

# NEGOTIATIONS ON ADDITIONAL INVESTMENT AND FINANCIAL FLOWS TO ADDRESS CLIMATE CHANGE IN DEVELOPING COUNTRIES

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**Capacity development for policy makers: addressing climate change in key sectors**

The UNDP “Capacity development for policy makers” project seeks to strengthen the national capacity of developing countries to develop policy options for addressing climate change across different sectors and economic activities, which could serve as inputs to negotiating positions under the United Nations Framework Convention on Climate Change (UNFCCC). The project will run in parallel with the “Bali Action Plan” process—the UNFCCC negotiations on long-term cooperative action on climate change set to conclude in December 2009 in Copenhagen at the fifteenth Conference of the Parties.

This paper is one of a series produced for the project that provides in-depth information on the four thematic building blocks of the Bali Action Plan—mitigation, adaptation, technology and finance—as well as on land-use, land-use change and forestry. The project materials also include executive summaries for policymakers, background briefing documents and workshop presentations. These materials will be used for national awareness-raising workshops in the participating countries.

**Disclaimer**

The views expressed in this publication are those of the author(s) and do not necessarily represent those of the United Nations, including UNDP, or their Member States.

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**Acronyms**

ADB	Asian Development Bank	
Annex I	Parties included in Annex I to the United Nations Framework Convention on Climate Change. These countries have additional commitments to assist developing countries with finance and technology.	
Annex II	Parties included Annex II to the United Nations Framework Convention on Climate Change.	
AOSIS	Alliance of Small Island States	
CCS	CO <sub>2</sub> capture and storage	
CDM	Clean Development Mechanism	
CERs	Certified emission reductions, the credits issued for emission reductions achieved by a CDM project activity (equal to one metric tonne of carbon dioxide equivalent)	
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol.	
CO	Carbon dioxide	
COP	The Conference of the Parties to the United Nations Framework Convention on Climate Change. It is the supreme body of the Convention.	
CTF	Clean Technology Fund	
DIVA	Dynamic Interactive Vulnerability Analysis	
DOE	Designated Operational Entity	
ERU	Emission Reduction Unit, the credits issued for emission reductions achieved by a Joint Implementation project activity (equal to one metric tonne of carbon dioxide equivalent)	
GEF	Global Environment Facility	
IATAL	International Air Travel Adaptation Levy	
IET	International Emissions Trading	
IMERS	International Maritime Emissions Reduction Scheme	
IMF	International Monetary Fund	
IMO	International Maritime Organization	
IPCC	Intergovernmental Panel on Climate Change	
JI	Joint Implementation	
LDC	Least Developed Country	
LDCF	Least Developed Countries Fund	
LULUCF	Land use, land-use change and forestry	
MDGs	Millennium Development Goals	
MOU	Memorandum of Understanding	
NAMA	Nationally Appropriate Mitigation Actions	
NAPA	National Adaptation Plans of Action	
NAI Parties	Parties to the United Nations Framework Convention on Climate Change that are not included in Annex I (developing countries)	
		NGO Non-governmental organization
		ODA Overseas Development Assistance
		RAF Resource Allocation Framework
		RD&D Research, development and demonstration
		REDD Reducing Emissions from Deforestation and Degradation in Developing Countries
		RMU Removal Unit: a type of tradable unit based on LULUCF activities such as reforestation
		SCCF Special Climate Change Fund, a fund established under the Convention that funds adaptation and technology cooperation projects in developing countries
		SCF Strategic Climate Fund
		SD-PAMs Sustainable development policies and measures
		SDRs Special Drawing Rights
		SIDS Small Island Developing States
		UNFCCC United Nations Framework Convention on Climate Change (the Convention)
		<b>Units and measures</b>
		AAUs Assigned Amount Units (equal to one metric tonne of carbon dioxide equivalent)
		CO <sub>2</sub> -eq CO <sub>2</sub> -equivalent
		CO <sub>2</sub> -eq/yr CO <sub>2</sub> -equivalent per year
		Gt Gigatons: 10 <sup>9</sup> tons, 1 billion tons
		Mt Megatons: 10 <sup>6</sup> tons, a million tons
		tCO <sub>2</sub> tons of CO <sub>2</sub>

## 1. INTRODUCTION

### 1.1 Purpose and scope

The purpose of this paper is to help developing countries to assess options in negotiations on additional international investment and financial flows to address climate change. This paper covers:

- Estimates of the investment and financial flows needed to address climate change;
- Existing funding mechanisms of the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol;
- Options to enhance international investment and financial flows to developing countries;
- Governance of the international investment and financial flows;
- Effective disbursement of the international funds.

This paper does NOT deal with national policies relating to investment and financial flows to address climate change in developing countries – that is addressed in a separate paper produced for this series<sup>1</sup>. In addition, separate guidelines that developing countries can use to assess their national needs are available. Information on the terminology used in this paper can be obtained from the glossary in Annex 2.

### 1.2 Background

The UNFCCC and the Kyoto Protocol foresee financial assistance from developed country Parties to developing country Parties. Developed country Parties (Annex II Parties) committed to provide new and additional financial resources to assist developing country Parties comply with their obligations under the Convention (Article 4.3) and the Kyoto Protocol (Article 11.2).<sup>2</sup> The financial assistance may be provided through a “financial mechanism” established by Article 11 of the Convention

or through bilateral, regional or other multilateral channels.<sup>3</sup>

The Global Environment Facility (GEF) was designated as an entity entrusted with the operation of the financial mechanism of the Convention on an interim basis in 1995.<sup>4</sup> The financial mechanism is accountable to the Conference of the Parties (COP), which decides on its policies, programme priorities and funding criteria. A memorandum of understanding (MOU) between the COP and the Council of the GEF was concluded in 1996.<sup>5</sup> After its first review of the financial mechanism, the COP decided to grant the GEF its status on an ongoing basis, subject to review every four years.<sup>6</sup>

Parties have also established two special funds under the Convention managed by the GEF; the Special Climate Change Fund (SCCF) and Least Developed Countries Fund (LDCF) (see section 3.1.2).<sup>7</sup>

The Adaptation Fund under the Kyoto Protocol was established to assist developing country Parties to the Protocol that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation.<sup>8</sup> A “share of proceeds” consisting of 2% of the certified emission reductions (CERs) issued for most Clean Development Mechanism (CDM) projects is contributed to the Adaptation Fund. The operating entity of the Fund is the Adaptation Fund Board serviced by a secretariat and a trustee. The GEF and World Bank have been appointed the secretariat and trustee respectively on an interim basis.<sup>9</sup> The Board, subject to the guidance and under the authority of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP), will develop strategic priorities, policies and guidelines, decide on projects and develop rules of procedure.

Financial support is currently being addressed in two

<sup>1</sup> Please refer to the paper by Dennis Tirpak, Sujata Gupta, Daniel Perczyk, and Massamba Thioye, *National Policies and Their Linkages to Negotiations over a Future International Climate Change Agreement*.

<sup>2</sup> Article 4.3 of the Convention states that developed country Parties shall provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties to prepare national communications and to meet the agreed full incremental costs of implementing measures covered by Article 4.1. Article 4.4 stipulates that developed country Parties shall assist particularly vulnerable developing country Parties to meet the costs of adaptation and Article 4.5 commits developed country Parties to take all practicable steps to promote, facilitate and finance the transfer, or access, to environmentally sound technologies and know how.

<sup>3</sup> Parties are required to report such financial assistance in their national communications.

<sup>4</sup> Decision 9/CP.1.

<sup>5</sup> Decision 12/CP.2.

<sup>6</sup> Annex to decision 3/CP.4.

<sup>7</sup> Decision 7/CP.7.

<sup>8</sup> Article 12.8 of the Kyoto Protocol and decisions 10/CP.7 and 28/CMP.1.

<sup>9</sup> Decision 1/CMP.3.

negotiating processes. One is the **fourth review of the financial mechanism**, which is scheduled to be completed by the COP at its 15th session (2009). The COP has adopted objectives and methodology for the review of the financial mechanism.<sup>10</sup> The fourth review will inform the fifth replenishment of the GEF. The second process is the Ad Hoc Working Group on Long Term Cooperative Action established by the **Bali Action Plan**. Its mandate includes enhanced action on the provision of financial resources and investment to support action on mitigation and adaptation and technology cooperation. That process is also scheduled to conclude at COP-15 in 2009.

The financial component of the Bali Action Plan will consider, inter alia:

- Improved access to adequate, predictable and sustainable financial resources and the provision of new and additional funding for developing country Parties;
- Positive incentives for developing country Parties for the enhanced implementation of national mitigation strategies and adaptation action;
- Innovative means of funding to assist developing country Parties particularly vulnerable to the adverse impacts of climate change to meet the cost of adaptation;
- Incentives to implement adaptation actions on the basis of sustainable development policies;
- Mobilization of public- and private-sector funding and investment; and
- Financial and technical support for capacity building in the assessment of the costs of adaptation in developing countries.

For an overview of COP and CMP decisions, please refer to Annex 1 of this report.

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<sup>10</sup> Decision 6/CP.13.

## 2. ESTIMATES OF THE INVESTMENT AND FINANCIAL FLOWS NEEDED TO ADDRESS CLIMATE CHANGE

In 2007, the UNFCCC Secretariat prepared a report on “Investment and Financial Flows to Address Climate Change”.<sup>11</sup> The report covers mitigation and adaptation in various sectors over the period to 2030. The report defines an **investment** as the initial (capital) cost of a new physical asset with a life of more than one year, such as the capital cost of a gas-fired generating unit or a water supply system. A **financial flow** is an ongoing expenditure related to climate change mitigation or adaptation that does not involve physical assets, such as research or health care. These investment and financial flows are NOT the same as the cost of addressing climate change; changes to the operating costs of investments are not considered nor are damages due to climate change estimated.

Total investment and relevant financial flows are estimated for both a reference scenario and a mitigation scenario. The scenarios are a composite of several sources covering energy-related emissions, industrial process carbon dioxide (CO<sub>2</sub>) emissions, non-CO<sub>2</sub> emissions, and agriculture and forest sinks. A comparison of those scenarios indicates the investment and financial flows needed to address climate change.

Addressing climate change will require significant shifts and an overall net increase in global investment and financial flows. **While the changes appear large in absolute terms, they are small relative to total investment.** Most of the changes and additional investment are likely to be made by corporations and households, although this may require government policies and incentives. But additional public sector investment and financial flows will be required, primarily for adaptation.

Approximately half of the shifts and net increase in investment and financial flows needed to address climate change occur in developing countries. Mitigation investments in developing countries are more cost-effective; larger emission reductions per dollar invested. On average developing countries are estimated to suffer more damage as a percentage of their GDP than developed countries.

The UNFCCC report and other studies conclude that developing countries, especially the poorest and those

most vulnerable to the adverse impacts of climate change, will need international financial support for mitigation and adaptation.

The estimated investment and financial flows are distinct from development needs. The energy sector investment, for example, does not reduce the number of people without access to modern energy services. The UNFCCC analysis does not systematically address individual countries or groups of developing countries. However, the data indicate that official development assistance plays a much larger role in least developed countries (LDCs) than other developing countries.

### 2.1 Mitigation

Mitigation investment and financial flows depend on the scale of the emission reductions. The reference scenario used in the UNFCCC report assumes that global emissions rise from 38.87 Gigatons CO<sub>2</sub>-equivalent (GtCO<sub>2</sub>-eq) in 2000 to 61.52 GtCO<sub>2</sub>-eq in 2030; about 1.5% per year.<sup>12</sup> Most of the growth occurs in developing countries. Under the mitigation scenario, global emissions peak in 2015 at 41.81 GtCO<sub>2</sub>-eq and then decline to 29.11 GtCO<sub>2</sub>-eq in 2030; 25% below 2000 emissions.

The lower emissions under the mitigation scenario are due to major changes to energy demand and supply and to shifting forests and agriculture from a source to a sink. Energy demand is estimated to be about 15% lower in 2030 due to aggressive implementation of energy efficiency measures – industry, buildings and transportation – by energy consumers and electric utilities. Electricity generating capacity is about 10% lower in 2030 and the mix of sources used is less carbon-intensive. Forests shift from an emissions source to a large sink.

The changes to the investment and financial flows in 2030 for climate change mitigation are shown in Table 1. The net change to the annual investment and financial flows in 2030 for climate change mitigation is estimated increase of \$200-\$210 billion globally, of which about \$75 billion is projected to occur in developing countries.

<sup>11</sup> UNFCCC, 2007.

<sup>12</sup> The reference and baseline scenarios for mitigation used by the UNFCCC correspond to scenarios from IEA World Energy Outlook (WEO) 2006; the non-CO<sub>2</sub> emissions projections from the United States Environmental Protection Agency (US EPA) extrapolated to 2030 (US EPA, 2006) and industrial process CO<sub>2</sub> emissions from the World Business Council on Sustainable Development (WBCSD) (WBCSD, 2002). For more detail, please see UNFCCC, 2007, Chapter II, p. 22 and Table 5, p. 216.



As discussed below, the net increase involves reduced investment for fossil fuel supply and large shifts in the investment for electricity generation.

Annual investment in **fossil fuel supply** and associated infrastructure in 2030 is almost \$60 billion lower due to the increased energy efficiency. However, global fossil fuel consumption is still about 30% higher than in 2000.

**Substantial shifts in investment for electricity supply will be needed. Mitigation is projected to reduce investment for fossil-fired generation, transmission and distribution by \$156 billion in 2030. Almost all of that amount, about \$148 billion, needs to be shifted to renewables, nuclear and CO<sub>2</sub> capture and storage (CCS).** Currently investment in the power sector is mostly domestic (about 70%), with significant international foreign direct investment and international borrowing in

some regions. Shifting domestic investments into more climate friendly alternatives may require national policies and/or financial incentives.

Increased energy efficiency requires additional investment for electrical and fossil fuel equipment in **industry** and **buildings**. Some CCS is also projected for the industrial sector. Improved vehicle efficiency, including hybrid vehicles, increases energy efficiency in the **transportation** sector. Actions to reduce emissions of non-CO<sub>2</sub> gases and from **waste** (landfills and wastewater treatment plants) require small investments. Finally, annual spending on **energy research, development and demonstration (RDD&D)** is projected to double from the current level. Currently, most research is undertaken in a few developed countries; what share of the research will be conducted in developing countries in 2030 is difficult to predict.

**Table 1: Change to the annual investment and financial flows in 2030 for climate change mitigation**

SECTORS	GLOBAL (BILLIONS OF \$ 2005)	SHARE OF NAI PARTIES (PERCENTAGE)
Fossil Fuel Supply	(-) 59	50 to 55%
Electricity Supply	(-) 7	50 to 55%
Fossil –fired generation, transmission and distribution	(-) 156	50 to 55%
Renewables, nuclear and carbon, capture & storage (CCS)	148	50 to 55%
Industry	36	50 to 55%
Building	51	25 to 30%
Waste	0.9	66 to 70%
Transport	88	40 to 45%
Forestry	21	Almost 100%
Agriculture	35	35 to 40%
Energy RD&D	35-45	-
<b>Net Change</b>	<b>200-210</b>	<b>35 to 40%</b>

Notes: NAI Parties: Parties to the United Nations Framework Convention on Climate Change that are not included in Annex I, developing countries.

RD&D: Research, development and demonstration

Source: UNFCCC 2007. *Investment and Financial Flows to Address Climate Change, Tables IX-61, IX-62 and IX-63, pp. 173 and 174.*

A little over half of the incremental investment for energy supply, electricity generation and industry is projected for developing countries, which reflects the relatively rapid economic growth projected for those countries and the cost-effective emission reduction opportunities available there. The shares are lower for buildings and transportation because building stocks with heating and/or cooling and vehicle fleets are concentrated in developed countries.

The **agriculture sector** offers opportunities to reduce nitrous oxide emissions from soils (fertilizer use) and manure management as well as methane emissions from animals, manure management and rice cultivation. The annual cost of such measures is estimated at \$20 billion in 2030, mostly (\$13 billion) in developing countries. Agroforestry offers the potential to increase carbon sinks; expanding agroforestry by 19 million ha/year would require an annual investment of about \$15 billion with virtually all of this potential in developing countries.

