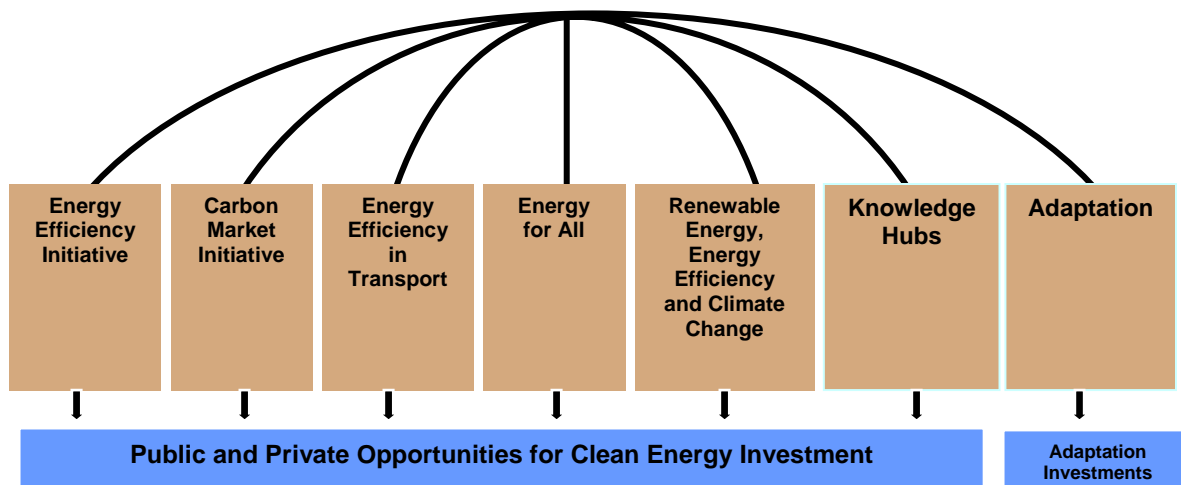




**ASIAN DEVELOPMENT FUND (ADF)
ADF X DONORS' MEETING**
26–27 November 2007
Vientiane, Lao People's Democratic Republic

Background Paper on
**ADB's Approach to Climate Change in
Asian Development Fund Countries**

ADB's Clean Energy and Environment Program



ABBREVIATIONS

ADB	–	Asian Development Bank
ADF	–	Asian Development Fund
ALGAS	–	Asia Least-cost Greenhouse Gas Abatement Study
APP	–	Asia-Pacific Partnership
ATC	–	Area traffic control system
C	–	celsius
CALCILM	–	Central Asian Countries Initiative for Land Management
CDM	–	Clean Development Mechanism
CMI	–	Carbon Market Initiative
DMC	–	developing member country
CE&EP	–	Clean Energy and Environment Program
CEFPF	–	Clean Energy Financing Partnership Facility
CEIF	–	Clean Energy Investment Framework
CO ₂	–	carbon dioxide
EEl	–	Energy Efficiency Initiative
GDP	–	gross domestic product
GEF	–	Global Environmental Facility
GHG	–	greenhouse gas
GMS	–	Greater Mekong Subregion
GWh	–	gigawatt hour
IEA	–	International Energy Agency
IPCC	–	Intergovernmental Panel on Climate Change
Lao PDR	–	Lao People's Democratic Republic
MDB	–	multilateral development bank
mm	–	millimeters
MW	–	megawatt
NAPA	–	National Adaptation Programme of Action
PRC	–	People's Republic of China
PREGA	–	Promotion of Renewable Energy, Energy Efficiency, and Greenhouse Gas Abatement
REACH	–	Renewable Energy, Energy Efficiency and Climate Change
TA	–	technical assistance
toe	–	tons of oil equivalent
UNDP	–	United Nations Development Programme
UNEP	–	United Nations Environment Programme
UNFCCC	–	United Nations Framework Convention on Climate Change
WEO 2007	–	World Energy Outlook 2007

NOTE

In this report, "\$" refers to US dollars.

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EXECUTIVE SUMMARY

Climate change is a real threat and Asian Development Fund (ADF) countries will be affected. There is no longer any doubt that climate change will fundamentally alter the region's future development. There is clear evidence that the poorest people in ADF countries are most vulnerable to the current and future adverse impacts of climate change. The Stern Review estimates that if we do not act, the overall costs and risks of climate change will be equivalent to losing 5% of global gross domestic product (GDP) every year for the foreseeable future. If a wider range of risks and impacts is considered, this amount rises to 20% of GDP per year.

ADF countries contribute little but are highly vulnerable. ADF countries contribute the least to climate change but they are the most vulnerable. The per capita emission of energy-related carbon dioxide emissions (CO₂) in ADF countries is only 0.4 tons of CO₂ per year (Bangladesh, Cambodia, Kyrgyz Republic, Mongolia, Nepal, Pakistan, Sri Lanka, Tajikistan, Viet Nam) and their share is only 1% of global emissions. Because large sections of the population of many ADF countries live in coastal areas and have low income levels, they have a limited ability to cope with extreme weather events and there is a risk that development gains get easily wiped out.

ADF countries need action on mitigation and adaptation. Now is the time for implementing measures to ensure that ongoing efforts in the Asia and Pacific region are not undermined by climate change. Technical solutions and economic instruments need to be improved and replicated in order for climate change mitigation and adaptation measures to have any meaningful effect on the region. For example, opportunities to reduce GHG emissions should be considered in all investment decisions in the high energy consuming countries, land management improvement to conserve carbon sinks, and market forces need to be harnessed to internalize the future costs of climate change in the ADF countries.

Resources are inadequate to adapt to climate change. An immediate investment of 1% of annual GDP in mitigation could avoid the worst impacts of climate change. Unfortunately, the current trends of support are not encouraging. It is likely that the impacts of climate change will get much worse—perhaps for decades—before they get better.

The Asian Development Bank (ADB) is well placed to support ADF countries on mitigation and adaptation. ADB brings to the table (i) its close working relationships with DMC ministries of finance and planning, where public investment decisions take place, (ii) extensive experience in the energy and transport sectors, where policy and operational changes need to occur; (iii) diverse experience in project financing that is needed to assist DMCs in accessing global funding; and (iv) productive relationships with leading institutions in the climate change arena; and (v) strategic-level commitment in supporting ADF-country climate change activities. ADB's engagement in the energy, transport, water, and urban sectors provide good opportunities to influence climate-friendly development patterns in its member countries. ADB has been working with DMCs to fill gaps in financing, knowledge, and capacities on climate change mitigation and adaptation. Given the enormous needs of the Asia Pacific region, ADB will mobilize significant additional resources to support this effort.

ADB operations during ADF X will respond to investments needed to help countries follow a climate-friendly path. (i) Mitigation responses are in progress. During the period 2008–2010, ADB expects to make mitigation investments for the promotion of clean energy in excess of \$200 million, based on projects already being planned, and continued demand growth. In addition, cofinancing of mitigation activities will be made available through ADB's access to the

Global Environment Facility (GEF). (ii) Adaptation responses are emerging. Based on National Adaptation Programmes of Action (NAPAs) prepared by least-developed countries, ADB estimates ADF country adaptation requirements will exceed \$1.5 billion for the ADF X period. This will mark the first ADF period where significant levels of investment will be in demand for adaptation. Depending on resources available, ADB is ready to expand its adaptation program from technical assistance to investment in order to support ADF country needs.

Global and Regional Efforts are Important. Climate change is a global challenge that requires a worldwide and concerted response. ADB is working with both developed and developing countries, as well as leading knowledge institutions, to help meet the challenges presented by climate change.

