the role of LULUCF in the carbon market since 2004. These projects have included prototype avoided deforestation projects, new methodologies and technologies for calculating carbon sequestration and developmental benefits for forest-dependent people. Scaling up to the national-level interventions envisaged by the FCPF is designed to synchronize with the expansion of the LULUCF sector as the UNFCCC's new REDD program takes shape.

### **FCPF and What It Does**

The FCPF has been designed to prepare for a large-scale system of incentives for REDD. The FCPF will experiment with REDD activities, test methods and technologies, build country capacity, offer new ways to finance biodiversity conservation and involve local forest-dependent people in about 30 developing countries. In a subset of these countries, the FCPF will provide payments for reduced emissions realized by keeping their forests standing, and will use programs that specifically target the drivers of deforestation and forest degradation.

## **Carbon Partnership Facility (CPF)**

### **Expanding Infrastructure**

Much of this century's infrastructure is already in planning or building phases that require large and lengthy investments. In developing countries especially, infrastructure and energy systems are expanding rapidly along with population and economic growth. Under the Kyoto Protocol, the CDM and JI mechanisms have shown how carbon markets can attract investment for low-carbon development—for example, renewable energy, waste management and energy efficiency. The CDM market accounted for \$15.5 billion worth of emission reductions from 2002 to 2007, and increased 30% in the last year of that period. Carbon markets can leverage as much as nine-fold underlying investment in some sectors, and can also be used to deliver social and environmental benefits.

### **Uncertain Carbon Markets**

However, neither the UNFCCC nor national or regional regulatory frameworks yet include clear provisions for measures that tackle the broad range of emission sources at the scale and duration needed to reduce emissions globally. Right now there is a period of uncertainty about the future after the first Kyoto commitment period ends in 2012. Moreover, the current carbon market is set up for short-term interests and a project-by-project approach, not large, longer-term investments in energy and infrastructure.

## Scaling Up

The World Bank's extensive experience in working with developing countries to create national programs makes it a credible leader of pilot activities in scaling up carbon finance to the sector level. The World Bank has started sector-wide incentives for energy efficiency, renewable energy and better environmental practices, in programs like the Clean Energy for Development Investment Framework and the Global Gas Flaring Reduction Partnership.

The World Bank's carbon funds and facilities have already begun to aggregate sub-projects under "umbrellas", by utilizing the CDM Programme of Activities approach, for example, in a chiller efficiency program in India. Gains from low-carbon growth technologies and economies of scale can be expanded from waste management and power development to energy efficiency, oil, gas, coal mining, industry and transport.

## The CPF and What It Does

The World Bank established the CPF specifically to catalyze large-scale, long-term investments in clean technology programs that will help developing countries in their efforts to move to lower carbon development paths. CPF objectives and its business model take into account the large-scale, potentially risky investments with long lead times, which require durable partnerships

between buyers and sellers, possibly spanning several market cycles. The capitalization of the CPF could grow to several billion dollars over time, and it is expected to operate well beyond 2020. The CPF can provide continuity and integrate carbon finance more closely with national development strategies and policies.

"Learning by doing" approaches will be an essential aspect of the facility—testing of methodologies, pricing and program approaches may well help to shape the international regulatory framework. CPF programs in the works include country-wide renewable energy, energy efficiency, waste management and urban transport programs. Methodology work, on city-wide approaches for example, and addressing energy efficiency of building blocks is also underway.

## Future Potential

The CPF and similar investments have the potential to transform emissions-intensive sectors. This will require integrating carbon finance into investment programs and sector development strategies. The World Bank can foster what's needed—strategic program approaches, capacity-building that helps countries get ready, efforts to synchronize development aspects and production needs (for example in industry), and development of best interventions for particular sectors. The CPF aims to pave the way forward to that goal.



**Carbon Finance** could  
potentially **account for**  
**25% of the actions**  
required to reduce global emissions

Stern Report, 2006





## Annexes

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# Governance

## PCF Participants' Committee

Hans-Georg Adam (Chair), RWE  
Akihito Nagata, JBIC  
Christine Fedigan, GDF SUEZ  
Erik Bjørnebye, Government of Norway  
Lisa Walker, BP Gas Marketing  
Olle Björk, Government of Sweden  
Takeshi Hokari, Mitsui & Co., Ltd.