**Deforestation and forest degradation** currently lead to emissions of 5.8 GtCO<sub>2</sub> per year globally, all from developing countries. Halting those emissions would cost an estimated \$12 billion per year. In addition forest management – reducing harvest rates and harvest damage – could increase the forest carbon stock in developing countries. The estimated annual cost of such measures is \$8 billion per year. The forest carbon stock can also be increased through afforestation and reforestation of cleared land, but the potential is relatively small and the associated annual investment is less than \$0.5 billion annually.

## 2.2 Adaptation

The global cost of adaptation to climate change is difficult to estimate, largely because adaptation measures will be widespread and heterogeneous. More analysis of the costs of adaptation at the sectoral and regional levels is required to support the development of an effective and appropriate international response to the adverse impacts of climate change. Nevertheless it is clear that large new

and additional investment and financial flows will be needed to adapt to climate change. Based on the available literature, the UNFCCC Secretariat was able to compile partial estimates of the investment and financial flows for adaptation for agriculture, forestry and fisheries; water supply; human health; coastal protection; and infrastructure. The UNFCCC estimates are partial estimates for a limited number of sectors, so they do not represent the full incremental cost of adaptation.

Since they are drawn from available literature, the UNFCCC estimates of the investment and financial flows for adaptation in 2030 are based on a different scenario for each sector.<sup>13</sup> For water supply and coastal zones, adaptation costs are the capital costs of measures designed for the projected climate over the life of the facility; 2050 and 2080 respectively.

According to the UNFCCC estimates, the incremental investment and financial flows needed to adapt to climate change in selected sectors are estimated to be \$49-\$171 billion globally in 2030 with \$28-\$67 billion of this total being needed in developing countries. Other recent estimates of adaptation costs for developing countries include: World Bank (\$9-\$41 billion),<sup>14</sup> Oxford Institute for Energy Studies (\$2-\$17 billion),<sup>15</sup> Oxfam (greater than \$50 billion),<sup>16</sup> and UNDP (\$86 billion).<sup>17</sup> While these estimates differ in terms of their scope and approach, and hence are not directly comparable, they all show that tens of billions of dollars annually will be needed by developing countries to adapt to climate change.

The estimated additional investment and financial flows needed for climate change adaptation in 2030 are shown in Table 2.

**The agriculture, forestry and fisheries** sector is estimated to need an additional investment of \$11 billion annually in new capital such as irrigation systems, equipment for new crops and fishing practices, and relocation and modification of processing facilities. An additional \$3 billion will be needed annually for research and extension activities to facilitate adaptation. About half of the total requirement will be for developing countries.

<sup>13</sup> The differences in temperature, precipitation and sea level rise between a reference and mitigation scenario would be quite small in 2030.

<sup>14</sup> World Bank, 2006, Table K.1. Current needs, based on share of investment estimated to be climate sensitive.

<sup>15</sup> Müller and Hepburn, 2006, p. 14. Current needs, based on extrapolations of LDC NAPAs.

<sup>16</sup> Oxfam 2007, p. 3. Current needs, based on extrapolations of NAPAs.

<sup>17</sup> UNDP 2007. Needs in 2015.

The capital cost of the **water supply**<sup>18</sup> infrastructure needed to meet the projected population and economic growth to 2030 given the projected climate in 2050 is about \$800 billion. A little over 25% of this – \$225 billion – was estimated to be due to climate change. Spreading the capital cost over the 20-year life of the facilities leads to an annual adaptation cost of \$11 billion.<sup>19</sup> About 85% of the additional investment would be needed in developing countries.

**Table 2: Change to the annual investment and financial flows in 2030 for climate change adaptation**

	GLOBAL (BILLIONS OF \$ 2005)	DEVELOPING COUNTRIES (PERCENTAGE)
Agriculture	14	50%
Water supply	11	85%
Human health	5	100%
Coastal protection	11	45%
Infrastructure	8 to 130	25 to 35%
<b>Total</b>	<b>49 to 171</b>	<b>35 to 60%</b>

Source: UNFCCC 2007. *Investment and Financial Flows to Address Climate Change*, Table IX-65, p. 177

For **human health** the adaptation cost is estimated as the cost of the additional cases of diarrhoeal disease, malnutrition and malaria due to climate change in developing countries. This cost is estimated at \$5 billion per year for 2030, all in developing countries.

The additional investment needed for **coastal protection** was estimated using the dynamic interactive vulnerability analysis (DIVA) model, which analyses adaptation options for more than 12,000 segments of the world's coasts. The model was run with and without sea level rise. It estimates the costs of beach nourishment, the costs of building dykes, land loss costs, number of people flooded, and losses from flooding. Only the costs of beach nourishment and dykes were counted as climate change adaptation costs. The annual investment in 2030 was estimated

at \$11 billion of which \$5 billion is in developing countries.<sup>20</sup>

**Infrastructure**, such as buildings and roads, may be damaged due to severe weather events, flooding or other impacts of climate change. New infrastructure can be adapted to the impacts of the projected climate. To estimate the adaptation cost for new infrastructure, the share of infrastructure vulnerable to the adverse impacts of climate was estimated by region based on historical data for damages due to extreme weather events. Adapting the vulnerable new infrastructure to the potential impacts of climate change was estimated to increase the capital cost by 5-20%. The adaptation cost for new infrastructure in 2030 is estimated at \$8-\$130 billion globally, of which \$2-\$41 billion is in developing countries.

<sup>18</sup> The model used to develop the estimates for water supply considered changes in demand due to population and economic growth and changes in supply due to projected climate change. The estimates in the UNFCCC report includes water supply, but not water quality, flood protection, unmet irrigation needs or water distribution systems. UNFCCC 2007, Chapter 5.4.2, p. 105.

<sup>19</sup> These estimates do not include the cost of sanitation facilities, storm water management, or flood protection. They also do not include the cost of meeting Target 10 of the Millennium Development Goals – halving the number of people without sustainable access to safe drinking water and basic sanitation by 2015 – which is estimated to require an annual expenditure of \$10 billion over that period.

<sup>20</sup> Flood and land losses are climate change damages. In practice, adaptation costs would be incurred in responding to those damages, so the adaptation costs are under estimated.

### 2.3 Sources of investment and financial flows

The additional investment and financial flows needed for climate change mitigation and adaptation in 2030 is \$249-\$381 billion (in 2005 \$). While that figure is large in absolute terms, it is only 1.1-1.7% of projected global investment in 2030. The sources of future investment and financial flows are not available from the economic models used. The sources of investment in 2000 are shown in Table 3.

Most investments are made by corporations (60%) with the balance being made by households (26%) and governments (14%). **Household** investments are for

vehicles, homes, farms, and small businesses and are financed by the owner.<sup>21</sup> **Corporate** investments are financed by foreign direct investment (37%), domestic sources (35%) and foreign loans (28%). **Government** investments are financed mainly from domestic sources (91%) with some foreign loans (8%) and official development assistance (1%). Official development assistance for new physical assets provides 30% of the government investment in least developed countries. The significant shares of foreign direct investment (22%) and foreign debt (18%) of global investment attests to the importance of international capital markets and financial institutions to address climate change.

**Table 3: Sources of investment in 2000**

		AMOUNT (BILLIONS OF \$ 2000)	SHARE OF TOTAL (PERCENTAGE)
Households	Total investment	1,184	26%
Corporations	Domestic funds	1,429	21%
	Foreign direct investment	1,540	22%
	Foreign debt	1,156	17%
	Total investment	4,125	60%
Governments	Domestic funds	850	12%
	Foreign debt	71	1%
	Official development assistance	16	0
	Total investment	937	14%
Total	Domestic funds	4,093	60%
	Foreign direct investment	1,540	22%
	Foreign debt	1,226	18%
	Official development assistance	16	0
	Total investment	6,875	100%

Note: Official Development Assistance (ODA) investment only; ODA for new physical assets with a life of more than one year. Total ODA is much larger.

Source: UNFCCC 2007. *Investment and Financial Flows to Address Climate Change*, Table III-3, p. 31.

<sup>21</sup> The household may borrow funds from financial institutions, but the financial institution would get the money from deposits by households and corporations. The available data do not allow the sources of domestic funding to be tracked.

Most of the additional investment and financing needed for climate change mitigation and adaptation is expected to be financed by corporations, although this may require government policies and incentives, e.g. electric utilities are usually government-owned or regulated private corporations. Changing the mix of generation types they build may require government policies. Facility owners should make the extra investment for energy efficiency in industry and buildings because it will yield an attractive return, but policies may be needed to address market barriers. Households will bear the higher initial cost of efficient vehicles, but policies are likely to be needed to induce manufacturers to produce more efficiency vehicles.

Governments are likely to play a larger role in providing the additional funds needed for adaptation. While most of the additional investment needed for agriculture, forestry and fisheries will be provided by households and corporations, a substantial part of the additional research and extension activity will be funded by government. Most water supply systems and coastal protection measures are funded by governments. Health care relies on a mix of public and private funding that varies widely across countries. Most infrastructure is privately owned, but government policies may be needed to ensure that new facilities are well suited to the future climate.

**Questions:**

- What are the major mitigation measures to reduce global greenhouse gas emissions? How will they affect future investment flows? How will investments by different types of entities – households, corporations, governments – be affected? How will investments in developing countries be affected? What role(s) will governments play?
- What types of adaptation measures will be needed to cope with the impacts of climate change? What are the estimated costs of those measures? How will investments by different types of entities be affected? What share of the adaptation investment is expected to occur in developing countries?
- What are the annual investment flows in your country? What are the main mitigation options in your country? What changes to the investment and financial flows would implementing those options entail? What are the main adaptation options in your country? What changes to investment and financial flows would implementing those options entail?

### 3. EXISTING FUNDING MECHANISMS OF THE CONVENTION AND THE KYOTO PROTOCOL

The Convention and its Kyoto Protocol foresee financial assistance from developed country Parties to developing country Parties. This assistance may be through bilateral, multilateral or regional channels or through a financial mechanism defined in Article 11 of the Convention. The GEF has been designated as an operating entity of the financial mechanism of the Convention on an on-going basis, subject to review every four years.

Annex II Parties are expected to provide information on the bilateral and multilateral assistance they provide in their national communications. Due to gaps and inconsistencies in reporting approaches in the third and fourth national communications, it is not possible to calculate the financial assistance provided by Annex II Parties through such channels.

The Kyoto Protocol created the CDM to assist non-Annex I (NAI) Parties in achieving sustainable development and in contributing to the ultimate objective of the Convention and to assist Annex I Parties in meeting their emissions limitation commitments.<sup>22</sup> The CDM provides financial assistance for mitigation projects in NAI Parties by issuing CERs credits for the emission reductions or removals achieved. A small share (2%) of the CERs issued for most projects is contributed to the Adaptation Fund. The Adaptation Fund will assist developing country Parties that are particularly vulnerable to the adverse impacts of climate change to meet the costs of adaptation.

#### 3.1 Financial Mechanism under the Convention<sup>23</sup>

The GEF receives guidance from the COP on policy, programme priorities, and eligibility criteria. The COP has provided general guidance with regard to operation of the financial mechanism, and has also provided specific guidance related to:

- Support to national communications of NAI Parties;
- Capacity-building;
- Public awareness and outreach (Article 6 activities);
- Development and transfer of technologies;
- Support to adaptation;

- Support to activities referred to in Article 4, paragraph 8(h) of the Convention;
- Support to mitigation.

The GEF is replenished on a four-year cycle. The donors agree on the amount of the replenishment and the contribution of each country is then calculated using a pre-defined “basic” burden share.<sup>24</sup> In anticipation of a replenishment, the COP makes an assessment of the funds needed to assist developing countries to fulfill their commitments under the Convention over the next cycle. The fourth review of the financial mechanism started at COP 13 (December 2007) and will be completed at COP 15 (December 2009). It will provide an input to the fifth replenishment of the GEF.

##### *3.1.1. GEF Trust Fund allocations and co-financing and allocation of GEF resources to climate change activities*

The funds contributed to the GEF Trust Fund for the pilot phase and the first four replenishments are shown in Table 4. The total is over \$3.3 billion. The GEF has used these funds to support projects that have provided over \$14.3 billion of co-financing.

<sup>22</sup> Kyoto Protocol, Article 12, paragraph 2.

<sup>23</sup> Please refer to [http://unfccc.int/cooperation\\_and\\_support/financial\\_mechanism/items/2807.php](http://unfccc.int/cooperation_and_support/financial_mechanism/items/2807.php) for more information.

<sup>24</sup> GEF, 2005a.

**Table 4: GEF Trust Fund Allocations and Co-financing (millions of \$)**

GEF PHASE	GEF GRANT	CO-FINANCING
Pilot phase (1991-1994)	280.60	2,402.89
GEF 1 (1995-1998)	507.00	2,322.10
GEF 2 (1999-2002)	667.20	3,403.40
GEF 3 (2003-2006)	881.80	4,609.69
GEF 4 (2007-2010)	990.00	
From which in the first half of 2007	76.35	1,651.82
<b>Total</b>	<b>3,326.60</b>	<b>14,389.90</b>

Source: UNFCCC 2007. *Investment and Financial Flows to Address Climate Change*, Table VII-56, p. 164.

The allocation of GEF resources to climate change activities is shown in Table 5. Most of the resources have been allocated to long-term mitigation projects, including renewable energy, energy efficiency, and low-greenhouse gas emitting technologies.

A key feature of the GEF Trust Fund is the requirement that projects meet the agreed incremental costs for delivering global environmental benefits. Many mitigation actions are able to meet this requirement; limiting climate change is a global benefit and the incremental costs can be calculated by comparing the measure with the cost of the conventional alternative. In contrast, the benefits of adaptation measures – reduced damage due to the adverse impacts of climate change – tend to be local and the incremental costs can be difficult to estimate.

In 2005 the GEF Council adopted the resource allocation framework (RAF) to increase the predictability and transparency of its resource allocation.<sup>25</sup> The resources each eligible country can expect from the GEF are specified at the start of the four-year replenishment period with an update in the middle of the period. Each country receives a minimum allocation of \$1 million with a maximum allocation of 15% of the resources available. Within that range the GEF Benefits Index and the GEF Performance Index are used to determine the resources allocated to each country.<sup>26</sup>

The Benefits Index measures the potential of a country to generate global environmental benefits (emission reductions) and the Performance Index measures a country's capacity, policies and practices relevant to successful implementation of GEF projects.

<sup>25</sup> The RAF does not change the GEF project cycle. A country still needs to work with a GEF implementing/executing agency to develop and prepare concepts for review, pipeline entry and inclusion in a work programme.

<sup>26</sup> China, India and the Russian Federation are likely to receive the most under the RAF formula, followed by Brazil, Mexico and South Africa, followed by a group of countries that includes Argentina, Egypt, Indonesia, Islamic Republic of Iran, Kazakhstan, Malaysia, Pakistan, Romania, Thailand, Turkey, Ukraine and Venezuela (GEF, 2005b).

**Table 5: Allocation of GEF Resources to Climate Change Activities (millions of \$)**

	PILOT PHASE	GEF 1	GEF 2	GEF 3	GEF 4	TOTAL	SHARE
OP 5: Energy efficiency	70.6	128.6	200.1	286.7	33.8	719.8	29.8%
OP 6: Renewable energy	108.8	191.3	251.8	299.2	10.0	861.1	35.7%
OP 7: Low-GHG emitting energy technologies	10.1	98.4	98.6	111.1		318.2	13.2%
OP 11: Sustainable transport			46.4	82.2	32.0	160.6	6.7%
Enabling activities	20.2	46.5	45.3	73.9		185.9	7.7%
Short term response measures	70.8	42.2	25.1	3.7		141.8	5.9%
Strategic pilot approach to adaptation				25.0		25.0	1.0%
<b>Total</b>	<b>280.5</b>	<b>507.0</b>	<b>667.3</b>	<b>881.8</b>	<b>75.8</b>	<b>2,412.4</b>	<b>100.0%</b>

Source: UNFCCC 2007. *Investment and Financial Flows to Address Climate Change*, Table VIII-58, p. 167.