I. INTRODUCTION

1. This background paper describes Asian Development Bank's (ADB's) Approach to Climate Change in Asian Development Fund (ADF) countries. Recently published reports and empirical evidence clearly indicate that there is a high risk to development from the climate change. The impact of traditional interventions designed to reduce poverty could be undermined because of climate change. As a consequence of climate change, ADF countries are now exposed to new risks that need to be addressed urgently.

2. The background paper draws extensively information, analyses and recommendations included in several major reports. The foremost is the report circulated by the World Bank to donors, *IDA and Climate Change: Making Climate Action Work for Development* (October 2007). ADB fully supports the view that a separate adaptation fund would not be necessary and climate change is best addressed by mainstreaming it into developmental plans. The information about climate change is taken from the 2007 Fourth Assessment Reports by the various Working Groups of the Intergovernmental Panel on Climate Change; the economic impacts are from the Stern Review on the Economics of Climate Change (November 2006); and several National Adaptation Program of Action (NAPA) reports prepared under the joint responsibility of United Nations Development Program (UNDP), Global Environment Facility (GEF) and host ADF governments. These sources provide adequate background information for determining ADB's broad approach as presented in this background paper. This will be incorporated into individual country partnership strategies based on country-specific resource and risk assessments, and eventually translated into suitable interventions to address climate change impacts in ADF countries.

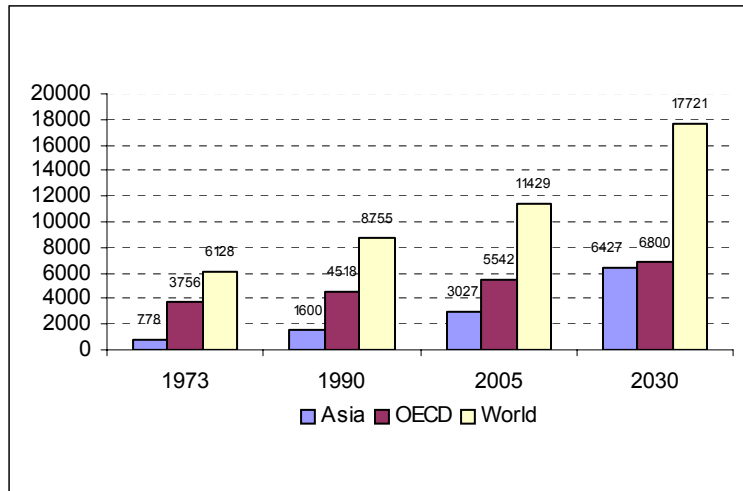
3. The background paper has six sections including this introduction. The second provides the nexus between energy and climate change; the third and fourth sections summarize the scientific findings and economics of climate change; sections four describes some key tasks that ADB has completed and ongoing and proposed activities to be completed during the ADF X period. The final section concludes with the salient features of ADB's proposed approach to addressing climate change impacts in ADF countries.

II. ENERGY AND CLIMATE CHANGE

4. The growth trajectory that the Asia and the Pacific region has been on for the last several decades is truly remarkable. This rapid growth has brought tremendous benefits to its people, not the least of which is a significant reduction in poverty. Despite this, more than 600 million people still live on \$1 a day or less, and so there is a clear need to sustain the high rates of economic growth and to make it increasingly inclusive.

5. To fuel the high growth, Asia and the Pacific's energy consumption has risen steadily. Between 1973 and 2005, it soared by 289%, compared with an average worldwide increase of 87% (Figure 1). The need to further reduce poverty and meet the Millennium Development Goals means that the region's energy consumption will continue to rise. According to the recently released World Energy Outlook 2007 (WEO 2007) by the International Energy Agency (IEA), Asia and the Pacific's energy demand will double by 2030. By then, it will make up 36% of global energy demand compared to 27% at present.

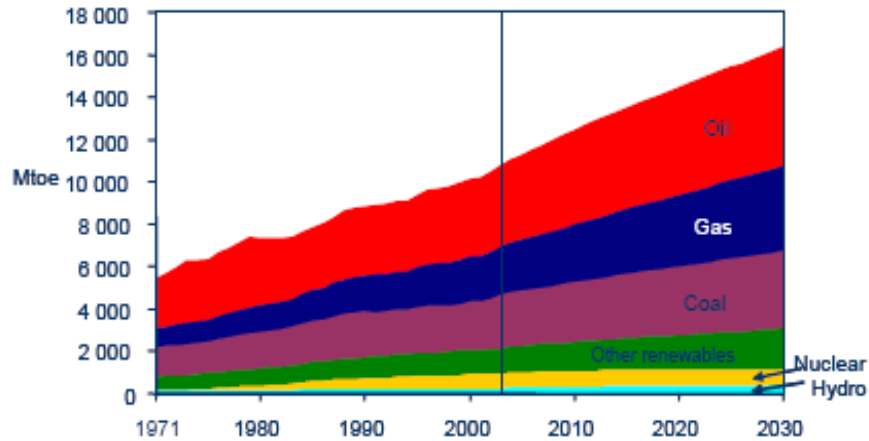
**Figure 1. Primary Energy Demand
(million tons of oil equivalent)**



Source: ADB, based on data from the International Energy Agency. Key World Energy Statistics 2007 and World Energy Outlook 2007.

6. Fossil fuel-dominated energy supply has put a serious strain on the environment (Figure 2). With coal and oil meeting the bulk (71%) of its energy demand, Asia now accounts for 29% of the world's energy-related carbon dioxide (CO₂) emissions, more than three times its share 30 years ago. Based on WEO 2007, this figure would reach 42% by 2030 under a business-as-usual scenario. Part of it would be on account of the geographical shift in manufacturing and increased global trade.

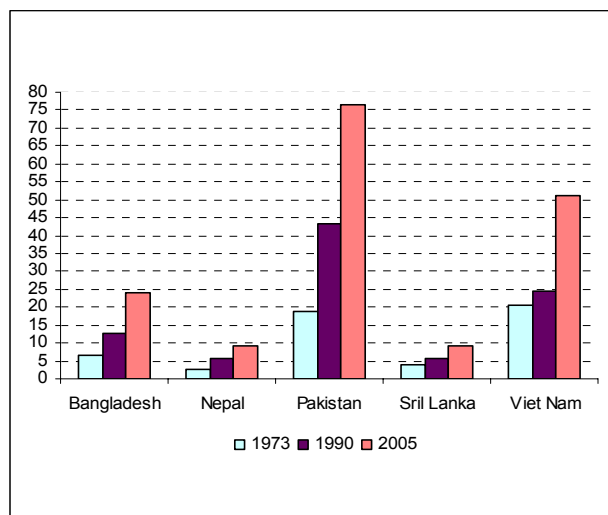
Figure 2.
World Primary Energy Demand



Source: International Energy Agency. World Energy Outlook.

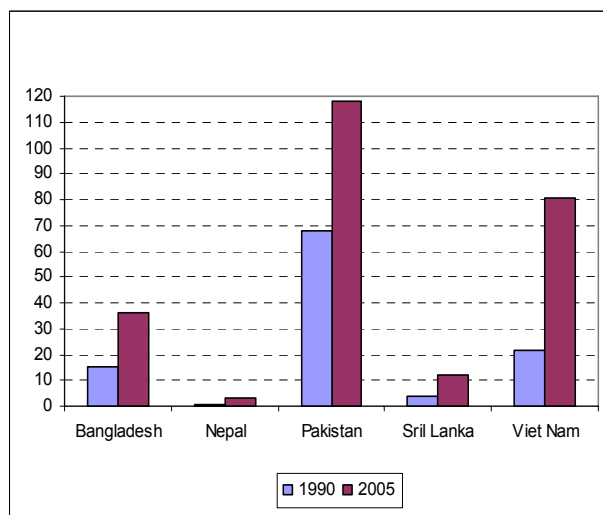
7. In many ADF eligible countries, energy consumption and CO₂ emissions have likewise gone up significantly to support higher gross domestic product (GDP) growth. In Bangladesh, Nepal, Pakistan, and Viet Nam, for example, energy use quadrupled in the last 30 years (Figure 3), with CO₂ emissions rising two to three times from 1990 levels (Figure 4).

