



Framework for a Post-2012 Agreement on Climate Change

A Proposal of

GLOBAL LEADERSHIP
for CLIMATE ACTION

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Introduction

Climate change is one of humanity's most pressing and difficult challenges. Its effects are already being felt and will only worsen over time, impacting current and future generations. Without urgent and concerted action, climate change will seriously affect the way of life in all countries, damage fragile ecosystems and threaten global security through migratory pressures and resource conflicts. While piecemeal efforts help, the scale of response required for a real solution is so large that immediate and widespread action is essential.

Climate change, its causes, and its adverse impacts are closely linked to economic development, the alleviation of poverty, and energy security. All countries have a legitimate right to economic development, but that need not conflict with strategies to address climate change. While solutions to the climate change problem require harmonization of economic growth and poverty alleviation with ambitious emissions reductions, they also present tremendous opportunities for innovation and technological development, especially in the energy field. In addition, providing clean energy to the two billion people currently without access to modern energy services would contribute to poverty alleviation and achieving the Millennium Development Goals as well as to emissions reductions.

Adaptation to climate impacts must be considered as an integral element of development and poverty alleviation efforts. Least developed countries and small island states, having contributed the least to climate change, are the most vulnerable to its effects. Failure to adapt will increase the economic and human impacts of extreme events and set back poverty alleviation efforts. Clearly, future efforts to deal with destabilization of the climate must address adaptation as well as mitigation.

Scientific experts believe that a temperature rise above 2° - 2.5°C (450-550 ppm CO₂-equivalent) risks serious impacts. With rising temperatures, the Intergovernmental Panel on Climate Change (IPCC) predicts, the frequency of heat waves, droughts, and heavy rainfall events will very likely increase, adversely affecting agriculture, forests, water resources, industry, human health and settlements. Developing countries, where greater poverty and vulnerability limit the capacity to act, will be the most seriously harmed, particularly the poorer segments of the populations.

Avoiding such a future requires global greenhouse emissions to peak in the next 10-15 years, followed by substantial reductions of at least 60% by 2050 compared to 1990 – a formidable task that requires international cooperation and collective action without further delay. The cost of taking action now, however, is small – about 1% of global GDP, according to the Stern Review – and the benefits are large compared with the much heavier penalties of postponing action. The costs of both mitigation and adaptation will rise substantially with delay.

Since climate change is a long-term problem, it cannot be addressed successfully through short-term, country-based actions alone. Resolving the climate crisis will require international cooperation at all levels—from bilateral to regional to global. A future global agreement, negotiated under the auspices of the United Nations Framework Convention on Climate Change (UNFCCC) must have a long-term target to “stabilize the concentration of greenhouse gases at a level that would prevent dangerous interference with the climate system” in accordance with the stated objective of the UNFCCC. Such a long-term target should be pursued through periods longer than Kyoto’s five-year commitment period. An initial 2013-2020 commitment period, coupled with a monitoring and review mechanism, would facilitate the development of more flexible and effective country-based strategies, would provide more certainty for public and private investments, and would allow for mid-course corrections as the science evolves.

Any global climate change agreement must be comprehensive. It should include all countries, all sectors, all sources and sinks, and mitigation as well as adaptation. A new agreement, however, will be successful only if it is perceived by all participating countries to be equitable. Requiring all countries to achieve the same percentage reduction in emissions in the next commitment period would be unfair. Developed countries should take the lead in global emissions reduction, given their historic responsibility and capability to act. Nevertheless, that alone will not be sufficient to avoid the most adverse and possibly irreversible impacts of climate change. Meaningful engagement of developing countries is needed also. Meaningful engagement of developing countries, especially the rapidly industrializing economies, is needed also. But not all developing countries are alike – some are rapidly industrializing, and some are least developed. Their engagement should be differentiated by their responsibilities and capabilities. Technological choices available to them are much greater today than even 10 or 20 years ago. These choices present new opportunities for economic growth and job creation. As a result, many leading businesses around the world are now in the vanguard of those calling for action; they require clear policy frameworks on which to base their investment decisions.