The COP requested the GEF to provide information on the initial application of the RAF to the allocation of resources in the fourth replenishment period and how the funding available to developing countries is likely to affect implementation of their commitments under the Convention.<sup>27</sup> The COP subsequently requested the GEF to report the resources available to each developing country Party through the initial implementation of the RAF including a list of climate change activities funded with these resources.<sup>28</sup>

### 3.1.2. Special funds

The **Special Climate Change Fund (SCCF)** finances activities, programmes and measures relating to climate change that are complementary to those funded by the climate change focal area of the GEF and by bilateral and multilateral funding, in the following areas:

- a) Adaptation,
- b) Transfer of technologies,
- c) Energy, transport, industry, agriculture, forestry and waste management; and,
- d) Activities to assist developing countries whose economies are highly dependent on income generated from the production, processing and export, and/or

on consumption of fossil fuels and associated energy-intensive products in diversifying their economies.<sup>29</sup>

As of March 2008, pledges to the SCCF totalled \$90 million of which \$74 million had been received.<sup>30</sup> Of this sum, \$60 million was pledged for the SCCF Programme for Adaptation and \$14 million for the SCCF Programme for Transfer of Technology. As of March 2008, nine adaptation projects had been approved with SCCF funding of \$33.5 million and another eight adaptation projects seeking grants of \$45.4 million were in the pipeline.<sup>31</sup> Donors are urgently requested to make further contributions to the SCCF Programme for Adaptation.

The **Least Developed Countries Fund (LDCF)** is designed to support projects addressing the urgent and immediate adaptation needs of the least developed countries (LDCs) as identified by their national adaptation plans of action (NAPAs). The LDCF contributes to the enhancement of adaptive capacity to address the adverse effects of climate change.

The priority sectors that are expected to receive the most attention under the NAPA are water resources, food security and agriculture, health, disaster preparedness and risk management, infrastructure and natural resources management. Community-level adaptation may also be a

<sup>27</sup> Decision 5/CP.11.

<sup>28</sup> Decision 3/CP.12.

<sup>29</sup> GEF, 2004.

<sup>30</sup> GEF, 2008a.

<sup>31</sup> GEF, 2008b.



crosscutting area of concern.

As of March 2008, \$173 million had been pledged and \$92 million had been paid.<sup>32</sup> At that time 46 of 49 eligible LDCs had been allocated funds to prepare their NAPAs, of which 29 had completed their NAPA.<sup>33</sup> In addition, 10 NAPA implementation projects involving LDCF funding of \$29.6 million had been approved.

### 3.1.3 Summary

In summary, the financial mechanism of the Convention relies on voluntary contributions by Annex II Parties. There is a pre-defined “basic” burden share for the GEF Trust Fund, but not for the SCCF and LDCF. The COP provides input to the replenishment of the GEF Trust Fund through its review of the financial mechanism, but can only support appeals for contributions to the SCCF and LDCF when needed. The fourth review of the financial mechanism, which will inform the fifth replenishment of the GEF, is currently underway and is scheduled for completion at COP 15 in 2009. The SCCF needs additional contributions to support projects that have been submitted.

Most of the contributions to the GEF Trust Fund have been allocated to long-term mitigation projects. Mitigation actions can more easily meet the GEF requirement of delivering global environmental benefits. However, a small amount of money has been allocated for a **strategic pilot approach to adaptation**. The Resource Allocation Framework determines the funds available to each eligible country. A transparent allocation process may be necessary given the limited funds available, but the funds allocated to a particular country may not be sufficient to support its commitments under the Convention such as preparation of national communications.

Most of the funding for adaptation comes from the

LDCF and SCCF. The LDCF supports the immediate adaptation needs of the LDCs. The SCCF Programme for Adaptation supports adaptation projects in all developing countries, including LDCs. The SCCF Programme for Transfer of Technology is the only mechanism that supports technology cooperation. The COP provides regular guidance to the GEF on the allocation and use of the funds.

#### Questions:

- Does a defined burden share, such as that used by the GEF Trust Fund, generate larger total contributions than voluntary contributions?
- Do the current funds provide sufficient support for mitigation? Adaptation? Technology transfer?
- What share of the total cost should be covered by Convention funds in the case of mitigation actions? Adaptation measures? Technology Transfer?
- Should all bilateral and multilateral assistance for climate change by Annex II Parties go through Convention funds?

## 3.2 The Kyoto mechanisms

The Kyoto Protocol established emissions limitation commitments for developed country (Annex.B) Parties<sup>34</sup> for 2008–2012 and established three mechanisms – the CDM,<sup>35</sup> Joint Implementation (JI),<sup>36</sup> and International Emissions Trading (IET) – they can use to help meet those commitments.

Most Annex B Parties plan to use domestic emissions trading systems to regulate the emissions of fossil-fired electricity generators and large industrial emitters to help comply with their Kyoto Protocol commitments.<sup>37</sup> Those emissions trading systems are already operational in the Member States of the EU and Norway.<sup>38</sup> Participation in

<sup>32</sup> GEF, 2008a.

<sup>33</sup> GEF, 2008b.

<sup>34</sup> Parties included in Annex B to the Kyoto Protocol.

<sup>35</sup> Please refer to [http://unfccc.int/kyoto\\_protocol/mechanisms/clean\\_development\\_mechanism/items/2718.php](http://unfccc.int/kyoto_protocol/mechanisms/clean_development_mechanism/items/2718.php) or <http://cdm.unfccc.int/index.html>.

<sup>36</sup> Please refer to [http://unfccc.int/kyoto\\_protocol/mechanisms/joint\\_implementation/items/1674.php](http://unfccc.int/kyoto_protocol/mechanisms/joint_implementation/items/1674.php) or <http://ji.unfccc.int/index.html>.

<sup>37</sup> An emissions trading system regulates total emissions by specified sources. The government sets a limit on total emissions by the sources during each compliance period and distributes emissions allowances equal to that limit. Each source must accurately measure its actual emissions during the period. At the end of a period, each source must remit allowances equal to its actual emissions to achieve compliance. With full compliance, the combined emissions of the specified sources can not exceed the overall limit. Emissions trading encourages participating sources to implement the lowest cost emission reduction measures. Some trading systems allow sources not covered by the system to earn credits for emission reductions they implement. Those credits can be used by system participants toward compliance.

JI and IET is limited to Annex B Parties.

The CDM enables a project to mitigate climate change in a NAI Party to generate CERs.<sup>39</sup> Most domestic emissions trading systems allow participating firms to use CERs toward compliance.<sup>40</sup> Those CERs are transferred to the government and it can use them for compliance with its Kyoto Protocol commitment. Some Annex B governments also purchase CERs directly to help meet their Kyoto Protocol commitment. The CDM was launched in November 2001, the first project was registered about three years later, and the first CERs were issued in October 2005.

The CDM is supervised by the CDM Executive Board under the authority and guidance of the Conference of the Parties serving as the meeting of the Parties to the Protocol.<sup>41</sup> A CDM project must use a methodology approved by the CDM Executive Board and be validated by an accredited designated operational entity (DOE).<sup>42</sup> CERs are issued by the CDM Executive Board only after the emission reductions achieved have been verified and certified by an accredited DOE. Thus, a CDM project incurs costs (validation of the project) before it can be registered, and further costs (certification of the emission reductions) before CERs are issued.<sup>43</sup>

### 3.2.1 Distribution of CDM projects by type

At the end of March 2008, 3188 projects were in the CDM pipeline, including 978 registered projects.<sup>44</sup> These projects are projected to reduce emissions by 464 million tCO<sub>2</sub>-eq. Figure 1 shows the distribution of these projects and their projected emission reductions by project type.

Over half of the projects are renewable energy – hydro, biomass, wind, solar and geothermal – but they account for about 30% of the projected reductions. On the other hand, less than 5% of the projects involve destruction of HFCs, N<sub>2</sub>O, coal bed methane and PFCs, but they represent over 30% of the estimated emission reductions.

<sup>38</sup> In addition, emissions trading schemes began operation in Switzerland and New Zealand in January 2008.

<sup>39</sup> Afforestation and reforestation projects under the CDM can generate temporary CERs (tCERs) or long-term CERs (ICERs), which have limited lifetimes. For ease of exposition CERs will include tCERs and ICERs unless explicitly stated otherwise.

<sup>40</sup> But not tCERs or ICERs.

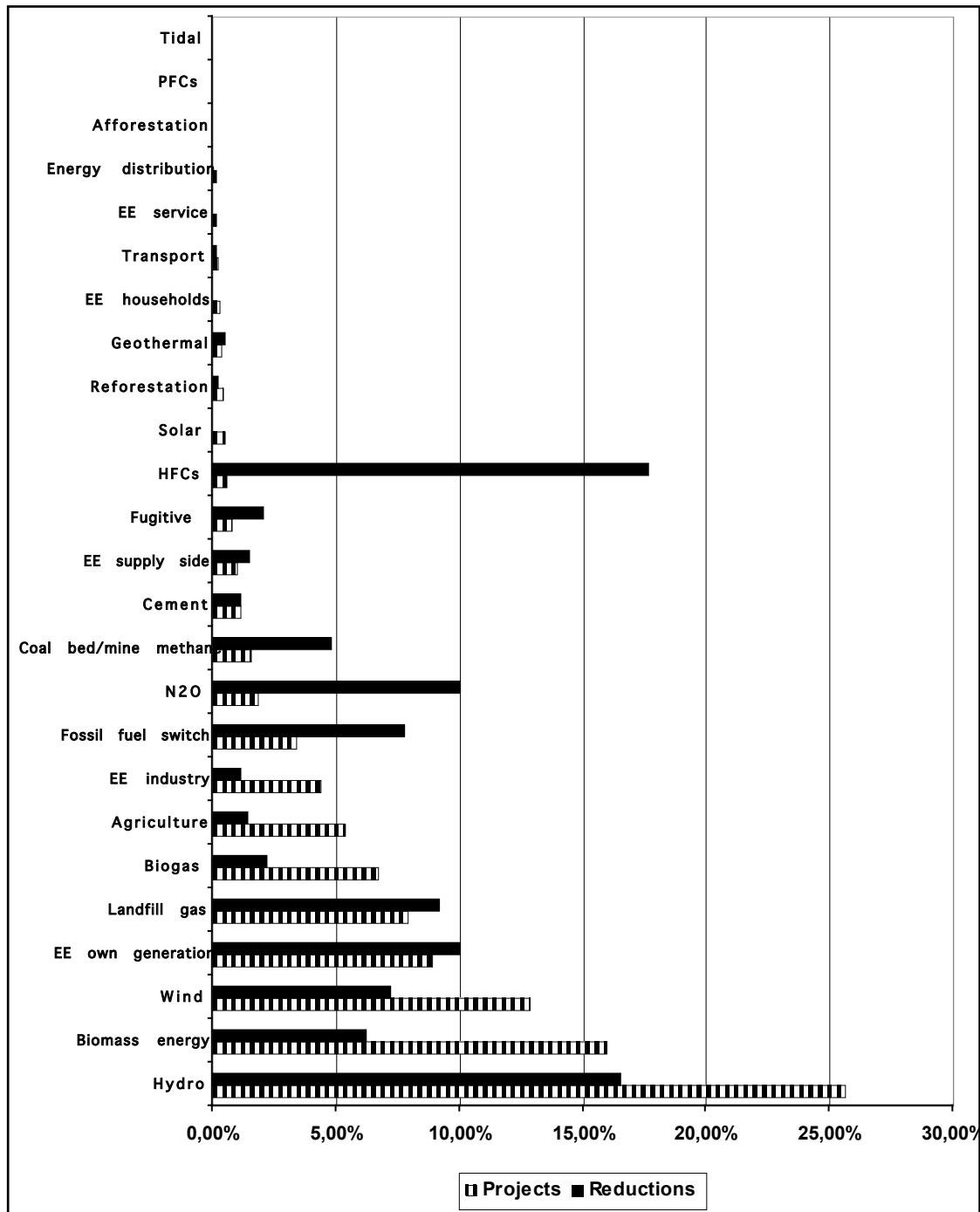
<sup>41</sup> Annex to Decision 17/CP.7 and Decision 3/CMP.1.

<sup>42</sup> DOEs are accredited by the CDM Executive Board.

<sup>43</sup> This approach to issuing CERs increases environmental integrity.

<sup>44</sup> Fenhann, 2008. As part of the validation process the project design document of a proposed comment must be posted for public comment. A project that has reached this stage is said to be in the CDM pipeline.

Figure 1: Distribution of CDM Projects by Type



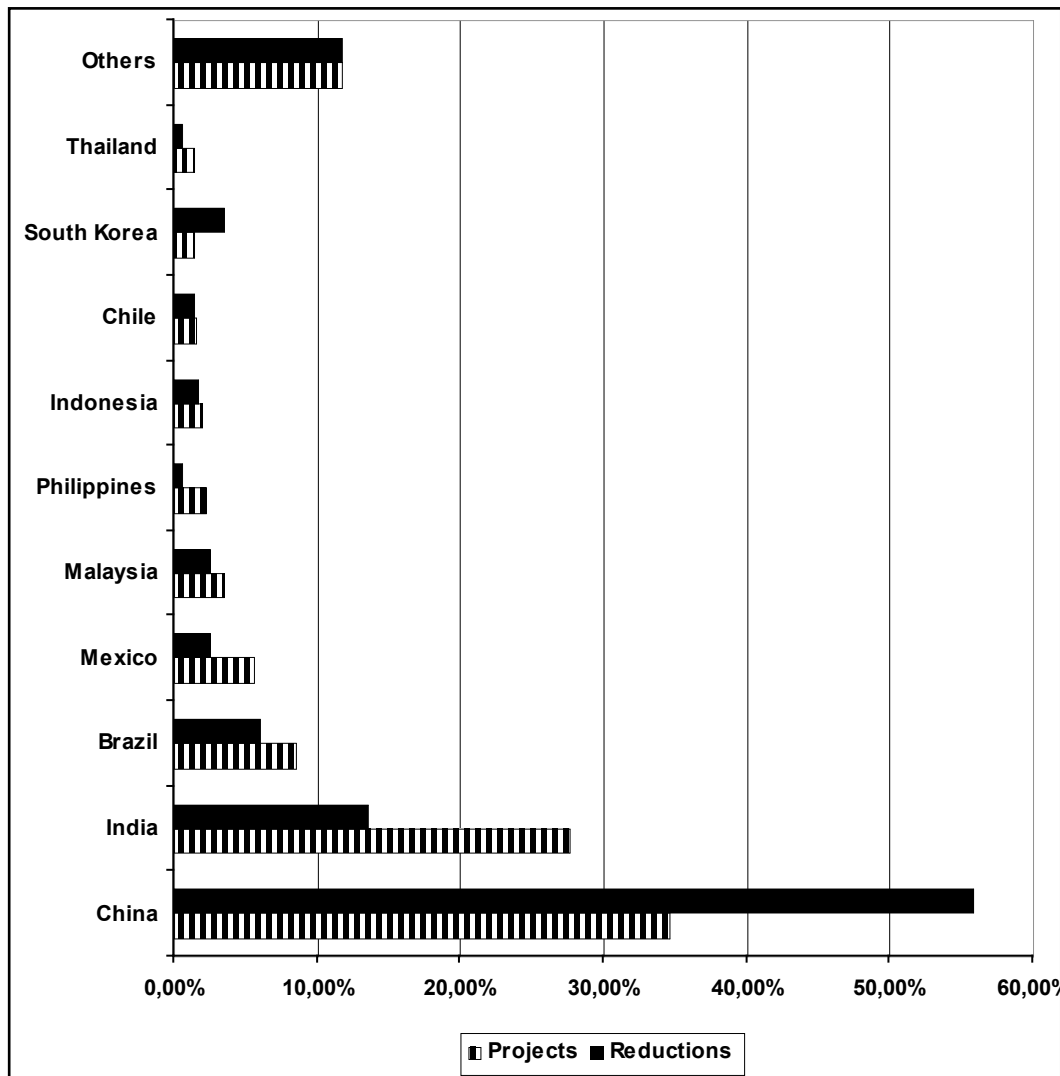
Source: Fenhann 2008. The CDM Pipeline.

### 3.2.2. Distribution of CDM Projects by Host Country

Sixty-eight countries have at least one CDM project in the pipeline.<sup>45</sup> Several countries had only one project in the pipeline at the end of March 2008 but China had over 1100 projects representing over 55% of the total projected emission reductions. Figure 2 shows other countries host-

ing a relatively large share of the projects or the forecast emission reductions. The ten countries with the largest number of projects are China, India, Brazil, Mexico, Malaysia, Philippines, Indonesia, Chile, South Korea and Thailand. The projects in China and South Korea are larger than average, while those in the other countries are smaller than average.