Figure 3. Primary Energy Demand in ADF Countries
(million tons of oil equivalent)



Source: International Energy Agency, Key World Energy Statistics 2007 and Energy Statistics of Non-OECD Countries 2004-2005.

Figure 4. Energy-Related CO₂ Emissions in ADF Countries
(tons of CO₂)



Source: WDI Online and International Energy Agency, Key World Energy Statistics 2007.

8. The per capita energy consumption and emission levels in ADF countries (Table 1), however, remain significantly below regional and world averages except for Mongolia, which has small population but large heating requirements. Combustible renewable energy and waste (e.g., biomass, fuel wood, dung, municipal and industrial wastes) meet the bulk of energy needs in countries such as Cambodia, Lao People's Democratic Republic (Lao PDR), Nepal, Sri Lanka, and Viet Nam. Fuel wood collection often threatens forests, which are the global carbon sinks and are essential to control the level of CO₂ concentration in the atmosphere. Though carbon neutral, such extensive use of polluting traditional biomass poses serious health hazards—especially to women and children. Increasingly longer time spent for collecting fuel reduces opportunities for productive economic activities. Expanding access to modern and more efficient forms of energy is a major challenge as electrification rates remain low in many countries including Afghanistan (7%), Bangladesh (32%), Cambodia (20%), Lao PDR (45%), Mongolia (64%), Nepal (33%), and Pakistan (54%).

Table 1. Per Capita Energy Consumption and Energy-Related CO₂ Emissions

Country/Region	Per Capita, 2005	
	Energy Consumption tons of oil equivalent	Energy-Related CO ₂ Emissions tons of CO ₂
World	1.78	4.22
OECD	4.73	11.02
Asia	0.89	2.27
Asia excluding China	0.62	1.25
China, People's Republic	1.32	3.88
India	0.49	1.05
Indonesia	0.81	1.55
Bangladesh	0.17	0.26
Cambodia	0.35	0.27
Kyrgyzstan	0.54	1.06
Mongolia	0.92	3.44
Nepal	0.34	0.11
Pakistan	0.49	0.76
Sril Lanka	0.48	0.63
Tajikistan	0.53	0.87
Viet Nam	0.62	0.97

Source: International Energy Agency. Key World Energy Statistics 2007.

III. IMPACTS OF CLIMATE CHANGE IN ASIA AND THE PACIFIC

9. Climate change presents a real threat to the prosperity of ADB's developing member countries (DMCs). Based on recent reports of the Intergovernmental Panel on Climate Change (IPCC),¹ there is now a global scientific consensus that concentrations of carbon dioxide and other greenhouse gases (GHG) in the atmosphere have already contributed to at least a 0.50° Celsius (C) increase in average global temperatures over the past 100 years. It predicts that global mean temperatures could increase by a further 1.8–4.0° C by the end of this century, depending on the rise in atmospheric concentrations of GHGs. Any increase that results in more than a 2° C rise in average global temperature over pre-industrial levels is predicted to have a devastating impact on people's lives, economic infrastructure, and natural environments in Asia and the Pacific region, and around the world.

10. Climate change is predicted by the scientific community to lead to a range of impacts including rising average temperatures and an increase in the frequency and intensity of extreme weather events. Another early and clear sign of global warming is the accelerated melting of glaciers around the world, which already has led to increased flows in rivers with their headwaters in the Himalayas. This will be followed by sharply decreased flows as glaciers retreat further. Risks of climate change to the sustainability of economic progress affect all DMCs, but certain areas, particularly the poorer countries are predicted to feel the greatest impacts. Arid and semi-arid lands of the Himalaya, Central Asia, and southern India should see much greater rainfall variability, raising concerns about agricultural production and food security. The greater frequency of extreme weather events puts all of the great river basins of the region at increased risk from flooding. Many coastal cities, especially those located at river deltas, will face multiple risks from storm surge, river flooding, sea-level rise, and typhoon damage. Southeast Asia (Bangladesh and Viet Nam), the low-lying islands of the Pacific (Table 2), and the Indian Ocean face similar compound risks, often exacerbated by their isolation and weak infrastructure. There would be a

¹ Intergovernmental Panel on Climate Change (IPCC), 2007. *IPCC Fourth Assessment Report: Summary for Policy Makers of Working Group I Report – The Physical Science Basis*, Inter-governmental Panel on Climate Change, Bonn.

rise in endemic morbidity and mortality due to diarrheal disease primarily associated with floods and droughts in South and Southeast Asia. Increases in coastal water temperature would exacerbate the abundance and/or toxicity of cholera in South Asia. Natural habitats of vector-borne and water-borne diseases in north Asia are likely to expand in the future.

Table 2. Recent Trends in Sea Level Rise Recorded at Various ADF Pacific Island Countries

Nation	Year of Gauge Installation	Trend (mm/year)
Cook Islands	1993	+2.5
Fiji	1992	+2.5
Federated States of Micronesia	2001	+21.4
Kiribati	1992	+5.7
Marshall Islands	1993	+5.2
Nauru	1993	+7.1
Papua New Guinea	1994	+8.1
Samoa	1993	+6.9
Solomon Islands	1994	+6.8
Tonga	1993	+8.0
Tuvalu	1993	+6.4
Vanuatu	1993	+3.1

Source: Australian Bureau of Meteorology, 2006

11. There are several known feedback loops where warming begets itself. For example, ice acts like a mirror, reflecting nearly 90% of the sunlight striking it back into space. Ocean water absorbs 90% of it as heat. As the water heats up, each new kilometer of Arctic ice melts faster than the one before it. Such loops will accelerate the rise in sea level and glacier retreat. Ongoing meteorological studies will provide estimates but it is quite likely that event could be fairly rapid and action has to be taken urgently.

12. Given all the adverse impacts of climate change, there will be increasing needs for defensive or adaptive investments to avoid such negative consequences especially in poor countries which are deemed to be the most vulnerable. For example, the design of hydropower, water supply systems, roads, bridges, schools, ports development projects may need significant adjustments to deal with greater precipitation variability or more frequent severe storms. Transmission towers should be made to withstand higher wind speeds. The agriculture sector must consider the greater variability of water supply and flooding, and increased demands for drought and flood resistant crops, irrigation innovations and other technological and management measures. Coastal cities, flood prone areas and low-lying infrastructure will need to be climate proofed. Disaster risk reduction and safety nets have to be developed.

13. On the mitigation front (reduction of GHG emissions), substantial changes will be needed in both production and consumption patterns, affecting especially the energy, transport and natural resources sectors.² Power generation from hydrocarbons – coal, oil and gas – will continue in the short run, though it must be done in as clean and efficient a manner as possible. Energy efficiency levels must improve dramatically to reduce electricity demand fueled by the burning of hydrocarbons. Development of renewable energy and other low or zero-carbon energy sources must accelerate rapidly. Transportation patterns must adjust, with motorized vehicles becoming far more energy efficient, and lower-carbon alternatives – such as public transport

² Appendix 1 summarizes implications by sector of climate change considerations.

systems, bikeways and walkway – made readily available. Deforestation must be curbed and carbon-absorbing land-use practices encouraged. Market forces must drive the development of new technologies and management practices, and public policy must create the conditions that will lead to this innovation and behavioral change.