The Framework

The purpose of this document is to propose the outlines of a broadly acceptable framework that addresses at least the following issues:

- Differentiated targets and timetables: How can developed and developing countries participate on a fair and equitable basis?
- Forests as carbon sinks: What incentives are possible and appropriate for avoided deforestation?
- Market-based mechanisms: What is their proper role and scale?
- Adaptation: Since some amount of climate change is inevitable, what mechanisms will be used to finance adaptation measures and to reduce the climate-susceptibility of development investments?
- Research, development and deployment: How can they be stimulated and enhanced?
- Technology cooperation: How can innovation and increased collaboration on clean energy technologies be encouraged amongst all countries?
- Finance: What incentives are needed to increase developing-country adoption of, and private-sector investment in, clean energy technologies?

Since a number of these issues are inter-related (for example, finance cuts across all other issues, and large-scale deployment of technology is needed for mitigation and adaptation), our proposed “framework” focuses on four broad and inter-connected areas of concern:

- (1) mitigation targets, timetables, and market-based mechanisms;
- (2) adaptation;
- (3) technology development and cooperation; and
- (4) finance.

Recommendation 1:

The GLCA recommends that in addition to setting a timetable for negotiating a comprehensive post-2012 agreement, the Parties agree in Bali on four pathways for negotiation that address mitigation, adaptation, technology, and finance. Initial draft articles should be presented to the COP in 2008 as a first step towards concluding a new and comprehensive agreement in 2009.

I. Mitigation—Targets, Timetables, and Market-Based Mechanisms

Mitigating emissions sufficiently to protect the Earth’s climate will require many types of international cooperation. Mitigation also has the additional benefit of protecting human health, for example by reducing the serious air pollution affecting many countries. A comprehensive emissions-based agreement sends a clear signal to the market and offers countries the flexibility to implement emissions reduction strategies that are most appropriate to their national circumstances. Smaller, targeted agreements, on the other hand, offer the potential of early action by countries that are not ready to accept emissions limits and could be incorporated into a comprehensive climate change agreement. The objective should be to make the comprehensive agreement and smaller targeted agreements mutually supportive and complementary.

The narrower scope being considered for targeted agreements pertains to countries, sectors, policies, or measures:

- Country-based agreements among the top-emitting countries in the world, or alternatively between smaller geographic groups, may offer a simpler negotiating process and the potential to address a large fraction of the world’s emissions.
- Sector-based agreements can avoid competitiveness concerns by setting emissions targets for particular industries – e.g., power, transportation, aluminum, steel, cement, appliances, buildings, forestry – including those located in developing countries.
- Policy-based agreements could require harmonized carbon taxes or reductions in emissions intensity, for example, or support clean technology dissemination.
- Measures-based agreements could involve specific emission reduction strategies – e.g., energy efficiency, renewable energy, and land-use regulation.

Recommendation 2:

Given the scale of response required, and in order to avoid the most adverse impacts of climate change, we recommend a comprehensive post-2012 agreement under the auspices of the UNFCCC. Targeted agreements – for example, on industrial sectors, energy efficiency, renewable energy, and technology cooperation – should be encouraged and incorporated within a new comprehensive agreement.

Targets and Timetables

Article 3.1 of the UNFCCC states that the “developed countries should take the lead in combating climate change.” The continuing leadership role that developed economies have to play in any future effort to reduce global emissions was also acknowledged by the communiqué issued by the G8 Summit at Heiligendamm in June 2007.

To date, the most ambitious targets have been declared by the European Union (EU) – reducing GHG emissions by 20% from 1990 levels by 2020. The EU would agree to a 30% target by 2020 if other developed countries commit themselves to comparable emission reductions and if the more advanced developing countries adequately contribute in accordance with their respective responsibilities and capabilities. Canada, the EU, and Japan have decided to work towards a goal to at least halve *global* emissions by 2050. This, the G8 countries promised to consider seriously.

In the U.S., the state of California has embarked upon an ambitious plan to cut its greenhouse gas emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 80% below 1990 levels by 2050. Other U.S. states are taking similar steps. Businesses also have made strong commitments to reducing their emissions and are urging strong and long-term actions by governments to curb climate change.