Figure 1: Distribution of CDM Projects by Type



Source: Fenhann 2008. *The CDM Pipeline*.

<sup>45</sup> Fenhann, 2008.

### 3.2.3. Investments and Revenues of CDM Projects

To help defray the cost of implementing the CDM project, proponents often agree to sell some of the expected CERs before the project has been implemented. Capoor and Ambrosi (2008) indicate that expected CERs from projects at an early stage of regulatory and operational preparation transacted at around €8-10 during 2007, while registered projects attracted prices between €11-13. The lowest prices reflect risks that the proposed project might not be registered and might not deliver the expected emission reductions.<sup>46</sup> Projects demonstrating strong sustainability attributes and community benefits (such as projects certified under the Gold Standard) could fetch a €1-1.5 premium.

Capoor and Ambrosi (2008) report total sales by CDM project proponents at 551 million tCO<sub>2</sub>-eq with a value of 2007 \$7,426 million during 2007, an average price \$13.60 (€9.90) per tCO<sub>2</sub>-eq. As the quantity of issued CERs increased, some of those CERs were sold by the project proponents or entities that had contracted to buy them. Such “spot market” transactions yielded a price of about €16.50 per tCO<sub>2</sub>-eq.<sup>47</sup> The past year witnessed a ten-fold growth of the secondary market for CERs. In this market, sellers guarantee delivery of the specified quantity of CERs by the agreed date. The guarantee is based on CERs from a designated project or portfolio of projects enhanced by credit guarantee by a highly rated bank. During 2007 secondary market transactions amounted to 240 million tCO<sub>2</sub>-eq with a value of 2007 \$5,451 million, an average price \$22.70 (€16.70) per tCO<sub>2</sub>-eq.

The UNFCCC estimated that over \$26.4 billion would be invested in CDM projects that entered the pipeline during 2006.<sup>48</sup> Over 80% of the investment was for renewable energy and energy efficiency projects. Approximately half of the total investment is capital invested in unilateral projects by host country proponents.<sup>49</sup> Capoor

and Ambrosi (2008) estimate that in 2007 the CDM led to investment of \$33 billion (€24 billion) for renewable energy and energy efficiency.

Although the CDM does not have an explicit technology transfer mandate, it contributes to technology transfer by financing projects that use technologies currently not available in the host countries. Roughly 39% of all CDM projects accounting for 64% of the annual emission reductions claim to involve technology transfer.<sup>50</sup> Technology transfer usually involves both knowledge and equipment with equipment imports accounting for most of the remaining transfer. Technology transfer is more common for larger projects and projects with foreign participants. Technology transfer is very heterogeneous across project types. The host country can have a significant impact on the prevalence of technology transfer.

The operation of the CDM responds to the number and types of projects proposed. During its short life there has always been some part of the CDM administration that has been under strain due to the large number of projects. The CDM Executive Board has tried to address the problems as they arise. In early 2008 strains include the limited capacity of accredited DOEs, the complexity of and frequent changes to the rules, and inconsistent treatment of proposed projects leading to delays and higher costs.<sup>51</sup> Proposals to modify or abolish the additionality requirement and to move from individual projects to larger emission reduction initiatives have been floated.<sup>52</sup> And expansion of the CDM to include CCS, HFC destruction at new HFCF plants and reduced deforestation and degradation in developing countries (REDD) has been suggested.

The main use of CERs is to help meet the emission reduction commitments of Annex B Parties to the Kyoto Protocol. These commitments are currently limited to the 2008-2012 period. Unless and until post-2012 commitments are agreed by developed countries, the market for

<sup>46</sup> In each contract the price also depends on how the risks are shared between the buyer and the seller through penalty provisions or requirements to replace CERs that could not be delivered.

<sup>47</sup> In a spot market the CERs are delivered to the buyer's registry account within a day or two.

<sup>48</sup> UNFCCC, 2007, pp. 140-141.

<sup>49</sup> A unilateral project is one for which the project proponent in the developing country bears all of the costs before selling the CERs.

<sup>50</sup> Seres, 2007.

<sup>51</sup> Capoor and Ambrosi, 2008, pp. 5-6.

<sup>52</sup> The Kyoto Protocol requires that CDM emission reductions must be “additional to any that would occur in the absence of the certified project”. The CDM Executive Board has developed a tool to help project proponents demonstrate the additionality of their projects. But assessing additionality almost always involves judgment, so this remains a controversial requirement. Defining some project types, such as wind projects, as additional or adopting defined benchmarks for the baseline emissions of specified project types have been proposed as alternatives to assessment of additionality for individual projects.

CERs generated by post-2012 emission reductions is uncertain.<sup>53</sup> The UNFCCC found that estimates of potential post-2012 demand vary widely.<sup>54</sup> The low estimates of demand are in the range of \$5–25 billion per year (representing purchases of 400 – 600 Megatons (Mt) CO<sub>2</sub> per year); roughly the same as the current market. The high estimates suggest an annual demand of the order of \$100 billion with 4,000 – 6,000.Mt CO<sub>2</sub>-eq per year, which requires ambitious commitments by all Annex I Parties, no commitments of any type by any NAI Party, and CERs for a large fraction of the potential emission reductions from all existing and some new categories of sources.

### 3.2.4 Summary

In summary, the CDM has grown rapidly and is now a significant market and source of renewable energy and energy efficiency investment in developing countries. Although the number of host countries is growing, CDM activity is concentrated in a small number of countries.

The CDM was designed as a responsive mechanism that approves proposed projects individually. The Executive Board has broad powers to engage assistance as necessary and to modify its administrative procedures. The rapid growth of the number of projects has strained the operation of the CDM and this continues to be the case despite changes implemented by the Executive Board. As part of its annual guidance to the Executive Board, the COP can also change CDM procedures.

Approval on a project-by-project basis is costly and cumbersome. Numerous changes to administration of the CDM have been proposed to reduce the administrative burden for individual projects or to enable larger reductions to be approved by a single decision, sectoral CDM for example. The success of the CDM has also generated proposals to expand its scope to new categories of emission reductions.

The absence of post-2012 commitments by developed countries creates uncertainty for the CDM. The ambition of those commitments will be a major determinant of the future demand. A large post-2012 demand would require

credits to be supplied by a large fraction of the potential emission reductions from all existing and some new categories of sources. That is likely to require new mechanisms in addition to the current types of CDM projects.

#### Questions:

- What impact does the negotiation of a post-2012 agreement have on the CDM?
- How could the CDM be improved?

### 3.3 The Adaptation Fund

The Adaptation Fund was established under the Kyoto Protocol to finance concrete adaptation projects and programmes in developing country Parties to the Protocol, in particular those that are particularly vulnerable to the adverse effects of climate change. The Adaptation Fund is supervised and managed by the Adaptation Fund Board under the authority and guidance of the CMP. The Adaptation Fund Board is serviced by a secretariat, the GEF, and a trustee, the World Bank – both on an interim basis.

The Adaptation Fund is financed through a share of proceeds from CDM projects and other sources of funding. The share of proceeds is 2% of CERs issued for CDM projects with exemptions for some project types.<sup>55</sup> The revenue received by the Adaptation Fund will depend on the quantity of CERs issued and the price of CERs. Assuming annual sales of 300–450 million CERs and a market price of €17.50 (range of €10–25), the Adaptation Fund would receive \$80–300 million per year for 2008 to 2012.<sup>56</sup>

Post-2012 funding for the Adaptation Fund depends on the continuation of the CDM and the level of demand in the carbon market. Assuming the same price levels and a share of proceeds for adaptation of 2% continues to apply post-2012, the level of funding could be \$100–500 million per year in 2030 for low CDM demand (\$5 – 25 billion representing purchases of 400 – 600 Mt CO<sub>2</sub> equivalent per year (CO<sub>2</sub>-eq/yr)) and \$1 to \$5 billion per year for high CDM demand (\$100 billion with 4,000 – 6,000 Mt CO<sub>2</sub>-eq/yr).

<sup>53</sup> Capoor and Ambrosi, 2008, p. 5.

<sup>54</sup> UNFCCC, 2007, Section 7.4, pp. 156-160.

<sup>55</sup> Article 12.8 of the Kyoto Protocol and decisions 17/CP.7 and 3/CMP.1.

<sup>56</sup> UNFCCC, 2007, p. 169.

The first two meetings of the Adaptation Fund Board were held in Bonn in March and June 2008. The members elected a chair and a vice-chair for 2008–2009. The Board agreed on: the role and responsibilities of the Adaptation Fund Secretariat,<sup>57</sup> the 2008 work plan and budget, and draft legal arrangements for the Adaptation Fund Secretariat. The Board began, but did not complete, the rules of procedure of the Board, provisional operational policies and guidelines for Parties to access resources from the Fund, legal status of the Fund, monetization of CERs, the role and responsibilities of the Trustee, and the responsibilities of implementing and executing entities.<sup>58</sup>

In summary, the Adaptation Fund, financed by a levy of 2% of the CERs issued for most CDM projects, is just becoming operational. It could have \$80–300 million per year for adaptation projects and programmes in developing countries during 2008–2012. Post-2012 the Adaptation Fund depends on the continuation of the CDM and the level of demand in the carbon market.

**Questions:**

- What should be the Board's priorities for disbursement of funds? How should eligible Parties access the Fund?

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<sup>57</sup> With the exception of one bracketed paragraph.

<sup>58</sup> Adaptation Fund Board, 2008.

## 4. OPTIONS TO ENHANCE INTERNATIONAL INVESTMENT AND FINANCIAL FLOWS TO DEVELOPING COUNTRIES

### 4.1 Introduction

The UNFCCC report on investment and financial flows to address climate change concluded that to meet the additional investment and financial flows would require a combination of:

- Commitments by Annex II Parties to provide additional financial assistance to developing countries under the Convention;
- Appropriate national policies to encourage private investment and domestic government investment in mitigation and adaptation measures;
- Optimal use of the funds available under the Convention and from other sources to spread the risk across public and private sources;
- Expansion of the carbon market through more stringent commitments by Annex I Parties to increase demand and possible additional mechanisms to increase supply; and
- New sources of predictable funds to provide additional external financial flows to developing countries for adaptation and mitigation.

**If the funding available under the financial mechanism of the Convention remains at its current level and continues to rely mainly on voluntary contributions, it will not be sufficient** to address the future financial flows estimated to be needed for mitigation and adaptation.

With appropriate policies and/or incentives, a substantial part of the additional investment and financial flows needed could be covered by the currently available sources. **National policies can assist in shifting investments and financial flows made by private and public investors into more climate-friendly alternatives and optimize the use of available funds by spreading the risk across private and public investors.**

However, **improvement in, and an optimal combination of, mechanisms**, such as the carbon markets, the financial mechanism of the Convention, ODA, national policies and, in some cases, new and additional resources, will be needed to mobilize the necessary investment and financial flows to address climate change.

The **carbon market**, which is already playing an important role in shifting private investment flows, would have to be significantly expanded to address needs for additional investment and financial flows for mitigation.

**New and additional external funding for climate change mitigation and adaptation will be needed**, particularly for sectors in developing countries that depend on government investment and financial flows. Several other options for generating additional funds have been suggested. Some of these options, such as auctioning a share of the assigned amount and auctioning allowances for emissions from international bunkers, could generate revenues commensurate with the additional needs.

This section summarizes options that have been proposed to enhance funding. The options are categorized as follows:

- **Increasing the Scale of Existing Mechanisms**
  - The Convention Funds
  - The CDM and Other Possible Crediting Mechanisms
  - The Adaptation Fund
- **Additional Contributions by Developed Countries**
  - New Bilateral and Multilateral Funds
    - *Cool Earth Initiative*
    - *International Climate Protection Initiative*
    - *Clean Investment Funds*
    - *Global Climate Financing Mechanism*
  - Proposals Funded by Defined Contributions from Developed Countries
    - *Convention Adaptation Fund, Technology Fund and Insurance Mechanism*
    - *Adaptation Fund and Multilateral Technology Acquisition Fund*
    - *Mechanism for Meeting Financial Commitments under the Convention*
    - *Efficiency Penny*
  - Proposals Funded by Contributions from Developed and Developing Countries
    - *World Climate Change Fund*
    - *Multilateral Adaptation Fund*
- **More Stringent Commitments by Developed Countries**
  - Auction of Assigned Amount Units
  - Nationally Appropriate Mitigation Actions
- **Other Sources of Funds**
  - Extension of the 2% levy on CDM to other Market Mechanisms
  - International Air Travel Adaptation Levy
  - International Maritime Emission Reduction Scheme



- o Auction of Allowances for International Aviation and Marine Emissions
- o Funds to Invest Foreign Exchange Reserves
- o Access to Renewables Programmes in Developed Countries
- o Tobin Tax
- o Donated Special Drawing Rights
- o Debt-for-clean-energy Swap

#### 4.2 Increasing the scale of existing mechanisms

More funds could be contributed to the GEF Trust Fund, the SCCF and LDCF. And the CDM could be expanded, which would increase the support for mitigation actions in developing countries and also raise more revenue for the Adaptation Fund.

##### 4.2.1 The Convention funds

The fourth review of the financial mechanism will inform the fifth replenishment (2011-2014) of the GEF Trust Fund. The COP has adopted objectives and methodology for the review of the financial mechanism. The COP will complete the review at its 15th session (2009). Replenishment of the GEF Trust Fund occurs on a fixed four-year cycle and follows a pre-defined “basic” burden share formula. A country that feels its share of the proposed replenishment is higher than it wishes to contribute may argue for a lower amount thus reducing the contributions by all countries.

Contributions to the SCCF and LDCF are voluntary and may occur at any time. The SCCF and LDCF have defined roles that meet specific needs of developing countries, rather than their overall mitigation and adaptation needs. The COP can only support appeals for contributions to the SCCF and LDCF when needed. The SCCF needs additional contributions to fund projects that have been submitted.

##### Questions:

- What are the roles of the respective funds? Are there overlaps or gaps in their roles?
- Are the replenishment methods appropriate to their

roles?

##### 4.2.2 The CDM and other crediting mechanisms

The scale of the CDM depends on commitments by developed countries, which determines the demand, and the availability of eligible, cost-effective mitigation measures in developing countries, which determines the supply. The supply can be increased by expanding the range of eligible mitigation actions, for example to include CCS, REDD, and by expanding the range of crediting approaches, for example to include sectoral CDM or sectoral crediting.

Increasing the number of countries with commitments and/or the stringency of the commitments is the only way to increase the demand. The demand can be reduced by restrictions on the use of CDM credits (CERs) for example by restrictions on the eligible countries or project types. Developed countries may also restrict the quantity or types of CERs that will be accepted. A requirement that use of the market mechanisms be supplemental to domestic action by developed countries may also reduce the demand for CERs.

Due to the uncertainties affecting the potential supply and demand, estimates of the potential scale of the CDM span a wide range. The UNFCCC reported that the post-2012 market is likely to be between \$25 and \$100 billion per year.<sup>59</sup>

Despite the uncertainty, it appears the CDM could supply a substantial part of the funding needed for mitigation measures in developing countries. The UNFCCC estimated the additional investment needed for mitigation in developing countries in 2030 at \$176 billion.<sup>60</sup> About \$69 billion is for energy efficiency with a financially attractive payback that may require policy direction but likely would be funded mainly by private investors. About \$73 billion is for renewables, nuclear and CCS most of which reduces investments in conventional generation. The balance is for reduced deforestation and

<sup>60</sup> UNFCCC, 2007, Figure VII-37, p. 158.

<sup>61</sup> UNFCCC, 2007, Table IX-64, p. 175.

forest management and agriculture.

The CDM supports annual investments of roughly the same order of magnitude as the size of the market.<sup>61</sup> If the post-2012 market is \$25 to \$100 billion as projected, the CDM and possible new mechanisms could support the investments needed for renewables and non-CO<sub>2</sub> emissions. At the upper end of the range, the CDM might also be able to support investment in CCS and reduced forest emissions.

Most proposals for expansion of the international carbon market for NAI Parties focus on the CDM, increasing the supply of credits from countries with no target or a non-binding target. The suggestions cover both expansion of the types of projects eligible under the CDM and possible new mechanisms. Suggestions for expansion of the project types:<sup>62</sup>

- HFC-23 destruction projects at new HCFC-22 plants;
- CO<sub>2</sub> CCS;
- REDD;
- Sustainable development policies and measures (SD-PAMs);
- New nuclear generation stations;
- Sectoral CDM; and
- Policy CDM.