## CDCF Participants' Committee

Toni Hemminki (Chair), Rautaruukki Oyj  
Anne Bolle, Statkraft Carbon Invest A.S.  
Kunihiro Nishikawa, Daiwa Securities SMBC Principal  
Investments Co., Ltd.  
Laura Canuto, Ministry for the Environment, Land and  
Sea, Italy  
Nobutaka Ohki, FujiFilm Corporation  
Teresa Solana Méndez de Vigo, Ministry of  
Environment, Spain





### **BioCF T1 Participants' Committee**

Laura Canuto, Government of Italy

François Falloux, Eco-Carbone

Takanao Ibuki, Japan Iron & Steel Federation

Takenobu Shiina, Suntory

Teresa Solana Mendez de Vigo, Government of Spain



### SCF Participants' Committee

**Alicia Montalvo** (Chair), Ministry of Environment, Spain  
**Ana de Vicente Lancho**, Ministry of Economy and Finance, Spain  
**Emilio Rodriguez-Izquierdo Serranom**, Zeroemissions Carbon Trust, S.A.  
**Felix Alonso de las Fuentes**, Iberdrola  
**Ismael Aznar Cano**, Ministry of Environment, Spain  
**José Luis Gross Iribas**, Ministry of Environment, Spain  
**Juan Carlos Garcia Marinas**, Hidroeléctrica del Cantabrico  
**Luis Orgaz Garcia**, Ministry of Economy and Finance, Spain

### ICF Participants' Committee

**Corrado Clini** (Chair), Ministry for the Environment, Land and Sea, Italy  
**Fabio di Benedetti**, ERG S.p.A.  
**Federica Fricano**, Ministry for the Environment, Land and Sea, Italy  
**Sara Leggio**, Ministry for the Environment, Land and Sea, Italy  
**Stefano Apuzzo**, E.ON Italia S.p.A.



## FCPF Participants Committee

A representative from each of the following entities will serve on the Participants Committee of the Forest Carbon Partnership Facility. The balanced committee is made up of 10 donor and carbon fund participants and 10 REDD country participants.

Agence Française de Développement (AFD)

Australia

Bolivia

Costa Rica

Democratic Republic of Congo

Gabon

Germany

Ghana

Guyana

Japan

Madagascar

The Nature Conservancy

Nepal

The Netherlands

Norway

Panama

Switzerland

United Kingdom

United States

Vietnam



# Glossary

## **Assigned Amount Unit (AAU)**

A Kyoto Protocol unit equal to one metric ton of carbon dioxide equivalent. Each Annex I Party issues AAUs up to the level of its assigned amount, established pursuant to Article 3, paragraphs 7 and 8, of the Kyoto Protocol. Assigned amount units may be exchanged through emissions trading.

## **Adaptation**

Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities; for example, the construction of flood walls to protect property from stronger storms and heavier precipitation, or the planting of agricultural crops and trees more suited to warmer temperatures and drier soil conditions.

## **Afforestation**

Planting of new forests on lands that historically have not contained forests.

## **Annex I Parties**

The countries listed in Annex I of the UNFCCC and in Annex B of the Kyoto Protocol.

## **Avoided Deforestation**

Preventing deforestation by compensating countries for carbon dioxide reductions realized by maintaining their forests.

## **Bagasse**

The fibrous residue left after crushing sugarcane.

## **Biomass Fuel**

Fuels produced from dry organic matter or combustible oils produced by plants. These fuels are considered renewable as long as the vegetation producing them is maintained or replanted, such as firewood, alcohol fermented from sugar and combustible oils extracted from soy beans. Their use in place of fossil fuels cuts greenhouse gas emissions because the plants that are their sources recapture carbon dioxide from the atmosphere.

## **Cap-and-trade System**

An approach used to control pollution by providing economic incentives for achieving reductions in the emissions of pollutants.

## **Carbon Asset**

The potential of greenhouse gas emission reductions that a project is able to generate and sell.

## **Carbon Credits**

They provide a way to reduce greenhouse gas emissions on an industrial scale by capping total annual emissions and letting the market assign a monetary value to any shortfall through trading. Credits can be exchanged between businesses or bought and sold in international markets at the prevailing market price.

## **Carbon Finance**

Resources provided to projects generating (or expected to generate) greenhouse gas emission reductions in the form of the purchase of such emission reductions.

## **Carbon Finance Documents**

A project document, which contains a more advanced project description than the project idea note, including financials, is submitted by the project sponsor and reviewed by the Carbon Finance Unit, which submits it for clearance to the Fund Management Committee (as in the case of the Prototype Carbon Fund) and the respective Participants' Committees.

## **Carbon Market**

A popular term for a trading system through which countries may buy or sell units of greenhouse gas emission reductions in an effort to meet their national limits on emissions, either under the Kyoto Protocol or under other agreements, such as that among member states of the European Union. The term comes from the fact that carbon dioxide is the predominant greenhouse gas and other gases are measured in units called carbon dioxide equivalent.

## **Carbon Sequestration**

The process of removing carbon from the atmosphere and depositing it in a reservoir.