However, “dangerous anthropogenic interference” cannot be avoided by developed countries acting alone. Even an 80% reduction of greenhouse gas emissions in all developed countries by 2050 would not achieve this objective without emissions reductions by rapidly industrializing developing countries.

The energy intensity¹ of all countries has been declining over the past 20 years at an average annual rate of 1.25%. A report by an international experts group convened by the United Nations Foundation recommends that G8 countries commit themselves to increasing their rate of improvement to 2.5% per year. The energy intensity of non-OECD countries has also been declining, at a rate of about 1.42% per year, partly because services are becoming an increasing fraction of developing economies. Nonetheless, because their economies are growing at much faster rates, total emissions from some developing countries are increasing rapidly. Making greater reductions in energy intensity would moderate this growth in emissions while enabling developing countries to continue to pursue their sustainable development objectives. China has set a goal of reducing energy consumption per unit of GDP by 20% between 2006 and 2010, which amounts to an average annual rate of 4% per year.

Recommendation 3:

Dangerous anthropogenic interference with the climate system must be avoided by all countries acting in concert. All countries should commit to reduce collectively global emissions by at least 60% below the 1990 level by 2050. Developed countries should take the lead in emissions reduction by adopting effective targets and timetables. As a

¹ We use energy intensity (energy per unit of GDP) as a “proxy” for emissions intensity, which is of most relevance to climate change. Emissions intensity, besides being related to energy intensity, is also influenced by the fuel mix of an economy and the relative share of non-CO₂ greenhouse gases emitted. Globally, the decline in overall carbon intensity stems more from reduced energy intensity than from changes in fuel mix. Projections of emissions intensity tend to exhibit less uncertainty than absolute emission forecasts.

first step, this could include a commitment to reduce their collective emissions by 30% by 2020. Rapidly industrializing countries should commit to reduce their energy intensity by 30% by 2020 (an average of 4% per year) and agree to emissions reduction targets afterwards. Other developing countries should commit to an energy intensity target differentiated by their responsibilities and capabilities. The international community should develop a monitoring and review system and clear criteria for determining when and how various categories of countries should assume stronger climate commitments.

Energy security and climate security are intertwined and should be addressed at the same time. Renewable energy and energy efficiency can contribute to such a strategy. Renewable energy is a win-win proposition for all countries:

- (1) it provides opportunities for poverty alleviation and for satisfying the energy needs in rural and remote areas;
- (2) it helps generate employment and creates local economic opportunities;
- (3) it helps curb climate change and contributes to the protection of human health caused by air pollution; and
- (4) it enhances energy security through reliance on domestic energy sources such as biomass, hydro, wind, solar and geothermal.

The technical and economic potentials of improving energy efficiency are also enormous. Increased efficiency, long recognized as the cheapest, cleanest source of energy, has not been pursued by countries as aggressively as new supply in spite of experience showing the large opportunities for gains in that area. Improving the efficiency of commercial and residential buildings and appliances can help moderate global climate change while contributing to a more sustainable energy future. In addition, technological innovations can cost-effectively reduce the risk of large-scale impacts of energy supply disruptions, especially in the electricity sector.

Recommendation 4:

Long-term policies, as well as measurable and verifiable targets, should be adopted by all countries to increase substantially the use of renewable energy and to promote greater efficiency in energy production and use. In addition, global standards for end-use efficiency should be developed and adopted.

Sinks and Avoided Deforestation

Land-use changes, mainly deforestation, account for more than 20% of global emissions, a share greater than either the global transport or industrial sectors. With increasing emphasis on growing biofuels for transport, there will be increasing pressure to convert remaining forests to other uses. Both Article 3.3 of the Framework Convention and the history of Kyoto Protocol negotiations point to the need to include greenhouse gas sinks in any agreement. Difficulties in monitoring and verifying both above-ground and below-ground stocks of carbon need to be overcome with improved science and measurement methods. Because not all forests are alike in their capacity to sequester carbon dioxide, additional research is needed to account for these differences.

The issue of avoided deforestation (now referred to as reduced emissions from deforestation (RED)) in tropical and equatorial countries is a contentious one. Because of the size of the

forest resource, credits for avoided deforestation must be coupled with sharply reduced emissions targets or they could destabilize carbon markets.