Other options for REDD, SD-PAMs and sectoral targets propose financial or other incentives, rather than tradable credits. The appropriate mechanism for an option depends on the marginal cost of its emission reductions and its scale relative to the size of the CDM. If the marginal cost of its emission reductions is higher than the market price of CERs the projects will not be economic and they will not be implemented even if they are eligible for the CDM. If the marginal cost of its emission reductions is low relative to the price of CERs and the potential scale is large, it could drive down the price of CERs and displace many other CDM project types. In both cases,

financial or other incentives are better than including the option in the CDM.

Numerous new mechanisms, such as no lose targets, sectoral crediting and REDD targets, have been proposed. The mechanisms would differ from the CDM in terms of the process for approving the target and/or issuing the tradable credits, or they would create tradable credits that are not fully fungible with CERs. The operational details of most of these proposed mechanisms remain to be developed. If Parties agree to any of these mechanisms, there would be a need for modalities to define baseline emissions and verify the actual emissions to determine the credits earned.

#### Questions:

- What are the effects of adding new types of mitigation actions, such as CCS, to the CDM? How do those effects change if the cost per ton of CO<sub>2</sub> reduced is low (high) relative to the market price for CERs?
- What are the effects of adding new project types to the CDM?
- What are the effects of restricting the eligibility of particular host countries or project types?
- How would other crediting mechanisms differ from the CDM?
- What is the effect of a supplementarity requirement for developed countries?

#### 4.2.3 The Adaptation Fund

A share of proceeds, currently 2% of the CERs issued for most projects, is the main source of revenue for the Adaptation Fund. Thus the revenue received by the Adaptation Fund depends mainly on the scale of the CDM. If the post-2012 market for CERs is \$25 to \$100 billion per year, the contribution to the Adaptation Fund would be \$0.5 to \$2 billion annually. This could be

<sup>61</sup> The UNFCCC (2007, p. 140) estimated the revenue to projects registered during 2006 at \$1 to \$1.5 billion and the total investment in those projects at \$7 billion, equivalent to 4.5 to 7 years of revenue. For projects that entered the pipeline during 2006 the corresponding figures are revenue of \$2 to \$2.5 billion and investment of \$26.4 billion or 10.5 to 13 years of revenue. Capoor and Ambrosi (2008, pp. 1 and 3) estimate the primary CER sales at \$7.43 billion and total investment in clean energy projects (not all projects) at \$33 billion, or about 4.5 years of revenue. These figures suggest that the investment is of the same order of magnitude as the sales revenue for the initial crediting period – 7 or 10 years. This means that if total emission reductions are stable, the investment in new projects is of the same magnitude as total sales.

<sup>62</sup> Almost all of these proposals are being considered under various CMP agenda items or the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP). Additional material can be found in the UNFCCC documents for the agenda item or AWG-KP. Background on some of these proposals is also found in the paper: Climate Change Mitigation Negotiations with Emphasis on Developing Countries.

increased by increasing the share of proceeds from the current 2%. Further exemptions from the share of proceeds for groups of host countries or categories of projects would reduce the revenue received by the Adaptation Fund. Proposals to extend the share of proceeds to other mechanisms are discussed below.

**Questions:**

- How does a change to the share of proceeds affect the Adaptation Fund?
- How does a change to the size of the CDM affect the Adaptation Fund?

### 4.3 Increased contributions by developed countries

Currently, financial assistance under the Convention relies on voluntary contributions by developed countries (Annex II Parties) to the Convention Funds or through bilateral or multilateral assistance.

#### 4.3.1 New bilateral and multilateral funds

New bilateral and multilateral funds supported by voluntary contributions are being established to address climate change.

**Cool Earth Initiative.** As part of its Cool Earth Initiative, Japan announced the establishment of a five-year, \$10 billion fund to support efforts in developing countries to combat climate change. The fund will support climate change alleviation policies, adaptation policies for developing countries vulnerable to climate change and support for access to clean energy.

**Questions:**

- Which countries will be eligible? Will the support be in the form of grants or loans?

**International Climate Protection Initiative.**<sup>63</sup> Germany has decided to use some of the revenue raised from

auctioning allowances for its domestic emissions trading scheme for national and international climate initiatives. The international component has a budget of €120 million in 2008 with a smaller allocation in subsequent years. Half of this amount will be used to fund sustainable energy supply projects. The projects will include both investment and capacity building in emerging, developing and transition economies for improved energy efficiency, renewable energy and fluorocarbon reductions. The other €60 million will support climate change adaptation and measures to conserve climate-relevant biodiversity, mainly through bilateral projects.

**Questions:**

- Why will future allocations decline, when the share of allowances auctioned is rising?
- How much of the money will go to transition economies?
- Will the support be in the form of grants or loans?
- How is the level of support for a particular project determined?

**Climate Investment Funds.** The World Bank and regional development banks have established the Climate Investment Funds – the Clean Technology Fund (CTF) and the Strategic Climate Fund (SCF). The CTF is designed to promote scaled up demonstration, deployment and transfer of low-carbon technologies in power sector, transportation, and energy efficiency in buildings, industry and agriculture. The SCF will provide financing to pilot new development approaches or to scale-up activities aimed at a specific climate change challenge through targeted programs. The SCF will pilot national level actions for enhancing climate resilience in a few highly vulnerable countries. Other programs under consideration include: support for energy efficient and renewable energy technologies to increase access to “green” energy in low income countries; and investments to reduce emissions from deforestation and forest degradation through sustainable forest management. The funds have an initial target of \$5 billion. Each fund will be managed

<sup>63</sup> [http://www.bmu.de/files/pdfs/allgemein/application/pdf/klimaschutzinitiative\\_flyer\\_en.pdf](http://www.bmu.de/files/pdfs/allgemein/application/pdf/klimaschutzinitiative_flyer_en.pdf).

by a committee with equal representation from donor and recipient countries.

**Questions:**

- Which countries will be eligible? What types of projects will be funded?

**Global Climate Financing Mechanism.** The European Commission and the World Bank are exploring the possibility of selling a bond and using the funds generated to finance initiatives aimed at helping the poorest developing countries deal with climate change. The concept is to raise money in the capital market to fund critical investments immediately and to repay the bonds from future ODA commitments, carbon linked revenue (such as auctioned allowances for national emissions trading schemes) or from another innovative sources. The GCFM would provide grants for adaptation actions, and possibly mitigation actions that contribute to domestic poverty reduction strategies, in LDCs and SIDS.

**Questions:**

- What types of adaptation projects will be funded? Who will determine which projects are funded? How will the funding level be determined? What types of mitigation projects will be funded?

#### 4.3.2 Proposals funded by defined contributions from developed countries

Some recent proposals move from voluntary contributions to defined contributions.

**Convention Adaptation Fund, Technology Fund and Insurance Mechanism.**<sup>64</sup> The Alliance of Small Island States (AOSIS) has proposed the establishment of a new adaptation fund, a technology fund and an insurance mechanism. The funds would receive revenue from mandatory or assessed contributions from developed countries beyond traditional ODA and levies on carbon

markets. Funds would be disbursed as grants rather than loans and Small Islands Developing States (SIDS) and LDCs should be given priority access to the Adaptation Fund. The Technology Fund would focus on accelerating development of renewable energy technologies. The Insurance Mechanism would create a pool of funds to help SIDS manage financial risk from extreme weather events.

**Questions:**

- What is the proposed formula for the assessed contributions? How would the proposal ensure that the funds are additional to ODA? How would priority for SIDS and LDCs be implemented?

**Adaptation Fund and Multilateral Technology Acquisition Fund.**<sup>65</sup> China has proposed that developed countries should contribute 0.5% of GDP for climate change, almost \$170 billion per year.<sup>66</sup> The funds could come from various sources, including auctioned allowances, in addition to government contributions. The money would go to enhance action on mitigation, adaptation and technology cooperation by establishing specialized funds such as a multilateral technology acquisition fund.

**Questions:**

- How would the money be divided between adaptation and technology acquisition? Would the technology fund focus on acquisition of proven technologies for mitigation or development and diffusion of new technologies?
- Is the 0.5% for climate change a mandatory or voluntary contribution? If a country's ODA is less than 1.2% of GDP how are the development and climate contributions determined?

**Mechanism for Meeting Financial Commitments under the Convention.** The G-77 and China have

<sup>64</sup> [http://unfccc.int/files/meetings/ad\\_hoc\\_working\\_groups/lca/application/pdf/barbados\\_on\\_behalf\\_of\\_aosis.pdf](http://unfccc.int/files/meetings/ad_hoc_working_groups/lca/application/pdf/barbados_on_behalf_of_aosis.pdf)

<sup>65</sup> [http://unfccc.int/files/meetings/ad\\_hoc\\_working\\_groups/lca/application/pdf/china.pdf](http://unfccc.int/files/meetings/ad_hoc_working_groups/lca/application/pdf/china.pdf).

<sup>66</sup> In 2006 ODA by OECD countries amounted to \$104 billion, which amounted to 0.31% of their GNI (about the same as GDP). This means that ODA would need to have been over \$130 billion higher to reach the 0.7% target. At 0.5% the climate change contribution would have been almost \$170 billion. This proposal would require OECD countries to almost quadruple their ODA, which seems very unlikely given the persistent failure to meet the 0.7% target.

<sup>67</sup> UN Foundation, 2007.

<sup>68</sup> [http://unfccc.int/files/meetings/ad\\_hoc\\_working\\_groups/lca/application/pdf/mexico.pdf](http://unfccc.int/files/meetings/ad_hoc_working_groups/lca/application/pdf/mexico.pdf).

proposed the establishment of a new mechanism for meeting financial commitments under the Convention. The mechanism would be accountable to the COP, which would elect the members of its governing board. The main source of funds would be contributions by Annex II Parties “new and additional” to ODA and set at a level of 0.5% to 1% of their GNP. The mechanism would fund the agreed full incremental costs for the implementation of mitigation, adaptation, technology deployment and diffusion, and other actions by developing countries.

#### Questions:

- What principles would be used to divide the money between mitigation, adaptation, technology deployment and diffusion, and other purposes?

**Efficiency Penny.**<sup>67</sup> A UN Foundation report on “Realizing the Potential of Energy Efficiency” proposes that G8 countries impose a small surcharge (e.g., 0.5 to 1%, 1 cent per dollar of sales, or 1 cent per unit of consumption) on end-use energy consumption (e.g., electricity, natural gas, and transportation fuels). The “efficiency penny” surcharge would raise about \$20 billion per year in G8 countries (\$8 billion from electricity, \$6 billion from natural gas, and \$6 billion from oil) without significantly affecting macroeconomic conditions. The revenue would be invested in energy efficiency measures with at least 25% of revenue going to energy efficiency policies, programmes, and projects in developing and transition economies.

#### 4.3.3 Proposals funded by contributions from developed and developing countries

In some proposals, both developed and developing countries contribute but developing countries are net recipients.

**World Climate Change Fund.**<sup>68</sup> Mexico has proposed the establishment of a World Climate Change Fund with revenue of at least \$10 billion per year. The fund would be

open to all countries with annual contributions based on agreed criteria such as greenhouse gas emissions, population and GDP. All members could benefit from the fund, although it is expected that developed countries would be net contributors and developing countries would be net beneficiaries. The contributions would be divided among mitigation, adaptation and clean technology as agreed by the members.

#### Questions:

- Would participation by developed countries be mandatory; as net contributors they have no incentive to join? How will the governance regime ensure that members are able to agree a contribution scale and allocation of money among mitigation, adaptation and technology?
- Would funds be disbursed on a project basis or on a formula basis to member countries?

**Multilateral Adaptation Fund.**<sup>68</sup> Switzerland has proposed a global CO<sub>2</sub> levy of \$2/tCO<sub>2</sub>. Every country, except those with per capita emissions less than 1.5tCO<sub>2</sub>, would impose and collect the tax and forward a part of the revenue to the fund. The tax would generate an estimated \$48.5 billion. Low-, medium- and high-income countries would forward 15%, 35% and 60% respectively of the tax revenue collected. The remaining tax revenue (\$30.1 billion globally) would go into each country’s National Climate Change Fund. The tax revenue forwarded to the Multilateral Adaptation Fund (\$18.4 billion) would be divided equally between a prevention pillar and an insurance pillar.

#### Questions:

- What measures would be supported by the prevention pillar and the insurance pillar? What countries would be eligible for financial support from the prevention pillar and insurance pillar?
- What conditions would be imposed on the National Climate Change Funds?

<sup>69</sup> [http://unfccc.int/files/meetings/ad\\_hoc\\_working\\_groups/lca/application/pdf/switzerland.pdf](http://unfccc.int/files/meetings/ad_hoc_working_groups/lca/application/pdf/switzerland.pdf).

<sup>70</sup> Parties with commitments under the Kyoto Protocol have accepted targets for limiting or reducing emissions. These targets are expressed as levels of allowed emissions, or “assigned amounts,” over the 2008-2012 commitment period. The allowed emissions are divided into “assigned amount units” or AAUs equal to one metric tonne of CO<sub>2</sub> equivalent.

<sup>71</sup> [http://unfccc.int/files/meetings/ad\\_hoc\\_working\\_groups/lca/application/pdf/norway.pdf](http://unfccc.int/files/meetings/ad_hoc_working_groups/lca/application/pdf/norway.pdf).

## 4.4 More stringent commitments by developed countries

As mentioned above, the scale of the CDM depends, in part, on the stringency of developed country commitments. Other proposals increase the stringency of developed country commitments to raise funds for adaptation, mitigation or technology cooperation.

### 4.4.1 Auction of Assigned Amount Units

Norway has proposed that a small percentage of the assigned amount units (AAUs)<sup>70</sup> of each country with an emissions reduction commitment be auctioned to raise revenue for adaptation.<sup>71</sup> This proposal has the effect of making compliance with the national emissions reduction commitments more costly for developed countries. Their emission reduction commitments need to take the form of quantitative limits so that a share of the units can be auctioned.

A target reduction of 25 to 40% from 1990 emissions in 2020 has been suggested for developed countries. That would mean total allowable emissions (assigned amount) by these countries of 10 to 13 billion tons of CO<sub>2</sub>-eq/yr. If 2% of that amount were auctioned with an average price of \$25 per tonne, the revenue would be \$5 to \$6.5 billion per year. As national commitments become more stringent the revenue generated falls unless the price rises and/or additional countries adopt commitments.

The Norwegian proposal differs from Germany's voluntary initiative described above. The Norwegian proposal is mandatory for all developed countries. The assigned amount units to be auctioned would not be issued to countries. They would be sold by a financial institution on behalf of the adaptation fund and the revenue would go directly to the fund. Germany is auctioning some of the allowances for its domestic emissions trading scheme. The revenue goes to the German government, which decides how it is to be used.

The European Commission has proposed a transition to auctioning all of the allowances in the EU ETS beginning in 2013 and proposes that member states should use 20% of the revenue for specified "green" purposes including international climate change action. This would be an extension of the German initiative to all European countries. If it were extended to all developed countries with domestic emissions trading schemes it could raise \$6 to \$10 billion per year.<sup>72</sup>

To be fair extension of the EU proposal to all developed countries would require agreement on domestic emissions trading scheme design including coverage and share of allowances auctioned. Some developed countries, such as Russia and the Ukraine, may not implement a domestic emissions trading scheme, so they would not have any domestic allowances to auction. The share of national emissions covered by the domestic emissions trading scheme varies widely from less than 20% in some European countries to about 90% in New Zealand. The share of allowances auctioned also varies widely from zero in Canada to 100% in all EU schemes by 2020.

#### Questions:

- If developed countries know that a share of the assigned amount will be auctioned, will they not insist on less stringent commitments?

### 4.4.2 Nationally appropriate mitigation actions

The Republic of Korea has proposed that developing countries implement Nationally Appropriate Mitigation Actions (NAMA) with technology, financing and capacity-building support from developed countries.<sup>73</sup> The verified emission reductions achieved by NAMAs would earn credits that could be used by developed countries for compliance with their commitments. In effect, the NAMAs are a wholesale form of CDM and the rules, modalities and procedures could draw on those for the CDM. To create a demand for NAMA credits, developed

<sup>72</sup> Assume that the national emissions commitments total 10 billion tonnes per year for developed countries. Assume that the commitments for countries with domestic emissions trading schemes range from 6 to all 10 billion tonnes. If the domestic emissions trading schemes cover about 40% of the total - 2.4 to 4.0 billion tonnes per year - and half of that amount - 1.2 to 2.0 billion tonnes - is auctioned at an average price of \$25 per tonne it would raise \$30 to \$50 billion and 20% of that would be \$6 to \$10 billion.