IV. THE ECONOMICS OF CLIMATE CHANGE

14. The costs of climate change are expected to be enormous. The Stern Review³ estimates that the cost of stabilizing emissions due to 2° C rise in average global temperature is 1% of global GDP. If we do not act, the overall costs attributed to climate change will be equivalent to losing 5% of global GDP every year for the foreseeable future. If a wider range of risks and impacts is considered, this amount could rise to 20% of GDP per year. In Southeast Asia, for example, the cost of climate change could reach as high as a 9–13% loss in GDP by 2100.

15. Economic losses are not only barriers to future growth in the Asia and Pacific region; they are also risks that can undermine recent regional poverty reduction accomplishments. ADF countries are particularly vulnerable, considering that the poorest people in the poorest countries are expected to suffer first and most seriously from the negative impacts of climate change. Poor people are already the most vulnerable to economic disruptions caused by natural disasters, and they are least able to cope with new risks. For example, urban populations—especially in coastal areas—are at increased risk from simultaneous heat waves, storm damage, sea-level rise, etc. And rural populations are at risk to natural resource and agricultural productivity decline from higher rainfall variability and floods. Shifts in crop patterns will severely affect marginal farmers. Frequent epidemics caused by disease vectors could wipe out household savings and make many more people in destitute or take them below the poverty line. Delays or uncertainties in availability of resources at the national level to face disasters, crop failures and epidemics will expose the poor in ADF countries to life-threatening conditions.

16. The prospects are least encouraging. According to WEO 2007, emissions will need to peak by 2020 at the latest and fall between 30% to 60% of 2000 levels by 2050⁴. This is a daunting challenge considering that the WEO 2007 also projects the world primary energy demand to grow by more than half between 2005 and 2030, and 74% of the increase to come from developing countries. Unfortunately, the 1% investment of GDP per year in mitigation measures is not being made by donors and governments in the Asia and Pacific region. If this remains unchanged, it is likely that the impacts of climate change will get much worse—perhaps for decades—before they get better. During these decades, Asia's economies and population will continue to grow, making the transition to low-carbon societies even more difficult; there will be sharp increases in power production based on the use of dirty, GHG emitting fossil fuels. In addition, fossil fuel consumption in the transport sector is likely to rise in every DMC, exacerbating greenhouse gas emissions. Additional climate change implications by sector are summarized in Appendix 1.

17. Countries in the Asia and Pacific region are working to understand the specific climate change threats they face—developing strategies and programs for both their climate change mitigation efforts (improving land management and reducing greenhouse gas emissions, and thus contributing to the global solution), and adaptation measures (preparing and implementing NAPAs. There will be some improvements from these efforts, but these could be smaller in comparison to rapidly rising energy demands and climate risks.

³ UK Government, 2006. *Stern Review: Report on the Economics of Climate Change*, Treasury Office of the Government of the United Kingdom and Northern Ireland: London.

⁴ International Energy Agency, 2007, *The World Energy Outlook 2007*.

V. ADB'S ROLE IN CLIMATE CHANGE

A. ADB and Climate Change—A Brief History

18. ADB has been promoting improved awareness about climate change and how it affects both the region's development and needed responses for nearly two decades (Appendix 2). ADB began helping DMCs assess climate change risks and evaluate potential responses with the Asia Least-cost Greenhouse Gas Abatement Study (ALGAS), starting 1994. It produced seminal findings for 11 DMCs on their mitigation options, including the ADF countries of Bangladesh, Indonesia, Mongolia, Pakistan, and Viet Nam.⁵ Results are described in Box 1.

Box 1: ALGAS: Catalyzing Results and Building Capacity

The ALGAS Project formulated a strategy designed to assist countries to meet their commitments under the United Nations Framework Convention on Climate Change (UNFCCC), produced the first authoritative inventory of GHG sources and sinks of the participating countries in terms of the IPCC 1993 methodology, and prepared a portfolio of GHG abatement projects and national plans embodying country development objectives.

ALGAS was conducted at a time when DMCs had modest capacity for climate change: national focal points had often not yet been assigned, awareness was low, and climate change policies were lacking. Given this context a key aim ALGAS was to create capacity within each country to analyze and address challenges of sustainable development that arise from GHGs. As the participating countries account for more than half of the world's population, this contribution was considered both timely and relevant to global GHG abatement in the 1990s.

19. Following the agreement on the Kyoto Protocol in 1997, ADB, in 2000, undertook a capacity building program for Implementation of the Kyoto Protocol and the Clean Development Mechanism (CDM)⁶ in 16 DMCs which include the following ADF countries: Bangladesh, Bhutan, Cambodia, Mongolia, Myanmar, Nepal, Pakistan, Sri Lanka and Viet Nam. This also enabled more meaningful participation by these countries in international negotiations.

20. The capacity building continued with a shift in focus towards project-specific requirements and preparation of project concepts for funding through commercial, multilateral, and bilateral sources including specialized mechanisms such as the GEF and CDM. This was undertaken largely through the Renewable Energy, Energy Efficiency, and Climate Change (REACH) Program launched in early 2002. REACH is the umbrella program covering four bilateral energy and environment targeted trust funds supported by the governments of Canada, Denmark, Finland, and the Netherlands.

21. One of REACH-assisted programs was the Promotion of Renewable Energy, Energy Efficiency, and Greenhouse Gas Abatement (PREGA).⁷ Building on the findings of ALGAS, PREGA supported the preparation of 100 country and technical studies and specific technology applications in 18 DMCs potentially eligible for financing through the Kyoto Protocol's CDM. It included Azerbaijan, Bangladesh the Kyrgyz Republic, Lao PDR, Mongolia, Nepal, Pakistan,

⁵ TA 5592-REG: Asia Least-cost Greenhouse Gas Abatement Study, approved on 4 August 1994.

⁶ TA5861-REG: Capacity Building for the Implementation of the Kyoto Protocol and the Clean Development Mechanism, approved on 1 September 1999.

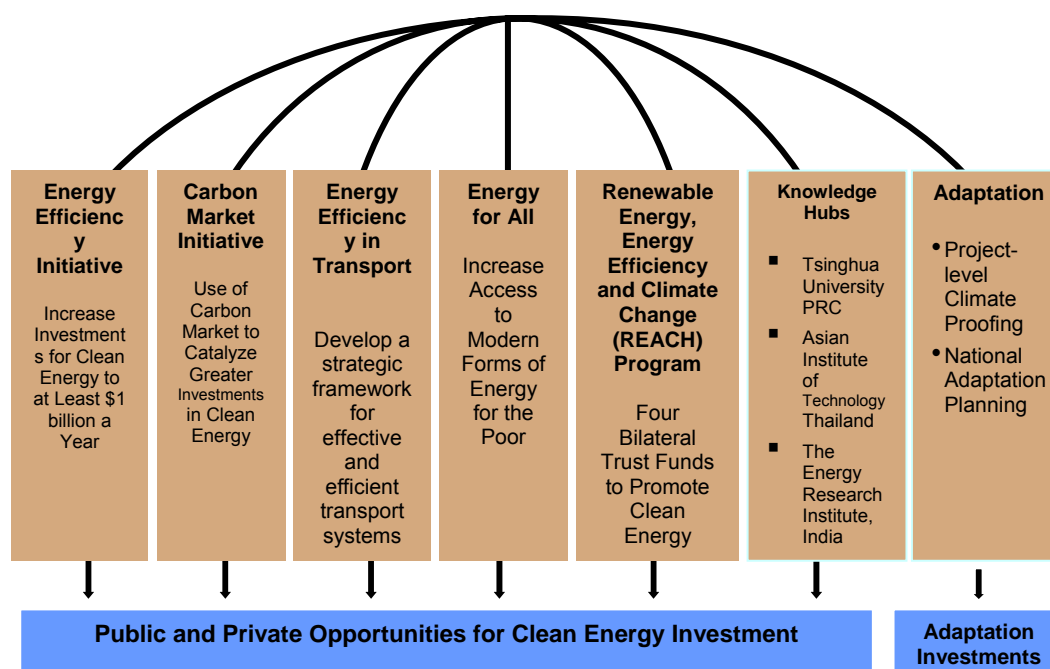
⁷ TA 5972-REG: Promotion of Renewable Energy, Energy Efficiency and Greenhouse Gas Abatement, approved on 4 January 2001.