Reducing deforestation presents an opportunity to reduce cost-effectively the accumulation of carbon dioxide in the atmosphere, thus slowing the rate of climate change. In addition, strategies to reduce deforestation have additional benefits – the conservation of biodiversity, the provision of ecosystem goods and services, especially water resources, and the improvement of livelihoods for neighboring communities. In this regard, the carbon market offers an opportunity to change forest management and improve livelihoods in rural areas of developing countries.

Recommendation 5:

To reduce the emissions of carbon dioxide cost-effectively, a full range of interventions to create and maintain biological sinks of carbon should be included in a post-2012 climate change regime in order to capture the many co-benefits of sustainable livelihoods, land management, forestry, and biodiversity conservation.

Market-Based Mechanisms

As the Stern Review said, “Establishing a carbon price, through tax, trading or regulation, is an essential foundation for climate-change policy.” The preferable mechanism is carbon taxes, which could reduce emissions and generate financial resources. It is up to national governments to decide what to do with the revenues, including, for example, the development of clean energy sources and adaptation to climate change. Carbon taxes are easier to implement than cap-and-trade schemes and are economically efficient. A system of harmonized, universal carbon taxes should be agreed by the international community.

We recognize that cap-and-trade schemes are generally welcomed by industry, as they tend to reduce the cost of complying with targets. The cap is generally set at a level below the national target or allowance because some sources that are difficult to monitor or too small are excluded. But without binding targets and a clear policy framework, a formal system cannot function. Tradable allowance systems can be limited either to upstream sources (i.e., fossil fuel producers and importers) if they are based on carbon content, or downstream if they focus on end uses and emissions. If tradable allowances are issued at no cost, the problem is one of distributing initial allowances among recipients. If the allowances are sold, or better still, auctioned, these schemes can raise revenue that can be used for other purposes.

Markets should be organized to have a reasonable promise of achieving the policy goals of carbon reductions in an efficient manner. The concerns associated with cap-and-trade schemes (as with any market-based system) are four-fold: transaction costs, market manipulation, leakage, and monitoring. Transaction costs can be minimized by having transparent and non-burdensome rules; the power to manipulate markets can be minimized by opening the market to more players (brokers, traders, etc.) besides those who need the allowances and by linking markets; leakage can be minimized by limiting the scheme to only those countries that have targets; and the burden of monitoring can be minimized by capping upstream sources. Permit systems can be designed to overcome these concerns, at least partly, if not fully.

Recommendation 6:

In order to deliver the greatest climate benefits efficiently and effectively, a carbon price should be set through carbon taxes or trading. The preferable mechanism is a system of harmonized, universal carbon taxes. For a cap-and-trade system, well functioning and financially linked carbon markets need to be developed across the globe, incorporating various national and regional cap-and-trade programs. Emissions allowances should be auctioned, thus raising resources that can be allocated by national governments for other purposes, such as clean energy development and adaptation.

II. Adaptation

Adaptation is a key component of an effective strategy to address climate change. Substantially reducing global emissions of greenhouse gases will not avoid the serious impacts of climate change to which the world is already committed and which will affect all countries to different degrees, with the poor in developing countries being the most vulnerable and the least able to adapt. Least developed countries lack the information, institutions, and the financial resources needed to assess their vulnerabilities and to take the necessary actions to adapt. Strong mitigation measures are needed to minimize the cost of adaptation; without them, adaptation may be impossible in some countries.

Adaptation is not simply a matter of designing projects or putting together lists of measures to reduce the impacts of climate change. A national policy response would increase resilience to climate vulnerability and change and should be anchored in a country's framework for economic growth and sustainable development and integrated in its poverty reduction strategies. Responses to climate change need to encompass several levels including access to clean energy for vulnerable populations, crop and farm-level adaptations, national level agricultural and supporting policies and investments.

Businesses and international financial institutions also need to integrate climate change into their activities and make their investments less susceptible to climate change. International technical and financial assistance should be strengthened and made more coherent in order to respond at the requisite scale to the needs of least developed countries. In this regard, UN agencies such as UNDP and UNEP have a pivotal role to play in building institutional, public policy, and human capacity in support of effective programs of adaptation.