<sup>73</sup> [http://unfccc.int/files/meetings/ad\\_hoc\\_working\\_groups/lca/text/plain/non-paper\\_from\\_korea.txt](http://unfccc.int/files/meetings/ad_hoc_working_groups/lca/text/plain/non-paper_from_korea.txt).

<sup>74</sup> This is being considered by the CMP as part of the Article 9 review of the Kyoto Protocol.

<sup>75</sup> UNFCCC, 2007, Table IX-66, p. 186. All CDM units are transferred internationally. Application of the levy to the units (AAUs, RMUs and Emission Reduction Units (ERUs)) issued to each country has been proposed by Norway and is discussed below.

countries would commit to more stringent targets. As with the CDM, a share of the proceeds from the sale of NAMA credits could be collected to fund adaptation. No estimate of the potential scale of NAMA reductions is available.

**Questions:**

- How would NAMAs differ from programmatic CDM? How would NAMAs differ from sectoral CDM? Would NAMA credits be CERs or different units?
- Is implementation of NAMAs by developing countries voluntary? How will it be possible to ensure that developed country commitments are more stringent?

#### 4.5 Other possible sources of funds

Several potential sources of funding that do not depend directly on developed country contributions have been suggested.

**Extension of the 2% levy on CDM to other Market Mechanisms.**<sup>74</sup> Some countries have proposed that the 2% share of proceeds collected from most CDM projects for the Adaptation Fund be applied to JI and IET. The UNFCCC estimated that applying a 2% levy to international transfers of units under JI and IET would generate \$10 to 50 million per year for 2008 – 2012.<sup>75</sup> This compares with its estimate of \$80 to 300 million per year for the levy on the CDM.

The UNFCCC does not provide an estimate for the post-2012 period because trading among countries with commitments will depend on the number of countries with commitments, the type(s) of commitments adopted, the relative stringency of the commitments, and the mitigation cost curves of those countries. The estimates for 2008-2012 are that extension of the levy would increase the revenue by 10 to 20%. The maximum contribution of the 2% levy on the CDM to the Adaptation Fund after 2012 is about \$2 billion per year. Based on the estimates

for 2008-2012, extension of the levy to the other mechanisms would increase the post 2012 revenue by at most \$0.5 billion per year.

Another interpretation of the extension of the share of proceeds is to apply the 2% levy to all units issued to developed countries (AAUs and removal units (RMUs), which are units issued for removals by land use, land-use change and forestry (LULUCF) activities such as reforestation).<sup>76</sup> The quantity of AAUs issued is the country's assigned amount. Basing the levy on the units issued raises a little more—the quantity of RMUs—revenue than the Norwegian proposal (Section 4.4.1); \$5 to \$6.5 billion per year. This is at least 10 times more than the revenue raised if the levy is applied only to units traded internationally. Thus, it is critically important to understand whether the share of proceeds applies to all units issued or only units traded internationally. Applying the share of proceeds to all units issued does not inhibit trading, but makes the commitment more stringent by the amount of the levy. Applying the share of proceeds to units traded internationally may inhibit international trade. But the levy would be collected primarily from units issued in countries with less stringent commitments; that is, those able to export units.

**Questions:**

- What are the options for applying the share of proceeds to JI and international emissions trading?

**International Air Travel Adaptation Levy.** Müller and Hepburn suggest that international air transport emissions be addressed through an international air travel adaptation levy (IATAL) or an emissions trading scheme with auction revenues hypothecated for adaptation (discussed below).<sup>77</sup> The IATAL is a charge based on the (per capita) flight emissions levied on the ticket price.

Müller and Hepburn suggest that the IATAL levy be set at an average of €5 (2005 \$6.5) per passenger per flight to

<sup>76</sup> ERUs are converted AAUs, so the share of proceeds would be applied only to AAUs and RMUs. ERUs would be exempt since the share of proceeds had already been collected for the AAUs that are converted to ERUs.

<sup>77</sup> Müller and Hepburn, 2006.

<sup>78</sup> This proposal is modeled on the 'international solidarity contribution' implemented by France in July 2006. It imposes a levy of €1 on all European economy class flights (€10 in business) and €4 on international economy flights (€40 in business), which is expected to generate revenue of €200 million per annum that will be devoted to fight pandemics, including access to anti-retroviral treatments for HIV/AIDS.

<sup>79</sup> Stochniol, 2007.

<sup>80</sup> Separate emissions limits and fees could be established for different types of ships - container ships, bulk carriers, passenger ships. This would reduce the impact on developing countries since much of their ship traffic (food imports and exports) uses bulk carriers and they are growing more slowly than the total, so the fee for these ships would be lower than that for container ships.

generate €10 billion (2005 \$13 billion) annually<sup>78</sup>. Air travel is projected to grow at over 4% per year for the next decade, so this mechanism is likely to generate increasing amounts of revenue over time. A levy on passenger tickets would not address the emissions associated with air freight.

**Questions:**

- How would the IATAL be implemented? How would the money be used? Who would bear the cost of the levy?

**International Maritime Emission Reduction Scheme (IMERS).** IMERS would implement a charge on the CO<sub>2</sub> emissions from international shipping based on fuel use.<sup>79</sup> Ship managers would report fuel use for voyages ended during the previous month. The fees would be collected from the fuel payers, typically charterers.<sup>80</sup> The fees would go to a fund established under the International Maritime Organization (IMO) and be used to:

- Fund maritime industry GHG improvements;
- Purchase CO<sub>2</sub> credits equal to the actual emissions in excess of an established emissions cap;
- Contribute to climate change adaptation in developing countries.

A fee of \$10 per tonne of CO<sub>2</sub> would raise about \$3 billion annually and raise shipping costs by about 3%. Assuming a market price of \$25 for CERs, about half of the revenue would go to adaptation.

**Questions:**

- Who would collect the revenue? How would the money be used? Who would bear the cost of the levy?

**Auction of Allowances for International Aviation and Marine Emissions.** Greenhouse gas emissions associated with international air and marine transport are rising rapidly and are currently not regulated. CO<sub>2</sub> emissions from fuel used for international air and marine transport

could be regulated under a post-2012 climate regime in conjunction with the International Civil Aviation Organization and the International Maritime Organization.

An emissions trading scheme similar to IMERS could be established for international shipping. Rather than paying the fee of \$10/tCO<sub>2</sub>, fuel payers would be responsible for remitting allowances for the CO<sub>2</sub> emissions from the fuel used. The ship managers and/or fuel suppliers would provide data on fuel use independently. The UNFCCC estimates that auctioning allowances equal to the projected international marine emissions could generate revenue of \$12 billion in 2010, rising to \$13 billion in 2020.<sup>81</sup>

ICAO could implement an emissions trading scheme for international aviation. An emissions cap would be established for the sector. Airlines could use international aviation allowances or other Kyoto units, such as CERs, for compliance. Countries would agree to collect data on fuel sales by airline for international flights and to cooperate with compliance enforcement actions. Each airline would report its CO<sub>2</sub> emissions (based on its fuel use) and remit the necessary allowances and credits annually.<sup>82</sup> The UNFCCC estimates that auctioning allowances equal to the projected international aviation emissions could generate revenue of \$10 billion in 2010, rising to \$15 billion in 2020.<sup>83</sup>

Emissions trading schemes for international aviation and shipping could provide special treatment for countries that would be adversely affected, such as small island nations highly dependent on shipping and international tourism. That is very different from exclusion of all developing countries. Such an exclusion would benefit mainly a small number of relatively wealthy countries including Singapore, Dubai, Hong Kong, Malaysia and Thailand. Airlines and shipping companies would increase the prices of their services. The higher costs would be borne mainly by residents of developed countries. If the auction revenue were used for adaptation, developing countries would benefit most.

<sup>81</sup> The IMERS and UNFCCC estimates are not consistent. IMERS estimates revenue of about \$3 billion annually for a \$10/tCO<sub>2</sub> charge. The UNFCCC estimates revenue of about \$12 billion for an allowance price of \$23.60. At that price the IMERS estimate corresponds to revenue of about \$7.5 billion per year.

<sup>82</sup> Other emissions at altitude also have an adverse climate impact, but it is not possible yet to monitor them accurately enough to include them in an emissions trading scheme.

<sup>83</sup> UNFCCC, 2007, Annex IV, Table 2, p. 204. These totals would be about 6% higher if a price of \$25 is used.

<sup>84</sup> UNFCCC, 2007, Annex IV.

<sup>85</sup> "Some analysts estimate that in local (appreciating) currency terms, the returns from these reserves are close to zero. Given the large reserves-to-GDP ratio of many Asian countries, the current investment strategies could be costing the countries between 1.5 and 2% of GDP each year." ADB, 2007.



**Questions:**

- Is emissions trading technically feasible for international aviation and shipping? Who would bear the cost of the allowances purchased by the airlines/shipping companies?
- Who would benefit most for the use of the funds?

**Funds to Invest Foreign Exchange Reserves.**<sup>84</sup>

Currently, most foreign exchange reserves are invested in government, mainly American, treasury bills with low yield and significant exchange risk.<sup>85</sup> Countries could transfer a small part of their foreign exchange reserves into funds that would invest the money in energy efficiency, renewable energy and other mitigation measures. The investor(s) would establish the policies of the fund such as eligibility of investments and target return on investment. With an appropriate mix of investments it should be possible to maintain the value of the reserves contributed and earn a small return. A fund would provide some diversification in the foreign exchange reserve investments, but would be less liquid than treasury bills. Liquidity is important for foreign exchange reserves, so only a small part of the total, less than 5%, could prudently be contributed to such funds. Global foreign exchange reserves at the end of 2004 totaled \$3,941 billion. Contributing 5% of the reserves to funds would provide capital of \$197 billion.

**Questions:**

- What are the foreign exchange reserves of your country? How are they invested?
- What would be the advantages and disadvantages of investing a portion of them in a fund that provides low interest loans for energy efficiency and renewable energy?

Access to Renewables Programmes in Developed Countries.<sup>86</sup> A number of developed countries have programmes to promote renewable energy, including feed-in tariffs, renewables obligations and targets with renewable energy certificates. One motivation for these programmes is the environmental benefits of renewable energy. Reduction of greenhouse gas emissions is one such benefit.

Recognizing that the climate change mitigation benefits of greenhouse gas emission reductions do not depend on the location of the reductions, such programmes could allow a share, say 5%, of the renewable energy supply to be met by sources in developing countries that meet the programme requirements. Specifically verified deliveries of power by eligible renewable sources in developing countries would receive certificates. Entities with compliance obligations under a renewables programme could purchase certificates to a maximum of 5% of their compliance obligation. A 5% share of the renewable energy programmes in developed countries in 2005 would have provided approximately \$500 million for renewable energy technologies in developing countries.

**Questions:**

- What types of renewable energy are produced in your country? What are their climate change benefits?

**Tobin Tax.**<sup>87</sup> James Tobin proposed a currency transaction tax as a way to enhance the efficacy of national macroeconomic policy and reduce short-term speculative currency flows. While the impact of such a tax on exchange rate volatility continues to be debated, there is a consensus that the tax rate should be 0.1% or lower to minimize the loss of liquidity. Although a currency transaction tax is widely accepted as being technically feasible, how it could best be implemented and enforced is still debated. But the biggest barrier is the global political consensus needed for universal adoption.

Nissanke (2003) assumes that the tax rate would need to be low for both political reasons (to achieve universal adoption) and technical reasons (to minimize market disruption and tax evasion). She estimates that a tax of 0.01% applied to wholesale transactions would generate revenue of 2003 \$15–20 billion.

**Donated Special Drawing Rights.**<sup>88</sup> In 2002, Soros and Stiglitz proposed that the International Monetary Fund (IMF) authorize a new form of special drawing rights (SDRs) to meet a share of the estimated cost of meeting the Millennium Development Goals (MDGs). SDRs are a form of intergovernmental currency issued by

<sup>86</sup> UNFCCC, 2007, Annex IV.

<sup>87</sup> UNFCCC, 2007, Annex IV.

<sup>88</sup> UNFCCC, 2007, Annex IV.

<sup>89</sup> UNFCCC, 2007, Annex IV.

the IMF to provide supplemental liquidity for member countries. Under the proposal, the IMF would allocate new SDRs to all member countries and developed countries that do not need the additional liquidity would make their new SDRs available to approved international non-governmental organizations (NGOs) that would convert them to hard currencies and fund implementation of MDG projects.

A modification of the Soros and Stiglitz proposal could be envisaged to address climate mitigation and/or adaptation. It could be implemented in two stages. First, a special SDR issue of \$27 billion authorized by the IMF in 1997 would be released, of which approximately \$18 billion would be donated. The second stage would see annual issues of SDRs, of which some would be donated for climate mitigation and/or adaptation.

**Questions:**

- A Tobin Tax and donated Special Drawing Rights have been proposed to finance economic development and poverty alleviation. Are you aware of the reasons these proposals have not been implemented?

**Debt-for-clean energy Swap.**<sup>89</sup> Debt swap programmes could become a new source of funding for clean energy (renewable energy and energy efficiency) projects. Under a debt swap programme creditors negotiate an agreement whereby a portion of the debt owed to them is cancelled in exchange for a commitment by the debtor government to convert the cancelled amount into local currency for investment in clean energy projects.

Since the proceeds from debt swaps are in the local currency, they could be used to pay for imported products. Where other financing can be found to pay for imported clean energy technologies, the proceeds from debt-swap programmes could be used to finance recurring local costs.

**Questions:**

- How much of the outstanding debt of your country is in default? In which countries are the creditors located? Has your country participated in any debt swaps?

## 4.6 Summary

Clearly, there are many possible options to enhance international investment and financial flows to developing countries. In choosing which of these possible options to adopt, countries may wish to consider:

- The amount of revenue likely to be generated relative to the overall need;
- Whether the option generates funds specifically for mitigation, adaptation or technology cooperation;
- Whether the funds are under the Convention;
- Whether the funds are based on a defined contribution; and
- Whether the funds pass through government budgets, since that could affect the amount contributed to international funds.

Table 6 lists the potential options discussed and provides the above information where it is available.

**Questions:**

- What is the best combination of options to provide the additional predictable financial and investment flows needed for mitigation, adaptation and technology cooperation on a sustained basis?

Table 6: Summary of the options to enhance international investment and financial flows to developing countries

OPTION	ESTIMATED ANNUAL REVENUE (BILLION \$)	SPECIFIC TO MITIGATION, ADAPTATION OR TECHNOLOGY	UNDER THE CONVENTION	DEFINED CONTRIBUTION	GO THROUGH GOVERNMENT BUDGET
<b>Increasing the Scale of Existing Mechanisms</b>					
The GEF Trust Fund	Currently \$0.25	N	Y	Y	Y
SCCF and LDCF	Currently \$0.10	A	Y	N	Y
The CDM and Other Possible Crediting Mechanisms	Currently \$25 \$25 to \$100	M	Y	N	N
The Adaptation Fund	\$0.50 to \$2	A	Y	N	N
<b>New Bilateral and Multilateral Funds</b>					
Cool Earth Initiative	\$2	N	N	N	Y
International Climate Protection Initiative	\$0.15	N	N	Y	Y
Clean Investment Fund	\$1 to \$2	N	N	N	Y
Global Climate Financing Mechanism	\$5 <sup>a</sup>	N	N	N	Y
<b>Proposals Funded by defined Contributions from Developed Countries</b>					
Convention Adaptation Fund, Technology Fund and Insurance Mechanism		N	Y	Y	Y
Adaptation Fund and Multilateral Technology Acquisition Fund	\$170	N	Y	Y	Y
Mechanism for Meeting Financial Commitments under the Convention	\$130 to \$260	N	Y	N	Y
Efficiency Penny	\$20	M	N	Y	Y
<b>Proposals Funded by Contributions from Developed and Developing Countries</b>					
World Climate Change Fund	\$10	N	Y	Y	Y
Multilateral Adaptation Fund	\$18	A	Y	Y	Y
<b>More Stringent Commitments by Developed Countries</b>					
Auction of Assigned Amount Units	\$5	A	Y	Y	N
Nationally Appropriate Mitigation Actions		M	Y	N	N
<b>Other Sources of Funds</b>					
Extension of the 2% levy on CDM to other Market Mechanisms	\$0.5 or \$5	N	Y	Y	N
International Air Travel Adaptation Levy	\$13	A	N	Y	N
International Maritime Emission Reduction Scheme	\$3	N	N	Y	N
Auction of Allowances for International Aviation and Marine Emissions	\$20 to \$40	N	N	N	N
Funds to Invest Foreign Exchange Reserves	Fund of up to \$200	M	N	N	N
Access to Renewables Programmes in Developed Countries	\$0.5	M	N	N	N
Tobin Tax	\$15 to \$20	N	N	Y	N
Donated Special Drawing Rights	\$18	N	N	N	N
Debt-for-clean-energy Swap		M	N	N	Y

Note: A = Adaptation, M = Mitigation, N = No, and Y = Yes

a. The total payment to frontload €5 billion over the period of 2010 – 2014 would amount to €7.2 billion. Repayment would start in 2011 at €74 million, gradually rise to €380 million in 2015 and continue at that level until 2031.