Samoa, Sri Lanka, Tajikistan, and Viet Nam. For example, a project identified under PREGA—the improved efficiency and reduced pollution urban center heat-only boilers in Mongolia—is being implemented and will serve as a model for replication elsewhere. REACH’s support widened further to include climate change adaptation, beginning with risk assessment efforts in the Pacific region through the Canadian-financed Climate Change Adaptation Program for the Pacific.⁸ During the period 2005–2007, ADB provided \$126 million in financing for clean energy components of projects, and a further \$146 million for CDM-eligible projects in ADF countries (Appendix 3).

B. ADB’s Climate Change Program

22. ADB’s current efforts on climate change are largely encompassed by its Clean Energy and Environment Program (CE&EP) (Figure 5). It draws from ADB’s comparative strengths. These include (i) close working relationships with DMC ministries of finance and planning, where public investment decisions are made; (ii) extensive experience in the energy and transport sectors, where policy and operational changes need to occur; (iii) diverse experience in project financing that is needed to access global funding; and (iv) productive relationships with leading institutions in the climate change arena (including the UNFCCC, IPCC, United Nations Environment Programme (UNEP), IEA, and the GEF), necessary to ensure that the science and knowledge regarding climate change causes, consequences, and responses is applied to investment planning.

Figure 5. ADB’s Clean Energy and Environment Program



23. CE&EP supports the Clean Energy Investment Framework (CEIF) of multilateral development banks (MDBs) and its three pillars that promote (i) transition to a low carbon economy, (ii) access to clean energy services, and (iii) adaptation to climate change. The program is summarized below into two subgroups of activities: (i) mitigation efforts (reducing the sources of greenhouse gases or enhancing their sinks); and (ii) adaptation responses (adjusting natural or human systems to climate change).

⁸ TA 6064-REG: Climate Change Adaptation Program for the Pacific, approved on 8 November 2002.

1. Mitigation Efforts

24. Developing countries are the world's fastest-growing source of new emissions. Given this context, DMCs will be required to avoid the pitfalls of the industrialized countries and play an active role in helping curb future global GHG emissions. For this reason, ADB is assisting its DMCs with mitigation support.

25. As emissions have increased, so have mitigation responses and the amount of capital to support those responses. For example, more than \$20 billion has become available through the CDM and other resources, which is mostly helping the middle income and transition countries. The ability of ADF countries to access these resources has been very limited; as of October 2007, only 19 (2%) out of a total of 818 projects proposed in Group A and Group B1 ADF countries had been registered. There is a tremendous opportunity for ADB to help ADF countries access CDM resources to enhance their capacity to implement a greater number of greenhouse gas mitigation activities and further their broader development goals. ADB's key initiatives to provide mitigation assistance are presented below.

(i) **Energy Efficiency Initiative (EEI).** EEI designs and implements innovative financing mechanisms for clean energy investments, with an annual target of at least \$1 billion by 2008. The expansion focuses on both demand-side and supply-side efficiency, including renewable energy. Based on a 6-year implementation framework (2005–2010), country-level strategies are now under development to catalyze and identify clean energy investments in DMC markets. For example, ADB is assisting Pakistan in formulating an energy efficiency plan that will integrate multisectoral efforts in scaling up the deployment of energy efficiency technologies during the next 6 years. ADB will also assist Viet Nam in drafting an Energy Efficiency and Conservation Law, which is expected to attract greater energy efficiency investments from both the public and private sectors. In both of these ADF countries, ADB will be working with the respective governments and private sectors to develop clean energy projects aimed at achieving established medium- and long-term conservation targets. See Box 2 for a profile of an ADB-assisted renewable project in Pakistan.

Helping to fund EEI is the Clean Energy Financing Partnership Facility (CEFPF), comprised of pooled funds from many sources. Its goal is to raise \$250 million for clean energy efforts to finance (i) smaller energy efficiency investments, (ii) technology costs, and (iii) grant assistance for activities, such as advocacy, institutional capacity-building, project preparation, and establishment of ADB's monitoring and evaluation mechanisms (See Appendix 3 for the CEFPF description and structure).

Box 2: Expanding Rural Power Supplies With Hydroelectric Power (Pakistan)

In 2006, ADB approved a \$510 million multitranche loan for the development of renewable energy for Pakistan. The program will expand Pakistan's power supply, especially in rural areas, to serve about 600,000 new domestic connections for 4.8 million people in two projects. It will also improve reliability and supply quality.

This project includes five small grid-connected run-of-river hydroelectric power plants in Punjab with a combined installed capacity of 24.8 megawatts (MW). A second project, in Northwest Frontier Province, involves three grid-connected run-of-river hydroelectric power plants with a combined installed capacity of 51 MW.

Together, these hydropower CDM projects will generate annual carbon credits of around 150,000 tons CO₂ equivalent, and preparations are underway for host country approval and validation. ADB's Carbon Market Initiative (CMI) is considering providing project cofinancing.

(ii) **Carbon Market Initiative (CMI).** CMI provides advance financing for purchase of certified emission reduction from CDM projects supported by ADB. Unlike most other funds in the CDM market, CMI is particularly helpful to the smaller CDM-eligible projects in reaping benefits from the Kyoto Protocol's market-based mechanisms to develop clean energy projects. The technical support facility component of the CMI was established to build the capacity of the DMCs for more effectively using the CDM process. Spain, Switzerland, Luxembourg, Sweden, Finland, Portugal, and Belgium have contributed a total of \$151 million to the Asia Pacific Carbon Fund under CMI.

(iii) **Sustainable Transport Initiative (STI).** STI provides efficient and cleaner transport systems in the region. The initiative gives advice and financing for public transport innovations, cleaner technologies, and new mobility patterns to reduce GHG emissions and other vehicular pollution. In 2006, ADB published the first major assessment of transport sectors contributions to climate change—*Energy Efficiency and Climate Change Considerations for On-road Transport in Asia*⁹—to identify priorities of action, namely (a) integrated management for travel demand, (b) improved uptake of new vehicle technologies, (c) fuel quality standards and increased use of alternative fuels, and (d) promotion of efficient transport systems. Case studies on sustainable transport options have already been carried out in five cities of which three are in ADF countries (Colombo, Sri Lanka; Kathmandu, Nepal; and Dhaka, Bangladesh (See Box 3), together with support for development of efficient transport systems in Karachi and Lahore in Pakistan, Ho Chi Minh City and Hanoi in Viet Nam.

**Box 3: Pilot Urban Transport Projects
(Dhaka, Colombo, and Kathmandu)**

Under the case studies, the concept of the investment projects are refined so as to strengthen their contribution to the efficient movement of people and goods, thereby supporting the sustainability of urban transport in the respective cities. The Dhaka study stressed the need to (i) to urgently restrain the increasing demand for private cars; (ii) develop a mass transit network and effectively integrate land use and transport planning, traffic management and enforcement of complimentary measures; and (iii) strengthen the institutional capacity of city planners to implement the strategic transport plan. The Colombo study addressed: weak coordination among transport planners and implementors, insufficient and inadequate traffic control devices, pedestrian environment, adulterated fuel, and pollution from three-wheeled vehicles. The Kathmandu study provided a roadmap for Kathmandu's urban transport and included investment proposals that address the need for better traffic flow and safety, reduced congestion, pedestrian facilities, and crossings, and energy efficient and effective public transport services.