Future agricultural systems will have to be more resilient to a variety of stresses to cope with the direct and indirect consequences of climate change. Technologies for adaptation (for example, salt- and drought-resistant crop cultivars) need to be developed and disseminated widely. New centers should be established for this purpose in developing countries, especially by the CGIAR in Africa. In the meantime, the CGIAR Centers should collaborate on appropriate technologies for farmers and policy advice for governments, with a focus on adaptation to climate change.

Because the costs of adaptation were thought to provide largely local benefits, were difficult to distinguish from "regular" development, were suspected to be large, and smacked of compensation awarded for damages, developed countries have been reluctant to agree to

substantial amount of funds for adaptation (through the Global Environment Facility (GEF), for example). Nevertheless, since climate change will impede development efforts, increase risks to public health, frustrate poverty alleviation programs, and exacerbate migrations from waterlogged, water-scarce or food-scarce regions, there is an important role for official development assistance (ODA) in financing adaptation measures, including human and institutional capacity building, and in reducing vulnerability of agriculture, forests and water resources. Effective adaptation will require broader planning capacity in all relevant departments and ministries in developing countries. Local scientists should be supported for monitoring and research on climate impacts on various sectors in their own countries. In addition, all countries should cooperate in identifying a package of reliable funding to help countries build resilience to climate risks. Such funding could include public and private finance and the carbon market. Development agencies should integrate climate change effects into their projects and programs.

Recommendation 7:

A post-2012 climate agreement should address both mitigation and adaptation. Adaptation should be seen as part of sustainable development and strategies to alleviate poverty. It should include vulnerability assessments, enhancing resilience to climate impacts, access to information and best practices, building human and institutional capacity, and making public and private investments in developing countries less susceptible to climate change. A substantial package of financial support, including public and private funds, should be established (see Recommendation 11). Centers for Adaptation in Agriculture should be established, particularly by the CGIAR in Africa.

III. Technology Development and Cooperation

Future cropping systems, for example, will have to be more resilient to a variety of stresses to cope with the direct and indirect consequences of climate change. cultivars

If the world continues on its current energy path, dominated by fossil fuels, energy-related CO₂ emissions in 2050 will be two and a half times their current levels. According to the International Energy Agency (IEA), these emissions can be returned to their current levels by 2050 through a combination of the following actions undertaken in all countries:

- (1) Strong energy efficiency gains in transport, industry and buildings sectors;
- (2) Increasing decarbonization of the electric power generation sector through increased deployment of renewables, natural gas, and coal with CO₂ capture and storage; and
- (3) Increased use of biofuels for road transport.

When fully commercialized, these technologies will help *stabilize* emissions at an incremental cost of no more than US\$25 per tonne of avoided CO₂, which would add 2 cents per kWh to the price of coal-generated electricity and 7 cents per liter (28 cents per gallon) to the price of petroleum fuels. However, reducing global emissions by at least 60% at acceptable costs will require a science and technology revolution, at least as large as those in the space and telecommunication sectors, to make clean energy technologies more efficient and affordable. Technologies such as solar, wind, environmentally sustainable biofuels, hydrogen, energy efficiency, and carbon capture and storage need additional breakthroughs that will only be made possible with an infusion of public funds. Unfortunately, investments in both public-

and private-sector energy research and development programs have been declining for the last two decades.

These declines need to be halted and reversed. The Stern Review recommended doubling the aggregate amount of public funds devoted to energy R&D from the current level to about US\$20 billion per year. Most of these additional expenses will be in the North.

Recommendation 8:

Recent declines in investments for energy research and development should be reversed. Research, development and demonstration of more efficient and less costly energy technologies, such as advanced solar thermal technologies, as well as carbon capture and storage, should be a high priority. Aggregate public expenditures should be increased to US\$20 billion per year.

Innovative public-private partnerships are required to encourage the private sector to invest more in post-R&D phases of energy technologies. The deployment phase often requires considerably more resources than the R&D phase. The private sector is best equipped to make incremental improvements in the deployment and diffusion phases that can help reduce costs. For technologies that are already commercial, the private sector again can best tailor on-going R&D to the market's needs. However, governments need to offer clear and predictable policy frameworks to support deployment in their countries.