## 5 GOVERNANCE OF INTERNATIONAL INVESTMENT AND FINANCIAL FLOWS

At present the Convention funds are managed by the GEF with guidance from the Conference of the Parties. Operation of the GEF is directed by the GEF Council, which has different representation and rules of procedure than the COP. The Adaptation Fund has its own Board elected by, under the authority of and accountable to the CMP.

Many of the proposals to enhance the financial resources involve the creation of new funds for specific types of mitigation actions, adaptation needs, and technology development and transfer. Establishment of several new funds could create a need for an umbrella mechanism to coordinate the management of all funds under the Convention. Establishment of new bilateral and multilateral funds outside the Convention could lead to fragmentation and inefficient allocation of resources. Some of the proposals for enhanced funding allow voluntary participation and suggest that the fund be managed by the participants.

In short, a significant increase in the financial resources will raise issues relating to the governance of the funds.<sup>90</sup>

**Governance issues apply both to the funds collected and to the manner in which those funds are disbursed. Governance issues include accountability to the COP, balanced representation of all Parties, transparency, and ease of access to the funding.**

Principles proposed for the collection and disbursement of financial resources under the Convention include equity, common but differentiated responsibility, the polluter-pays principle, adequacy, predictability, sustainability, new and additional funding, grant funding, simplified access and priority access for the most vulnerable countries. Agreeing upon and applying principles appropriate to each fund under the Convention will be a challenge.

### Questions:

- What are the strengths of the current governance system for Convention funds? What are the weaknesses of the current governance system for Convention funds?
- What are the advantages/disadvantages of establishing new funds with relatively narrow purposes, such as a fund for REDD or a fund for renewable energy technologies?
- Would the creation of several new funds require the establishment of an umbrella mechanism to coordinate their management?
- How are governance issues best addressed?

<sup>90</sup> See the report on the workshop on investment and financial flows to address climate change, June 5, 2008. <http://unfccc.int/resource/docs/2008/awglca2/eng/crp03.pdf>.

## 6. EFFECTIVE DISBURSEMENT OF THE INTERNATIONAL FUNDS

Disbursement of substantially larger amounts for mitigation, adaptation and technology cooperation will raise important delivery issues, including:

- The share of the available funds to be allocated for mitigation, adaptation and technology cooperation;
- Whether the funds are distributed by country or project type;
- Whether funds are distributed for individual projects (like the GEF) or for “national programmes”; and
- Whether, or under what conditions, funds can be provided through “direct access”.

How to allocate the available funds will be a major on-going challenge. Funds will need to be allocated among mitigation, adaptation and technology cooperation. The creation of separate funds with dedicated revenue sources may appear to address this issue. But the assignment of dedicated revenue sources is really an allocation of funds. And if one fund has a persistent surplus while another is continuously unable to fund proposed actions, the assignment of revenue sources will need to be reviewed.

**The allocation of funds among mitigation, adaptation and technology cooperation is ultimately a political decision and will fall to the COP.** However, an umbrella mechanism to coordinate the management of all funds under the Convention could provide advice to the COP.<sup>91</sup>

Within a given objective – mitigation, adaptation, technology cooperation – **funds will need to be allocated among different purposes.** Mitigation spending might need to be divided among CCS, REDD and several other types of mitigation actions. Adaptation spending might need to be divided among provision of health care, support for irrigation systems, coastal protection, reduction of the impacts of extreme weather events, etc. Technology funds may need to be split among cooperative research, demonstration projects, diffusion of available technologies, etc. Every allocation decision will implicitly involve a regional distribution of spending. The regional distribution of projects is a perennial issue for the CDM.

Every allocation decision will implicitly have a temporal dimension as well. Allocating funds for technology research means less money is available for diffusion of available technologies. Possible current mitigation efforts are sacrificed for, hopefully, larger future benefits. Funding

measures to reduce the impacts of extreme weather events should yield savings in the future, but it may reduce the money available to deal with immediate health care needs. These implicit choices cannot be avoided.

**Fundamentally, the mitigation, adaptation and technology funds can be disbursed by country or by project type, or a combination of the two.** To the extent that the funds are disbursed on the basis of the project type, the relevant Convention bodies must establish priorities and so implicitly or explicitly address regional and temporal equity. To the extent that the funds are disbursed by country, regional equity is explicitly addressed and project priorities and their temporal equity are delegated to the national government. Governments routinely face similar decisions. If the population disagreed with the decisions, it may lead to a change of government.

**A country allocation may not be appropriate for mitigation and technology cooperation because those funding decisions have global consequences. A country allocation might be appropriate for adaptation since adaptation needs are local and an integral part of sustainable development.** But it requires a basis for determining the country allocations that fairly reflects their needs.

The Bali Action Plan indicates that developing countries that are particularly vulnerable to the adverse effects of climate change, include the LDCs, SIDS and countries in Africa affected by drought, desertification and floods. More specific criteria are likely to be needed because some SIDS are quite rich and some relatively poor vulnerable countries would be excluded. The adverse reaction of many developing countries to the “pre-set criteria for country allocation” established through the resource allocation framework by the GEF attests to the difficulty of establishing such criteria.

Regardless of how funds are allocated, **disbursement could be on a project basis or a programme basis.** A project approach enables each proposed project to be reviewed carefully, but it each project takes a long time to process and incurs high administrative costs. A programme approach reduces the administrative costs, but may provide funding for some less cost-effective actions.

**How available funds are delivered will need to change if the scale of funding increases significantly.** At present,

<sup>91</sup> See the report on the workshop on investment and financial flows to address climate change, June 5, 2008. <http://unfccc.int/resource/docs/2008/awglca2/eng/crp03.pdf>.

mitigation projects, whether through the CDM or Convention funds, are approved on a project-by-project basis. The process is costly and cumbersome, thus provoking calls for changes to administration of the CDM. Changes that would reduce the administrative burden for individual projects and changes, such as sectoral CDM, that would enable much larger reductions to be approved by a single decision.

Adaptation likewise is implemented on a project-by-project basis. The number of projects is still small because the funds are limited and few countries have established their adaptation needs and priorities. If funds are allocated to countries, approval could be based on proposed plans. If funds are disbursed for different purposes, suitable cost-sharing arrangements may be needed. The cost-sharing arrangements are likely to differ for coastal protection, health care, and other purposes. But predictable cost-sharing arrangements would enable national governments and international agencies to prepare and execute implementation plans.

The difficulty with the programme approach is that the implementing agency or the national government must have some basis for establishing priorities for measures to be funded. Some countries have NAPAs, but they identify only “urgent” adaptation actions and do not address sectors/programme needs. Some countries have Technology Needs Assessments, but they do not specify the specific actions or the scale of the actions needed by technology. In short, few if any countries currently have the information needed to support a programme approach to mitigation, adaptation or technology cooperation internationally or on a country basis.

The issue of **direct access** is directly correlated to the issue of a project or programmatic approach as well as capacity for budgetary planning and for budget assistance. Under the GEF projects require an approved implementing agency; a country cannot access funds from the GEF directly. The Adaptation Fund allows developing countries to submit project proposals directly. Direct access to funds under the Convention is an important issue for developing countries.<sup>92</sup>

Bangladesh is proposing establishment of a multi-donor

climate fund to promote climate adaptation and mitigation in Bangladesh. The fund would pool contributions from various donors to support climate mitigation and adaptation activities in the country over a number of years. Priorities would be negotiated between Bangladesh and the fund’s contributors. The fund would promote robust fiduciary management, donor harmonization, lower transaction costs, efficiency and cost effectiveness.

#### Questions:

- How are mitigation and adaptation projects approved at the present time? Will this need to change if significantly more resources are available for those purposes? Why?
- What are the options for disbursing funds? Which option do you think is better for mitigation? For adaptation? For technology? Is one of these options better suited to your country’s capacity?

<sup>92</sup> See, for example, the presentation by Philippines on behalf of the G&G and China available at: [http://unfccc.int/files/meetings/ad\\_hoc\\_working\\_groups/lca/application/pdf/philippines.pdf](http://unfccc.int/files/meetings/ad_hoc_working_groups/lca/application/pdf/philippines.pdf).

## 7. CONCLUSIONS

The Convention, the Kyoto Protocol and a post-2012 agreement foresee financial assistance from developed country Parties to developing country Parties. Developing country Parties will need financial assistance for mitigation, adaptation and technology cooperation. The exact amount of assistance needed for each of these purposes is not known, but it could amount to tens of billions of dollars per year.

The CDM, and possible new market mechanisms, could supply a substantial part of the funding needed for renewables and non-CO<sub>2</sub> emission reduction measures in developing countries under a post-2012 agreement. The ability of programmatic CDM to stimulate large energy efficiency projects remains to be determined. It may be better to provide direct financial support for measures whose marginal cost is substantially above or below the price of CERs and whose scale of the potential reductions is large, such as CCS and REDD emission reductions, to avoid disrupting the market.

Some **potential new sources** of funding are better suited to mitigation. These include access to renewables programmes in developed countries, debt-for-clean-energy swaps, and funds to invest foreign exchange reserves (due to the need to earn a return on the funds).

Most of the contributions to the GEF Trust Fund for the climate change focal area have been allocated to long-term mitigation projects. Mitigation actions can more easily meet the GEF requirement of delivering global environmental benefits. The Resource Allocation Framework determines the funds available to each eligible country, but the funds allocated to a particular country may not be sufficient to support its commitments under the Convention.

Most of the funding for adaptation under the Convention consists of voluntary contributions to the LDCF and SCCF. The LDCF supports the immediate adaptation needs of the LDCs. The SCCF Programme for Adaptation supports adaptation projects in all developing countries, including LDCs. The Adaptation Fund provides funding

for concrete adaptation projects and programmes in developing country Parties to the Protocol. It is financed by a share of proceeds equal to 2% of CERs issued for CDM projects with exemptions for some project types.

The SCCF Programme for Transfer of Technology is the only mechanism that supports technology cooperation.

The funds likely to be available through these mechanisms are likely to be far less than the needs, especially for adaptation and possibly for technology cooperation. Several options for increasing the financial support provided by developed countries have been proposed. Some continue to rely on voluntary contributions, while others propose defined contributions. Although, some of the proposals focus on mitigation, they could be used to raise finance adaptation and/or technology cooperation as well.

Potential sources of funding that do not depend on developed country contributions are also available. Some, such as the Tobin tax and donated SDRs were proposed for other purposes but have not been adopted, so the prospect of their being implemented to fund climate change appears slim. Extension of the CDM levy to the other mechanisms is feasible, but the amount of revenue raised depends on whether the levy is applied to the units issued or those traded internationally. Revenue can also be raised from international aviation and shipping, either through a tax or through regulation of their emissions.<sup>93</sup> Those options could generate funds on the scale likely to be needed.

Ensuring adequate, predictable and sustainable financial resources for mitigation, adaptation and technology cooperation will be an essential component of a post-2012 agreement. That is likely to require agreement on a mix of investment and financial flows including:

- Increased funding for the financial mechanism of the Convention. The fourth review of the financial mechanism will inform the fifth replenishment of the GEF. Those funds will be disbursed over four years beginning in 2011.

<sup>93</sup> Emissions by international aviation and shipping (bunkers) are larger, and growing more rapidly, than those of most countries. Under the Convention Parties are responsible for the emissions that occur over their territory, hence international aviation and marine emissions are international emissions not developed or developing country emissions. All measures to raise revenue based on international aviation and marine emissions will collect most of the revenue from residents of industrialized countries. Almost all of the revenue raised will benefit residents of developing countries. The revenue flows are a better way to address the principle of common but differentiated responsibilities than efforts to apportion "responsibility" for international emissions. Some developing country economies may be adversely affected by measures to raise revenue based on international aviation and marine emissions. It should be possible to design the measures to reduce such adverse economic impacts, such as implementing the IMERS levy separately for different categories of vessels, or to accompany them with economic adjustment measures.

- More stringent commitments by Annex I Parties to generate additional demand for credits from the CDM and possibly other mechanism. Changes to the eligible project types and crediting mechanisms may be required to increase the supply of credits.
- New sources of funds for mitigation, adaptation and technology cooperation. Several options for new funds on the scale needed are available. They need to be assessed in terms of their political acceptability and their ability to provide predictable financial and investment flows on a sustained basis.

Raising substantial additional funds for mitigation, adaptation, and technology cooperation will give rise to important governance and delivery issues that will need to be addressed if the funds are to be used effectively.



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## ANNEXES

### Annex 1: COP decisions

#### Annex 1.1 COP decisions related to financial mechanisms

ISSUE	DECISIONS	PROVISIONS
COP 13 (Bali, 2007)	Decision 6/CP.13	Fourth review of the financial mechanism
	Decision 7/CP.13	Additional guidance to the Global Environment Facility
COP 12 (Nairobi 2006)	Decision 1/CP.12	Further guidance to an entity entrusted with the operation of the financial mechanism of the Convention, for the operation of the Special Climate Change Fund
	Decision 2/CP.12	Review of the financial mechanism
	Decision 3/CP.12	Additional guidance to the Global Environment Facility
COP 11 (Montreal, 2005)	Decision 3/CP.11	Further guidance for the operation of the Least Developed Countries Fund
	Decision 5/CP.11	Additional guidance to an operating entity of the financial mechanism
COP 10 (Buenos Aires, 2004)	Decision 8/CP.10	Additional guidance to an operating entity of the financial mechanism
	Decision 9/CP.10	Assessment of funding to assist developing countries in fulfilling their commitments under the Convention
COP 9 (Milan, 2003)	Decision 4/CP.9	Additional guidance to an operating entity of the financial mechanism
	Decision 5/CP.9	Further guidance to an entity entrusted with the operation of the financial mechanism of the Convention, for the operation of the Special Climate Change Fund
	Decision 6/CP.9	Further guidance for the operation of the Least Developed Countries Fund
COP 8 (New Delhi, 2002)	Decision 5/CP.8	Review of the financial mechanism
	Decision 6/CP.8	Additional guidance to an operating entity of the financial mechanism
	Decision 7/CP.8	Initial guidance to an entity entrusted with the operation of the financial mechanism of the Convention, for the operation of the Special Climate Change Fund
	Decision 8/CP.8	Guidance to an entity entrusted with the operation of the financial mechanism of the Convention, for the operation of the Least Developed Countries Fund
COP 7 (Marrakech, 2001)	Decision 4/CP.7	Development and transfer of technologies (decisions 4/CP.4 and 9/CP.5)
	Decision 5/CP.7	Implementation of Article 4, paragraphs 8 and 9, of the Convention (decision 3/CP.3 and Article 2, paragraph 3, and Article 3, paragraph 14, of the Kyoto Protocol)
	Decision 6/CP.7	Additional guidance to an operating entity of the financial mechanism
	Decision 7/CP.7	Funding under the Convention
	Decision 10/CP.7	Funding under the Kyoto Protocol
	Decision 17/CP.7	Modalities and procedures for a clean development mechanism, as defined in Article 12 of the Kyoto Protocol paragraph 15 and paragraph 66 of the annex
	Decision 27/CP.7	Guidance to an entity entrusted with the operation of the financial mechanism of the Convention, for the operation of the least developed countries fund
	Decision 28/CP.7	Guidelines for the preparation of national adaptation programmes of action
COP 5 (Bonn, 1999)	Decision 9/CP.5	Development and transfer of technologies: status of the consultative process
COP 4 (Buenos Aires, 1998)	Decision 2/CP.4	Additional guidance to the operating entity of the financial mechanism
	Decision 3/CP.4	Review of the financial mechanism
COP 3 (Kyoto, 1997)	Decision 11/CP.3	Review of the financial mechanism
	Decision 12/CP.3	Annex to the Memorandum of Understanding on the determination of funding necessary and available for the implementation of the Convention