⁹ ADB and Department for International Development of the United Kingdom (DFID). 2006. *Energy Efficiency and Climate Change Considerations for On-road Transport in Asia*. Manila.

(iv) **Energy for All.** The Initiative will develop modalities, financial instruments, and mechanisms needed to catalyze and mobilize financial and private-sector entities for expanded energy access. The objective is to increase access to clean and affordable energy for people (particularly poor people) throughout the Asia and Pacific region where about 1.8 billion people still rely on traditional biomass sources (such as fuel wood, charcoal and dung) and kerosene for basic energy needs. Such causes indoor pollution and at the same time increases the risk of further degradation of forests that are the sinks of the principal GHG. A regional technical assistance project on Energy for All is expected to be approved in early 2008 to develop new approaches and methodologies for promoting access of the poor to reliable and affordable modern energy services, and then to scale up to levels that can be supported by concessional funds. An example of such projects is presented in Box 4.

**Box 4: Sustainable Rural Electrification
(Bhutan)**

In November 1999, ADB provided a loan (1) to Bhutan to provide access to electricity and to improve the standard of living and quality of life of people living in rural areas of Bhutan. Although Bhutan had substantial clean and renewable hydropower generation capacity, distribution of electricity throughout the country was limited, with approximately 80% of the population lacking access to electricity when the Project was formulated in 1999. The overarching objective of the Project was to alleviate poverty by promoting local economic development in rural districts through provision of an electricity supply. The Project intends to to: (i) extend the existing electricity distribution networks to connect approximately 6,010 new consumers in 15 of Bhutan's 20 districts; and (ii) provide photovoltaic lighting systems in community facilities such as schools, hospitals and monasteries located in areas where grid access was impractical.

(v) **Knowledge Hubs.** Knowledge hubs give ADB and DMCs access to up-to-date information on best practices in all aspects of clean energy and climate change adaptation. ADB established regional knowledge hubs to act as think tanks for ADB and its DMCs on clean energy. The knowledge hubs will support and strengthen Asia and the Pacific's capacity to generate innovative concepts, science, technology, and management development on clean energy. Three knowledge hubs have already been established: (i) The Energy Research Institute (TERI) in New Delhi, India for Clean Energy, (ii) Tsinghua University in Beijing, PRC for Climate Change, and (iii) Asian Institute of Technology in Bangkok, Thailand for 3Rs, namely reduce, reuse and recycle. The knowledge hubs will play a critical role in transferring knowledge to the ADF countries.

(vi) **Regional Cooperation.** ADB actively supports regional cooperation and integration to allow more efficient and effective use of resources and management of common transboundary problems. In the case of energy, ADB is promoting regional power trade and collective action to address environment sustainability in the Greater Mekong Subregion (GMS) which has three ADF countries—Cambodia, Lao PDR, and Viet Nam. Boxes 5 and 6 present examples of projects that foster cooperation.

**Box 5: Reforestation And Afforestation
(Greater Mekong Subregion)**

Since 1992, the Greater Mekong Subregion (GMS) countries have embarked on the Economic Cooperation Program to promote economic linkage. Cooperation on environmental issues is an important part of this program. Current CO₂ emissions in the GMS North South and East West Economic Corridors¹ are estimated at 5 million tons per annum with an estimated growth rate of 5% per annum. ADB is exploring possibilities of sequestering carbon emissions in the economic corridors through reforestation and afforestation linked poverty reduction and rural development in the subregion. Forests for our Livelihood Improvement Project in Viet Nam support an investment of over \$90 million to prevent forest loss and degradation of more than three million hectares of forest.

**Box 6: Meeting Power Demand With Renewable Energy
(Bhutan and India)**

Bhutan has vast potential for hydroelectric power generation from Himalayan water streams. India has a power grid which is heavily dominated by fossil fuel based power. A 114-MW run-of-river Dagachhu hydroelectric power plant, now being considered for ADB financing, would generate 500 gigawatt hour (GWh) to be wheeled to the northern region of India. The Project will provide India with assured, clean power and will help generate employment and regional development for Bhutan. The Project will reduce GHG emissions of around 525,000 tCO₂e annually.

(vii) **Private Sector Development** From 2004 to 2007, ADB supported 16 clean energy projects of the private sector amounting to \$1.2 billion. These include energy efficiency, hydropower, wind, and other renewable energy generation. Such projects accelerate the deployment of new cleaner technologies, thereby creating economies of scale and a lowering of costs of technology for all countries, including the ADF countries. ADB also seeks to significantly increase its investments in the clean energy sector in Asia through specialized private equity funds (Box 7).

Box 7: Asian Private Clean Energy Development Funds

Private equity can be a critical and complementary type of financing instrument for renewable energy and energy efficiency companies and projects, especially those of small and medium size in Asia. But too often private equity is lacking due to perceived investment risks. To address this, ADB recently invited proposals from qualified private sector fund managers to invest in private companies and projects that are active in any aspect of GHG mitigation. ADB will consider providing up to \$100 million in limited partner interests or equivalent, which financing will represent up to 25 percent of the total capitalization of a given fund. The balance of each selected fund's capital would then be raised from other sponsors and private sector investors.

2. Adaptation Responses

26. There are enormous needs related to adaptation measures. If all 28 ADF countries implemented NAPAs (or their equivalent), their resource needs are expected to be over \$1.5 billion during the ADF X period.¹⁰ Given ADB's areas of comparative strengths as noted in para. 22, ADB's adaptation program has the ability to program significant resources in the three areas.

(i) **Project-level climate proofing.** Using existing infrastructure and future designs, the aim is to ensure that physical and hydrological assumptions take account of predicted changes in precipitation patterns, the severity and frequency of storms, accelerated glacial melting, sea-level rise, and other impacts. For example, from 2003 to 2005, ADB provided regional technical assistance to ADF south Pacific countries (Box 8), and the Water for All Program is providing grants to revise the hydrological assumptions used in the design and implementation of water projects across the region.

Box 8: Climate-Proofing a Road Project in the Federated States of Micronesia

The infrastructure development plan for Kosrae includes a 16 kilometer road. The drainage works for the original road design were based on a maximum hourly rainfall of 178 millimeters (mm), with a return period of 25 years. By 2050, however, ADB found that hourly rainfall with a 25-year return period will have increased to 254 mm as a consequence of climate change. ADB recommended to the Kosrae state government modification of the road design for the drainage works to accommodate the higher maximum rainfall. Benefit-cost analysis showed the incremental cost of climate proofing the road design and constructing its unbuilt section to be about \$500,000, with an internal rate of return of 11%. The analysis also revealed that while the capital cost of the climate-proofed road would be higher than if the road was constructed based on the original design, the accumulated costs would be lower after only about 15 years.

(ii) **National adaptation planning.** The aim is to prioritize and implement adaptation investments. Only about half of the ADF countries are preparing NAPAs. As knowledge improves, more climate change-related activities will get included in the NAPAs. There is a substantial need to finance the preparation of additional adaptation studies for the remaining ADF countries, and, following these, implement cost-effective measures to improve the resilience of infrastructure and vulnerable populations to adverse impacts. Some work has started in this area already. For example, as part of the joint ADB, World Bank, and Japan Bank for International Cooperation Coastal Mega-Cities Initiative (2007–2010), ADB is proposing grants to two of the six participating coastal ADF-country megacities (Karachi, Pakistan; and Ho Chi Minh City, Viet Nam) to better understand future climate conditions within the city areas and assist local government to adapt their investment plans to those future conditions. Furthermore, as an active partner with the GEF, ADB will contribute to implementation of projects in ADF countries that are identified in the NAPAs through the Least Developed Countries Fund. Another example is presented in Box 9.

¹⁰ Estimated by extrapolating from NAPAs completed to date. NAPAs do not have time frames but are designed to address "urgent and immediate needs with regard to adaptation to climate change." Available: <http://unfccc.int/adaptation/napas/items/2679.php>.