Market-based mechanisms are good at identifying the cheapest mitigation opportunities amongst existing options, and spurring innovations that have immediate cost reductions, but are less helpful in encouraging the development of new low-emission technologies. Innovation targets to bring new, more efficient, and less costly technologies to market could be very helpful. Incentives could be provided to countries (and businesses) that beat these targets in the form of credits against their future emission targets.

In addition, the formation of a Consultative Group on Clean Energy Research (CGCER), as suggested by the International Task Force on Global Public Goods, could facilitate international collaboration on the development of low-cost, zero-carbon technologies and the exchange of information about clean energy technologies. Examples of existing large-scale international collaborations include nuclear fusion research, the international space station, and the Consultative Group on International Agricultural Research (CGIAR). Initially, the CGCER could be established as a virtual institution, linking centers of excellence in developed and developing countries. In the meantime, the CGIAR Centers should collaborate on appropriate technologies and policy advice for developing country farmers and governments, with a focus on adaptation to climate change.

Sustainable development is not possible without making energy systems more sustainable. Rapidly industrializing countries need to grow in a climate-friendly manner. The infrastructure created in coal-fired power plants and energy-intensive industries is long-lived (about 40-50 years). However, the costs of cleaner and more efficient technologies are much higher (as much as \$100 million or more for an average 1 GW coal-fired power plant). In addition, issues of competitiveness and intellectual property rights (IPR) have impeded the dissemination of clean technologies in developing countries, and the full utilization of knowledge, which is a global public good. Yet it is important to all countries that clean

energy technologies are made as widely available as possible (like generic medicines for HIV-AIDS, for example). It may also be beneficial to conduct research and demonstrate technologies such as solar thermal and coal gasification in the South. A CGCER could support such research, act as a catalyst for South-South cooperation, and pay for patents or licensing fees to enable cleaner technologies to be deployed in the South. The proposed climate fund (*Recommendation 11*, below) would cover the incremental costs of cleaner and more efficient technologies.

Recommendation 9:

In order to tackle climate change at the requisite scale, clean energy technologies should be made available and utilized by all countries. All developing countries, especially rapidly industrializing countries, should have access to clean energy technologies on preferential terms. The barriers that hamper the dissemination of such technologies in developing countries, such as intellectual property rights and competitive rules, should be overcome. In order to encourage collaboration on a “clean technology revolution,” the formation of a “Consultative Group on Clean Energy Research” should be considered as part of a global climate agreement. Innovation targets to bring new technologies to market, as well as incentives for meeting them, should also be considered.

IV. Finance

Both public and private finance are essential for adaptation, and technology transfer to developing countries and to implement successfully any comprehensive and long-term strategy to combat climate change. Climate-friendly investments need to be multiplied through national and international frameworks, and the current international carbon market needs to be enhanced in order to scale up private flows. However, external funding must be additional to national resources such as domestic savings and taxation. Governments have an obligation to establish a supportive framework for investment. Local capital markets should facilitate long-term investments in adaptation measures. Carbon taxes or the auctioning of emissions allowances can also raise resources that can be used for this or other purposes.

The Clean Development Mechanism (CDM) was created under the Kyoto Protocol to support low-carbon investments in developing countries. For the developed countries, the purpose of the CDM is to lower the cost of emission reductions and provide an element of flexibility in carrying out their national obligations. From the developing countries’ perspective, the purpose of the CDM is to promote their sustainable development and contribute to the stabilization of greenhouse gases in the atmosphere. The CDM has encountered administrative and technical hurdles. Initial projects have been limited to a few countries and a few gases and have been plagued by bureaucratic procedures, and with little contribution to sustainable development. These weaknesses result because the CDM was created as a project-based instrument; however, the Executive Board recently approved the inclusion of “programmes of activities” in the CDM.

In order to promote policy reform, underwrite technology development, and stimulate investment flows at a scale that is truly transformational, an additional market mechanism must take a sectoral approach. The fundamental distinction between the sectoral approach and

the project-based or programmatic approach is that a developing country could set sector-wide baselines for carbon-intensive sectors (such as power, cement, steel and aluminum) at levels that coincide with its economic interest while meeting commitments to reduce the energy intensity of its growth.