COP 2 (Geneva, 1996)	Decision 3/CP.2	Secretariat activities relating to technical and financial support to Parties
	Decision 11/CP.2	Guidance to the Global Environment Facility
	Decision 12/CP.2	Memorandum of Understanding between the Conference of the Parties and the Council of the Global Environment Facility
	Decision 13/CP.2	Memorandum of Understanding between the Conference of the Parties and the Council of the Global Environment Facility: annex on the determination of funding necessary and available for the implementation of the Convention
COP 1 (Berlin, 1995)	Decision 9/CP.1	Maintenance of the interim arrangements referred to in Article 21, paragraph 3, of the Convention
	Decision 10/CP.1	Arrangements between the Conference of the Parties and the operating entity or entities of the financial mechanism
	Decision 11/CP.1	Initial guidance on policies, programme priorities and eligibility criteria to the operating entity or entities of the financial mechanism
	Decision 12/CP.1	Report of the Global Environment Facility to the Conference of the Parties on the development of an operational strategy and on initial activities in the field of climate change
	Decision 15/CP.1	Financial procedures
	Other Action Taken By The Conference Of The Parties (b).	Provision to developing country Parties of technical and financial support

### Annex 1.2 COP and CMP decisions related to the Adaptation Fund

ISSUE	DECISIONS	PROVISIONS
CMP 3 (Bali 2007)	Decision 1/CMP.3	Advance version : Adaptation Fund
CMP 2 (Nairobi 2006)	Decision 5/CMP.2	Adaptation Fund
CMP 1 (Montreal 2005)	Decision 28/CMP.1	Initial guidance to an entity entrusted with the operation of the financial mechanism of the Convention, for the operation of the Adaptation Fund
	Decision 3/CMP.1	Modalities and procedures for a clean development mechanism, as defined in Article 12 of the Kyoto Protocol, paragraph 1
COP 7 (Marrakech, 2001)	Decision 17/CP.7:	Modalities and procedures for a clean development mechanism, as defined in Article 12 of the Kyoto Protocol (see paragraphs 15 and 66 of the annex)
	Decision 10/CP.7:	Funding under the Kyoto Protocol
	Decision 5/CP.7:	Implementation of Article 4, paragraphs 8 and 9, of the Convention (decision 3/CP.3 and Article 2, paragraph 3, and Article 3, paragraph 14, of the Kyoto Protocol)

*Annex 1.3 CMP decisions related to CDM*

ISSUE	DECISIONS	PROVISIONS
CMP 3 (Bali 2007)	Decision 2/CMP.3	Further guidance relating to the clean development mechanism
	Decision 9/CMP.3	Implications of possible changes to the limit for small-scale afforestation and reforestation clean development mechanism project activities
CMP 2 (Nairobi 2006)	Decision 1/CMP.2	Further guidance relating to the clean development mechanism
CMP 1 (Montreal 2005)	Decision 2/CMP.1	Principles, nature and scope of the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol
	Decision 3/CMP.1	Modalities and procedures for a clean development mechanism, as defined in Article 12 of the Kyoto Protocol
	Decision 4/CMP.1	Guidance relating to the clean development mechanism, including
	Decision 5/CMP.1	Modalities and procedures for afforestation and reforestation project activities under the clean development mechanism in the first commitment period of the Kyoto Protocol
	Decision 6/CMP.1	Simplified modalities and procedures for small-scale afforestation and reforestation project activities under the clean development mechanism in the first commitment period of the Kyoto Protocol and measures to facilitate their implementation
	Decision 7/CMP.1	Further guidance relating to the clean development mechanism
	Decision 8/CMP.1	Implications of the establishment of new hydrochlorofluorocarbon-22 (HCFC-22) facilities seeking to obtain certified emission reductions for the destruction of hydrofluorocarbon-23 (HFC-23)

## Annex 2. Glossary

TERM	DEFINITION
Adaptation	Adjustment in natural or human systems to a new or changing environment. Adaptation to climate change refers to adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory and reactive adaptation, private and public adaptation, and autonomous and planned adaptation.
Asian Development Bank (ADB)	ADB is an international development finance institution whose mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Headquartered in Manila, and established in 1966, ADB is owned and financed by its 67 members, of which 48 are from the region and 19 are from other parts of the globe. ADB's main partners are governments, the private sector, nongovernment organizations, development agencies, community-based organizations, and foundations.
Annex I Parties	Industrialised countries
Annex II Parties	Industrialised countries that pay for costs in developing countries
Alliance of Small Island States (AOSIS)	The AOSIS is a coalition of small island and low-lying coastal countries that share similar development challenges and concerns about the environment, especially their vulnerability to the adverse effects of global climate change. It functions primarily as an ad hoc lobby and negotiating voice for small island developing States (SIDS) within the United Nations system.
Bali Action Plan	The United Nations climate change conference in Bali culminated in the adoption of the Bali Road Map, which consists of a number of forward-looking decisions that represent the various tracks that are essential to reaching a secure climate future. The Bali Road Map includes the Bali Action Plan, which charts the course for a new negotiating process designed to tackle climate change, with the aim of completing this by 2009. It also includes the AWG-KP negotiations and their 2009 deadline, the launch of the Adaptation Fund, the scope and content of the Article 9 review of the Kyoto Protocol, as well as decisions on technology transfer and on reducing emissions from deforestation.
Capacity building	Increasing skilled personnel and technical and institutional abilities.
Capture and storage (CCS)	CO <sub>2</sub> is already being captured in the oil and gas and chemical industries. Several plants capture CO <sub>2</sub> from power station flue gases for use in the food industry. However, only a fraction of the CO <sub>2</sub> in the flue gas stream is captured.
Clean Development Mechanism (CDM)	Defined in Article 12 of the Kyoto Protocol, the CDM is intended to meet two objectives: (1) to assist parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the convention; and (2) to assist parties included in Annex I in achieving compliance with their quantified emission limitation and reduction commitments. Certified Emission Reduction Units from CDM projects undertaken in NAI countries that limit or reduce GHG emissions, when certified by operational entities designated by Conference of the Parties/ Meeting of the Parties, can be accrued to the investor (government or industry) from parties in Annex B. A share of the proceeds from certified project activities is used to cover administrative expenses as well as to assist developing country parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation.
Certified emission reductions (CERs)	A Kyoto Protocol unit equal to 1 metric tonne of CO <sub>2</sub> -eq. CERs are issued for emission reductions from CDM project activities. Two special types of CERs called temporary certified emission reduction (tCERs) and long-term certified emission reductions (lCERs) are issued for emission removals from afforestation and reforestation CDM projects.
Climate	Climate in a narrow sense is usually defined as the 'average weather', or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. These quantities are most often surface variables such as temperature, precipitation, and wind. Climate in a wider sense is the state, including a statistical description, of the climate system. The classical period of time is 30 years, as defined by the World Meteorological Organization (WMO).

Climate Change	Climate change refers to a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/ or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use. Note that UNFCCC, in its Article 1, defines “climate change” as “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods”. The UNFCCC thus makes a distinction between “climate change” attributable to human activities altering the atmospheric composition, and “climate variability” attributable to natural causes.
Conference of the Parties serving as the meeting of the Parties (CMP)	The Convention’s supreme body is the COP, which serves as the meeting of the Parties to the Kyoto Protocol. The sessions of the COP and the CMP are held during the same period to reduce costs and improve coordination between the Convention and the Protocol.
Conference of the Parties (COP)	The supreme body of the Convention. It currently meets once a year to review the Convention’s progress. The word “conference” is not used here in the sense of “meeting” but rather of “association,” which explains the seemingly redundant expression “fourth session of the Conference of the Parties.”
Deforestation	Conversion of forest to non-forest. For a discussion of the term forest and related terms such as afforestation, reforestation, and deforestation, see the Intergovernmental Panel on Climate Change (IPCC) Special Report on Land Use, Land-Use Change, and Forestry (IPCC, 2000).
Dynamic interactive vulnerability analysis (DIVA)	DIVA is a tool for integrated assessment of coastal zones. It is specifically designed to explore the vulnerability of coastal areas to sea level rise. It comprises a global database of natural system and socioeconomic factors, relevant scenarios, a set of impact-adaptation algorithms and a customized graphical-user interface. Factors that are considered include erosion, flooding salinisation and wetland loss. DIVA is inspired by the paper-based Global Vulnerability Assessment, but it represents a fundamental improvement in terms of data, factors considered (which include adaptation) and use of PC technology.
Designated operational entity (DOE)	A Designated Operational Entity under the CDM is either a domestic legal entity or an international organization accredited and designated, on a provisional basis until confirmed by the CMP, by the Executive Board. It has two key functions: 1. It validates and subsequently requests registration of a proposed CDM project activity which will be considered valid after 8 weeks if no request for review was made. 2. It verifies emission reduction of a registered CDM project activity, certifies as appropriate and requests the Board to issue Certified Emission Reductions accordingly. The issuance will be considered final 15 days after the request is made unless a request of review is made.
Emission	In the climate change context, emissions refer to the release of greenhouse gases and/or their precursors and aerosols into the atmosphere over a specified area and period of time.
Energy efficiency	Ratio of energy output of a conversion process or of a system to its energy input.
Fossil fuels	Carbon-based fuels from fossil carbon deposits, including coal, oil, and natural gas.
Global Environment Facility (GEF)	Established in 1991, the GEF helps developing countries fund projects and programmes that protect the global environment. GEF grants support projects related to biodiversity, climate change, international waters, land degradation, the ozone layer, and persistent organic pollutants. GEF is an independent financial organization that provides grants to developing countries for projects that benefit the global environment and promote sustainable livelihoods in local communities.
Greenhouse gas	A gas that absorbs radiation at specific wavelengths within the spectrum of radiation (infrared radiation) emitted by the Earth’s surface and by clouds. The gas in turn emits infrared radiation from a level where the temperature is colder than the surface. The net effect is a local trapping of part of the absorbed energy and a tendency to warm the planetary surface. Water vapour (H <sub>2</sub> O), carbon dioxide (CO <sub>2</sub> ), nitrous oxide (N <sub>2</sub> O), methane (CH <sub>4</sub> ) and ozone (O <sub>3</sub> ) are the primary greenhouse gases in the Earth’s atmosphere.
Intergovernmental Panel on Climate Change (IPCC)	Established in 1988 by the World Meteorological Organization and the UN Environment Programme, the IPCC surveys world-wide 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 Monetary Fund (IMF)	The IMF is an international organization of 185 member countries. It was established to promote international monetary cooperation, exchange stability, and orderly exchange arrangements; to foster economic growth and high levels of employment; and to provide temporary financial assistance to countries to help ease balance of payments adjustment.

International Maritime Organization (IMO)	The Convention establishing the International Maritime Organization was adopted in Geneva in 1948 and IMO first met in 1959. IMO's main task has been to develop and maintain a comprehensive regulatory framework for shipping and its remit today includes safety, environmental concerns, legal matters, technical co-operation, maritime security and the efficiency of shipping.
International Emissions Trading (IET)	International Emissions Trading (Article 17 of the Kyoto Protocol) specifies that Annex I countries be allowed to trade assigned amount units (AAUs) with each other. Through emissions trading, an environmental (quantitative) target with a defined absolute upper load limit is to be achieved at minimum cost. Emitters will be assigned an emissions limit and receive permission to emit the specified emission quantity. The emitters receive certificates for the permitted amount of emissions. Emitters who want to emit amounts exceeding the assigned amount must obtain an additional certificate for each additional emissions unit. These can be purchased from other emitters who do not use up all the certificates assigned to them. Through the trading mechanism, a market price for the emissions certificates is established which reflects the costs of emission reduction. Each emitter can decide whether it is cheaper to reduce emissions through reduction measures or to purchase certificates for the generated emissions.
Investment	Investment from the perspective of the domestic economy is the purchase of capital equipment, e.g., machines and computers, and the construction of fixed capital, e.g., factories, roads, housing, that serve to raise the level of output in the future. From the perspective of an individual, investment is expenditure, usually on a financial asset, designed to increase the individual's future wealth.
Joint Implementation (JI)	Under Joint Implementation (Article 6 of the Kyoto Protocol) an Annex I country or an authorised institution or enterprise from an Annex I country A participates in an emission reducing project in another Annex I country B. Country A receives a certain amount of the resulting Emission Reduction Units (ERUs).
Least Developed Countries Fund (LDCF)	The LDCF was established to support a work programme to assist Least Developed Country Parties (LDCs) carry out, inter alia, the preparation and implementation of NAPAs. The GEF, as the entity that operates the financial mechanism, has been entrusted to operate this fund.
Millennium Development Goals (MDGs)	The eight Millennium Development Goals – which range from halving extreme poverty to halting the spread of HIV/AIDS and providing universal primary education, all by the target date of 2015 – form a blueprint agreed to by all the world's countries and all the world's leading development institutions.
Mitigation	An anthropogenic intervention to reduce the sources or enhance the sinks of GHG.
National adaptation plans of action (NAPA)	Documents prepared by least developed countries identifying urgent and immediate needs for adapting to climate change. The NAPAs are then presented to the international donor community for support.
Non-governmental organizations (NGOs)	Organizations that are not part of a governmental structure. They include environmental groups, research institutions, business groups, and associations of urban and local governments. Many NGOs attend climate talks as observers. To be accredited to attend meetings under the Convention, NGOs must be non-profit.
Renewables, Renewable Energy	Energy sources that are, within a short time frame relative to the Earth's natural cycles, sustainable, and include non-carbon technologies such as solar energy, hydropower, wind, and biomass.
Research, development and demonstration (RD&D)	Scientific and/or technical research and development of new production processes or products, coupled with analysis and measures that provide information to potential users regarding the application of the new product or process; demonstration tests; and feasibility of applying these products processes via pilot plants and other pre-commercial applications.
Resource allocation framework (RAF)	In September 2005, the Global Environment Facility Council adopted the Resource Allocation Framework, a new system for allocating GEF resources to recipient countries to increase the impact of GEF funding on the global environment. The RAF allocates resources to countries based on each country's potential to generate global environmental benefits and its capacity, policies and practices to successfully implement GEF projects. As such, the RAF builds on GEF's existing country-driven approach and partnerships with Implementing and Executing Agencies, and provides countries with increased predictability in the allocation of GEF funds.
Sink	Any process, activity or mechanism that removes a greenhouse gas, an aerosol, or a precursor of a greenhouse gas or aerosol from the atmosphere.

Special Climate Change Fund (SCCF)	The SCCF under the Convention was established in 2001 to finance projects relating to adaptation; technology transfer and capacity building; energy, transport, industry, agriculture, forestry and waste management; and economic diversification. This fund should complement other funding mechanisms for the implementation of the Convention. The GEF, as the entity that operates the financial mechanism, has been entrusted to operate this fund. The GEF Council approved a proposed programme outlining plans to utilize SCCF resources in document GEF/C.24/12 "Programming to implement the guidance for the SCCF adopted by the COP to the UNFCCC at its ninth session".
Special drawing rights (SDRs)	The SDR is an international reserve asset, created by the IMF in 1969 to supplement the existing official reserves of member countries. SDRs are allocated to member countries in proportion to their IMF quotas. The SDR also serves as the unit of account of the IMF and some other international organizations. Its value is based on a basket of key international currencies.
Sustainable development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
United Nations Framework Convention on Climate Change (the Convention) (UNFCCC)	The Convention was adopted on 9 May 1992, in New York, and signed at the 1992 Earth Summit in Rio de Janeiro by more than 150 countries and the European Community. Its ultimate objective is the 'stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system'. It contains commitments for all Parties. Under the Convention, Parties included in Annex I aim to return greenhouse gas emissions not controlled by the Montreal Protocol to 1990 levels by the year 2000. The Convention entered in force in March 1994.