**Box 9: Promoting Climate Change Adaptation in Asia and the Pacific
Co-financed by Governments of United Kingdom and Japan Special Fund**

This \$3.6 million technical assistance is helping address (i) the need to mainstream adaptation issues into investment planning, (ii) the need to develop a national capacity for adaptation, and (iii) the need to coordinate and strengthen international community responses for adaptation. A feature of this TA are small grants which will be awarded to DMCs, NGOs, or private sector to pilot-test, demonstrate, or further develop cost-effective adaptation measures in Asia and the Pacific.

(iii) **Specific adaptation investments.** The aim is to reduce the risks from increased flooding, storm surge, drought, wind damage, heat waves, dust storms, and other anticipated impacts of climate change. For example, the ADB-led Central Asia Countries Initiative for Land Management (CALCILM) 2006–2016¹¹ (Box 10) is helping Central Asian ADF countries adapt to future climatic conditions (including warmer temperatures, increased winter precipitation, increased summer drought, and eventual loss of glacial melt) through development of climatic adaptations (such as drought resistant crops, improved irrigation efficiency, better water resource management, rehabilitation of degraded forests and pasturelands, and watershed protection).

Box 10: Central Asian Countries Initiative for Land Management (CALCILM)

CACILM is a multi-country and multi-donor partnership to support the development and implementation of national level programmatic frameworks for a comprehensive and integrated approach to sustainable land management in Central Asia. It aims to combat land degradation and improve rural livelihoods in Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. With the implementation of sustainable forestry and agriculture, CACILM addresses climate change and global environmental issues through the reversal in the loss of carbon stocks sequestered in soils and forests resulting to reduction in greenhouse gas emissions. Monitoring and evaluation of CACILM projects utilizes carbon stock indicator to determine sustainable land management impacts on climate change.

3. ADB's Future Program and Strategic-Level Integration of Climate Change

27. ADB's climate change program is expanding to meet to the rapidly evolving needs of ADF countries. Our first wave of mitigation activities have already been launched. During the period 2008–2010 ADB has planned clean energy investments in ADF countries in excess of \$200 million through its formal country programs. The level of mitigation investment pipeline for the 2011 – 2012 period is expected to further increase as the demand for clean energy will continue to grow. Cofinancing of mitigation activities will also be possible through ADB's access to the GEF. Notwithstanding ADB's mitigation investments, it is clear that the collective mitigation investments of all institutions and nations falls short of the 1% of GDP spending called for in the Stern Review. More effort by all parties, including ADB, is required.

28. ADB, like most institutions, is in the process of developing and implementing an adaptation program. ADB is rapidly coming up to speed and will be fully operating a program by 2008 with first investments beginning in the ADF X period. The timing is appropriate: this is the

¹¹ For more details, visit <http://www.adb.org/projects/CACILM/>.

first ADF period where large investment demands will be made for adaptation. Based on NAPAs prepared by least-developed countries, ADB estimates ADF country adaptation demands will exceed \$1.5 billion for the ADF X period (Table 3 and Appendix 4).

Table 3. Estimates of Adaptation Needs and Mitigation Pipeline in ADF Countries by Region

ADF Countries	Adaptation Estimate millions USD	Mitigation Loan Pipeline 2008-2010 millions USD
Central Asia	700.00	360.00
East Asia	100.00	0.00
Pacific	109.80	14.00
South Asia	291.50	264.60
Southeast Asia	329.00	20.00
GRAND TOTAL	1,530.30	658.60

Source: NAPAs and ADB Staff estimates.

29. The current situation calls for measures by ADB and its partners to address the challenges brought about by climate change. Activities identified under ADB's on-going climate change program are expected to be scaled up under ADF X. Full range of specific mitigation and adaptation activities will need to be integrated into poverty reduction and economic growth strategies at the country level, as well as into public and private sector investment plans. This is an opportune time for a close assessment of ADB's responses, since both the Energy Strategy and the Long Term Strategic Framework are under review. The proposed Energy Strategy acknowledges current and future climate change challenges, and ADB's comparative strengths in helping its DMCs meet their energy needs without undermining the basis for their future prosperity. The ongoing Long Term Strategic Framework review is examining how environmental sustainability concerns, including those associated with climate change, will affect the region's longer-term prospects for poverty reduction in order to define what ADB can do with its partners to minimize negative impacts and harness new opportunities to help DMCs achieve low-carbon and environmentally sustainable economic growth.¹²

4. Global and Regional Efforts

30. Climate change is a global challenge that requires a worldwide and concerted response. ADB, the World Bank, and the rest of the development community have responded to the call to action expressed at the Gleneagles G8 summit in 2005. CEIF has emerged among MDBs and it is being used to track the development and results of MDB programs.

31. ADB also shares its vision with the Asia-Pacific Partnership on Clean Development and Climate (APP) to promote clean energy projects through cooperation, technology transfer, knowledge sharing, and private-public sector partnerships. APP comprises Australia, Canada, the People's Republic of China, India, Japan, the Republic of Korea, and the United States which have agreed to work together and with private sector partners to meet goals for energy security, national air pollution reduction, and climate change in ways that promote sustainable economic growth and poverty reduction.

¹² ADB. 2007. *Toward a New Asian Development Bank in a New Asia: Report of the Eminent Persons Group to the President of the Asian Development Bank*, Manila.

32. While there are clear signs of positive steps being taken, ADB recognizes that there are many challenges ahead. In the context of global agreements, ADB will continue the efforts to achieve common goals.

VI. CONCLUSIONS

33. **Climate change is a real threat and ADF countries will be affected.** There is no longer any doubt that climate change will fundamentally alter the region's development future. There is clear evidence that the poorest people in the ADF countries are most vulnerable to the current and future adverse impacts of climate change. The Stern Review estimates that if we do not act, the overall costs and risks of climate change will be equivalent to losing 5% of global GDP every year for the foreseeable future. If a wider range of risks and impacts is considered, this amount rises to 20% of GDP per year.

34. **ADF countries contribute little but are highly vulnerable.** ADF countries contribute the least to climate change but they are the most vulnerable. The per capita emission of energy-related CO₂ in ADF countries is only 0.4 (Bangladesh, Cambodia, Kyrgyz Republic, Mongolia, Nepal, Pakistan, Sri Lanka, Tajikistan, Viet Nam) and their share is only 1% of global emissions. Because large sections of the population of many ADF countries live in coastal areas and have low income levels, they have a limited ability to cope with extreme weather events and there is a risk that development gains get easily wiped out.

35. **Resources are inadequate to adapt to climate change; this knowledge should be used to motivate each organization to play their parts in the overall response.** An immediate 1% of GDP per year investment in mitigation will avoid the worst impacts of climate change. But much less than this amount is being invested and therefore most countries are expected feel the negative impacts of climate change for the coming decades. The sooner that mitigation and adaptation are supported, the less the negative impacts will be in most countries. No one organization can provide the 'climate change solution', but ADB is ready to employ its comparative strengths to support ADF countries with mitigation and adaptation. Energy, transport, water, and urban sectors already provide good opportunities for ADB to influence on climate-friendly development patterns in the region. Given the enormous needs of the Asia Pacific region, ADB will mobilize significant additional resources to help fill gaps in financing, knowledge, and capacities on climate change mitigation and adaptation.

36. **ADB operations during ADF X will respond to investments needed to help countries follow a climate-friendly path.** (i) Mitigation responses are in progress. During the period 2008–2010, ADB expects to make mitigation investments for the promotion of clean energy in excess of \$200 million, based on projects already being planned, and continued demand growth. In addition, cofinancing of mitigation activities will be made available through ADB's access to the GEF. (ii) Adaptation responses are emerging. Based on NAPAs prepared by least-developed countries, ADB estimates ADF country adaptation requirements will exceed \$1.5 billion for the ADF X period. This will mark the first ADF period where significant levels of investment will be in demand for adaptation. Depending on resources available, ADB is ready to expand its adaptation program from technical assistance to investment in order to support ADF country needs.