Recommendation 10:

The CDM should be reformed in order to deliver its full potential during the 2008-2012 commitment period, and in the post-2012 regime an additional market mechanism should support sectoral approaches capable of transforming whole sectors of rapidly industrializing countries at a speed commensurate with the challenge of taking emissions reductions to global scale.

Public finance also has an important role, especially in demonstrating new approaches for building human and institutional capacity and for mitigation and adaptation in developing countries. However, the existing funding sources for these purposes (for example, the GEF and the multilateral development banks (MDBs)) are too small for the scale of assistance required. They should be strengthened and their resources enhanced so that they can play a bigger role in leveraging private finance for mitigation and adaptation and in assisting developing countries to set appropriate framework conditions for private investment.

The costs of adequately addressing the risk of climate change, according to the Stern Review, are of the order of 1% of annual gross world product (approximately US\$470 billion at market exchange rates or US\$650 billion at purchasing power parity rates). Some of that investment will come from redirecting existing flows, and some will be additional. Some funds will be required for increased assistance to developing countries for the adoption of energy efficiency and clean energy technologies, and for avoided deforestation. Funds will be required for greening power sectors, for adaptation, and for increased R&D and deployment in all countries, focusing especially on technologies that are technically viable but not yet financially competitive.

Most of the resources for energy development (close to 60%) are raised locally within developing countries. The IEA estimates that the energy sector requires over US\$20 trillion in cumulative investments over 2005-2030. More than half, or about US\$400 billion per year, will be in developing countries. According to the World Bank, this sum would need to be augmented by US\$34 billion a year to support “green” energy development. The Stern Review similarly estimates the incremental amount at about US\$20-30 billion per year.

The average net public financial flows (ODA) from all developed countries (including loans) amounted to about US\$58 billion per year between 1996 and 2005, or about 0.23% of GDP, of which about US\$7 billion per year was for energy. We estimate that about \$50 billion per year will be needed for activities in developing countries in support of a comprehensive climate change agreement. A fund of that magnitude would require innovative finance, structure, and governance. Since commitments and actions to meet a 60% reduction by 2050 will have to be met in phases, the first phase of such funding could initially be about \$10 billion per year.

The source of funding could be a combination of public finance (increases in ODA) and the carbon market, especially the auctioning of emissions allowances. The average level of ODA

(0.23%) during the last decade is only one-third of the 0.7% commitment promised in Monterrey five years ago. An ultimate level of annual funding of US\$50 billion, if derived entirely from public sources, would represent less than a doubling of current ODA. However, a significant portion of the funding could be met by flows from carbon finance.

Recommendation 11:

Finance is a critical element of any strategy to address climate change effectively. A climate fund of additional resources, starting at US\$10 billion and growing to US\$50 billion per year, should be established to support climate change activities in developing countries (adaptation, avoided deforestation, and clean energy development and deployment) and should include both public and private resources. It should have an innovative structure and governance that is transparent and inclusive. In addition, existing mechanisms, such as the GEF and the MDBs, should be strengthened and their resources enhanced to continue their important work in demonstrating new approaches, building human and institutional capacity, and leveraging private finance.

Concluding Comments

With its limited time frame, participation, and inadequate provisions for monitoring, the Kyoto Protocol was never seen as a solution to the climate problem. It was meant to be a first step, preparing for the broader engagement that will be necessary and establishing the legal, technical and institutional groundwork for future regimes. As we embark upon a more comprehensive and inclusive agreement, we need to build on the experience gained from Kyoto, particularly in international emissions trading.

We also need to build on the experience of cities, states, communities, businesses, and individuals who have voluntarily undertaken important steps to address climate change. As they have shown, determined action presents substantial opportunities for economic growth and job creation, based on the development and deployment of clean energy technologies. In addition, public advocacy and information programs can play an important role in enhancing awareness of the impacts of personal behavior and lifestyle.

Above all, we need to build trust between North and South and establish an equitable basis and new modalities for genuine international cooperation to address the linked challenges of energy and climate security. For an issue this important to the future of the planet, there must be no more broken promises.