## **CDM Executive Board**

A 10-member panel elected at Conference of the Parties 7, which supervises the CDM.

**Certified Emission Reduction (CER)**

A unit equal to one metric ton of carbon dioxide equivalent, which may be used by Annex I parties towards meeting their binding emission reduction commitments under the Kyoto Protocol. CERs are issued for emission reductions from CDM project activities. Two special types of CERs (temporary CERs and long-term CERs) are issued for emission reductions from afforestation and reforestation CDM projects.

**Clean Development Mechanism (CDM)**

A mechanism provided by Article 12 of the Kyoto Protocol, through which developed countries may finance greenhouse gas emission reduction projects in developing countries, and receive credits for doing so which they may apply toward meeting mandatory limits on their own emissions.

**Clean Energy or Clean Technology**

Although there appears to be no strict definition, clean energy is any energy that causes little or no harm to the environment. Wind energy, solar energy (in all its forms—photovoltaic, geothermal, solar thermal, etc.), hydrogen and fuel cells, wave and tidal energy and biomass are all examples of clean energy.

**Community Benefits**

Community benefits are identifiable and quantifiable improvements in the quality of life of a local group of people who are identified by the trustee and the project entity as in the vicinity of or affected by a project.

**Conference of the Parties (COP)**

The supreme body of the UNFCCC. It currently meets once a year to review the Convention's progress.

**Countries with Economies in Transition**

Those Central and Eastern European countries and former republics of the Soviet Union in transition from state-controlled to market economies.

**Designated National Authority**

An office, ministry or other official entity appointed by a Party to the Kyoto Protocol to review and give national approval to projects proposed under the CDM.

**Emission Reduction (ER)**

The measurable reduction of release of greenhouse gases into the atmosphere from a specified activity or over a specified area and a specified period of time.

**Emission Reductions Purchase Agreement (ERPA)**

Agreement which governs the purchase and sale of emission reductions.

**European Union Emissions Trading Scheme (EU ETS)**

In January 2005, the European Union Emissions Trading Scheme commenced operation as the largest multi-country, multi-sector greenhouse gas emissions trading scheme worldwide. The scheme is based on Directive 2003/87/EC, which entered into force on October 25, 2003.

**Flexible Mechanisms**

Three procedures established under the Kyoto Protocol to increase the flexibility and reduce the costs of making greenhouse gas emissions cuts; they are the Clean Development Mechanism, International Emissions Trading and Joint Implementation.

**Greenhouse Gases (GHGs)**

The atmospheric gases responsible for causing global warming and climate change. Six gases are listed in Annex A of the Kyoto Protocol. The major greenhouse gases are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O). Less prevalent—but very powerful—are hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF<sub>6</sub>).

**Green Investment Scheme**

A financing mechanism in which the proceeds from emissions trading under the Kyoto Protocol are reinvested in projects in the host country's economy with the objective of further reducing emissions.

**Hectare (ha)**

A metric unit of measure equivalent to unit of area equal to 10,000 square meters, or 2.47 acres.

**HFC-23 (trifluoromethane)**

Greenhouse gas that has 11,700 times the global warming potential of carbon dioxide and is a by-product in the manufacturing process of HCFC-22, used in air conditioning, refrigeration and as a feedstock.

**Host Country**

The country where an emission reductions project is physically located.

### **Host Country Committee (HCC)**

The committee known as the Carbon Finance Host Country Committee established by the World Bank for the purpose of facilitating interaction between the host countries and the World Bank in relation to the development and operation of CDM projects.

### **Intergovernmental Panel on Climate Change (IPCC)**

Established in 1988 by the World Meteorological Organization and the UN Environment Program, the IPCC surveys worldwide scientific and technical literature and publishes assessment reports that are widely recognized as the most credible existing sources of information on climate change. The IPCC also works on methodologies and responds to specific requests from the Convention's subsidiary bodies. The IPCC is independent of the Convention.

### **International Development Association (IDA)**

One of the five institutions composing the World Bank Group, which focuses exclusively on the world's poorest countries.

### **Joint Implementation (JI)**

A mechanism under the Kyoto Protocol through which a developed country can receive "emission reduction units" when it helps to finance projects that reduce net greenhouse gas emissions in another developed country (in practice, the recipient state is likely to be a country with an "economy in transition"). An Annex I Party must meet specific eligibility requirements to participate in Joint Implementation.

### **Kyoto Protocol**

An international agreement standing on its own, and requiring separate ratification by governments, but linked to the UNFCCC. The Kyoto Protocol, among other things, sets binding targets for the reduction of greenhouse gas emissions by industrialized countries. It entered into force on February 16, 2005.

### **Land Use, Land-Use Change and Forestry (LULUCF)**

A greenhouse gas inventory sector that covers emissions and removal of greenhouse gases resulting from direct human-induced land use, land-use change and forestry activities. Expanding forests reduce atmospheric carbon dioxide; deforestation releases additional carbon dioxide; various agricultural activities may add to atmospheric levels of methane and nitrous oxide.

### **Least Developed Countries (LDCs)**

The world's poorest countries. Least developed countries are countries (i) listed in the World Bank's IDA list of countries; (ii) countries commonly referred to as "IDA blend," with a population of less than 75 million; or (iii) countries designated as least developed countries by the United Nations.

### **Letter of Intent**

Document required prior to negotiating the terms of the emission reductions purchase agreement.

### **Mitigation**

In the context of climate change, a human intervention to reduce the sources or enhance the sinks of greenhouse gases. Examples include using fossil fuels more efficiently for industrial processes or electricity generation, switching to solar energy or wind power, improving the insulation of buildings and expanding forests and other "sinks" to remove greater amounts of carbon dioxide from the atmosphere.

### **Programme of Activities**

Emission reductions that are achieved by multiple verifiable activities executed over time as a direct response to a government measure or private sector initiative. Programmes typically result in a multitude of greenhouse gas-reducing activities in multiple sites over the life of the programme.

### **Project Idea Note**

A document prepared by a project proponent regarding a project proposed for the World Bank's carbon funds or facilities. The note is set forth in a format provided by the Carbon Finance Unit and available on its website [www.carbonfinance.org](http://www.carbonfinance.org).

### **Reforestation**

Replanting of forests on land that was previously forested but subsequently converted to other use.

### **Small-scale Projects**

Projects that are compatible with the definition of "Small-scale CDM Project Activities" set out in decision 17/CP.7 by the Conference of Parties to the UNFCCC.

### **Sustainable Development**

Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.



**Ton of Carbon Dioxide Equivalent (tCO<sub>2</sub>e)**

The universal unit of measurement used to indicate the global warming potential of each of the six greenhouse gases. Carbon dioxide—a naturally occurring gas that is a byproduct of burning fossil fuels and biomass, land-use changes and other industrial processes—is the reference gas against which the other greenhouse gases are measured.

**Tranche**

The Spanish Carbon Fund and the BioCarbon Fund consist of tranches. For example, the BioCarbon Fund's first tranche supports a wide variety of land use, land-use change and forestry projects, some providing emission reductions potentially eligible for credit under the Kyoto Protocol, and some that explore options for carbon credits that achieve them by activities other than afforestation and reforestation and therefore not eligible for Kyoto credits in the first commitment period. Depending on the interests of contributors, various additional tranches may be opened, each one with a specific focus, which could be sectoral or geographic, e.g., arid or semi-arid land management, or marine, coastal and aquatic ecosystem management. BioCF Tranche 2 focuses on forests and agro-ecosystems.

**United Nations Framework Convention on Climate Change (UNFCCC)**

The international legal framework adopted in June 1992 at the Rio Earth Summit to address climate change. It commits the Parties to the UNFCCC to stabilize human-induced greenhouse gas emissions at levels that would prevent dangerous man-made interference with the climate system. In December 1997, the Parties to the UNFCCC adopted the Kyoto Protocol. In February 2005, the Kyoto Protocol entered into force thus becoming a legally binding instrument.

**Voluntary Market**

The unregulated market which allows individuals, companies and organizations to purchase emission reduction credits to offset the emissions they produce.

**World Bank Board of Executive Directors**

The IBRD (World Bank) Board is composed of 24 Executive Directors. The Executive Directors of the IBRD serve ex-officio as Directors of IDA and the IFC provided that the country that appoints them or any one of the countries that elects them, is also a member of IDA.

# Acronyms

AAU	Assigned amount units
A/R	Afforestation/reforestation
CDM	Clean Development Mechanism
CER	Certified emission reduction
COP	Conference of the Parties
DECC	Department of Energy and Climate Change (UK)
DFID	Department for International Development (UK)
ER	Emission reduction
ERPA	Emission reductions purchase agreement
EU	European Union
EU ETS	European Union Emissions Trading Scheme
GHG	Greenhouse gas
HFC-23	Trifluoromethane
HCFC-22	Chlorodifluoromethane
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IEA	International Energy Agency
IFC	International Finance Corporation
IPCC	Intergovernmental Panel on Climate Change
JI	Joint Implementation
LULUCF	Land use, land-use change and forestry
MtCO <sub>2</sub> e	Million tons carbon dioxide equivalent
N <sub>2</sub> O	Nitrous oxide
NGO	Nongovernmental organization
PIN	Project Idea Note
REDD	Reduce emissions from deforestation and forest degradation
SF <sub>6</sub>	Sulfur hexafluoride
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

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