37. **Global and Regional Efforts are Important.** Climate change is a global challenge that requires a worldwide and concerted response. ADB is working with both developed and developing countries, as well as leading knowledge institutions, to help meet the challenges presented by climate change.

SUMMARY OF CLIMATE CHANGE IMPLICATIONS BY SECTOR

1. A serious effort to adjust to climate change will alter some key parameters of ADB's broader poverty reduction and development activities. Primarily this will mean a change in the way ADB organizes and implements its support to key sectors.
2. **Energy.** Power sector development plans, which rely on burning hydrocarbons must now be placed in the context of the anticipated shift to lower-carbon energy sources. ADB will be called upon to actively work with its DMCs to promote policies, technologies, and investments that promote the use of renewable energy sources, and the introduction of energy efficiency measures. ADB's Energy Efficiency Initiative has already set a target of \$1 billion per year of related investments by 2008. Accelerated glacial melting or new weather patterns will affect planning for hydropower, wind energy, solar, and other energy sector investments. ADB's policy advice on the use of subsidies in the power sector will need to further emphasize the elimination of incentives which encourage hydrocarbon consumption while encouraging appropriate incentives to induce innovation and attract investment for energy efficiency and renewable energy sources.
3. **Transport.** In the coming decades it is likely that there will very large increases in investments in the roads and highways sector. This, in turn, is likely to exacerbate pollution and climate change problems across the region. Measures such as the introduction of cleaner fuels will help but cannot be expected to be significant compared with the large increases in the numbers of vehicles on the road. The transport sector will also be called upon to alter its design assumptions to adapt to climate change impacts, such as the impact of more frequent severe storms on coastal road or bridge specifications.
4. **Urban and Industrial Development.** Residential and commercial buildings account for more than 60% of electricity demand in Asia. ADB will need to respond to DMC requests for advice on measures, such as improved building codes and other steps, to encourage greater energy efficiency in urban and industrial settings. The technologies and approaches used to provide wastewater treatment and solid-waste management have strong implications for greenhouse gas emissions, particularly the emission of methane—a potent greenhouse gas. Investments in extractive industries must always meet stringent safeguard standards, but any engagement with the oil, gas, and coal-mining industries will require even greater scrutiny in the context of a country's strategy for shifting to a lower-carbon economy.
5. **Water.** Current efforts to address water issues are not encouraging. There will need to be significant adjustments made in the water sector. These adjustments will mainly be adaptations to account for how climate change affects project planning and design assumptions. As evidenced by the recent devastating floods in South Asia, coupled with accelerated glacial melting, it is clear that hydrological patterns are changing. There is also scope for improved energy efficiency in the water sector and wider use of renewable energy sources, e.g., using established windmill technologies to raise water from wells.
6. **Agriculture and Rural Development.** Rural areas are still home to 80% of the region's poor and are a necessary target for poverty reduction efforts. For many DMCs, rural land use also represents their most important leverage point to affect greenhouse gas emissions. Land use changes—such as deforestation—greatly affect the storage or release of carbon, since organic matter in soils and forests can absorb carbon dioxide from the atmosphere. Rice production and livestock rearing generate large quantities of methane, and farm management patterns may need

to be adjusted. There is also a growing realization that climate change represents the single-most important factor contributing to loss of biodiversity and a decline in ecosystem functions, since even relatively slow changes in temperature or other weather patterns can be too rapid for many species to adapt to. This comes at a time when there is an expanding appreciation of the economic benefits derived from the services provided by nature's infrastructure—ecosystems that support clean water, crop pollination, coastal protection, aesthetic beauty, and many other tangible values. ADB will also be called upon to advise its DMCs on the advisability of investments in biofuels, especially since it appears that many such proposals, often done in the name of the environment or energy security, may not be economically or environmentally viable.

7. **Health.** Climate change is projected to increase threats to human health in the region. This is due to warming trends and changes in the habitats of key disease vectors such as mosquitoes. The incidence of temperature-related illnesses, injuries, and other health impacts from extreme weather events (especially heat waves, typhoons, and floods) as well as waterborne diseases (already the principal cause of child health problems in the region) are all expected to rise. These added risks should be factored in to ADB's health sector work in order for it to be responsive to anticipated DMC requests for support.

8. **Disaster and Emergency Assistance Policy.** There is a very close correlation between the current practice of disaster planning and preparedness and those measures needed to assess and adapt to climate change vulnerabilities. Many climate change impacts serve to exacerbate natural hazard risks, particularly those impacts associated with hydrological events and in arid or coastal settings. Unfortunately, much of the climate change adaptation planning currently underway is weakly tied to mainstream disaster preparedness and civil defense efforts. Better integration of planning for adaptation and disasters and associated responses will be needed throughout the region, and ADB is well poised to lead efforts in this area at both the DMC and regional level.

RESPONDING TO GLOBAL CLIMATE CHANGE IN ASIA AND THE PACIFIC: A BRIEF HISTORY OF ADB'S ACTIVITIES

Date	Activity/Project	Description/Details
February 1989	Global Environmental Concerns: Possible Implications to Bank Operations	An ADB management directive reviewed climate change and other key global environmental issues of relevance to ADB operations and recommended responses, in cooperation with regional and international partners.
December 1989	Regional Study on Environmental Considerations in Energy Development (TA 5537-REG)	Analysis of climate change issues in the context of sustainable energy development in the Asia and Pacific region, including the publication <i>Environmental Considerations in Energy Development</i> .
November 1990	Asia–Pacific Seminar on Climate Change	ADB sponsored a regional seminar to review responses to climate change in Asia.
July 1991	Thailand National Strategy on Climate Change (TA1539-THA)	Support was provided to Thailand to develop understanding of climate change risks and responses.
March 1992	PRC Industrial Energy Conservation and Environment Improvement Project Approved (Loan 1178; \$76.41 million)	First multicomponent energy conservation and environmental improvement initiative financed by ADB.
April 1992	PRC National Response Strategy for Global Climate Change (TA 1690-PRC)	Support was provided to the PRC to develop understanding of climate change risks and responses.
1992–1993	Regional Study on Global Environmental Issues (TA 5463-REG)	Outputs of this technical assistance project included (i) eight country studies on the preparation of national climate change response strategies, and (ii) a regional strategy to respond to the challenge of climate change.
August 1993	Acid Rain and Emissions Reduction in Asia (TA 5528-REG)	Among other innovations, the project introduced cap-and-trade concepts applicable to greenhouse gas emissions management in Northeast Asian countries.
1994–1998	Asia Least-cost Greenhouse Gas Abatement Study (ALGAS) (TA 5592-REG)	This project produced (i) the first nationally derived greenhouse gas inventories for 12 Asian countries, (ii) inventory methodology development; (iii) a cadre of Asian greenhouse gas inventory and mitigation experts; (iv) national strategies and action plans, including the first national lists of candidate CDM projects; and (v) awareness and ownership of climate change strategies and projects.
June 1995	India Renewable Energy Development Project Approved (Loan 1465; \$100 million)	The project supported the introduction of renewable energy technologies and increased power generation capacity by 318 MW from these sources.
November 1998	UNFCCC COP4, Buenos Aires Seminar on ALGAS	ADB supported presentation of 13 ALGAS reports, including the launch of 11 country reports, and made a statement during the plenary High Level segment.
1999–2000	Capacity Building for Implementation of the Kyoto Protocol and the Clean Development Mechanism (TA 5861-REG)	This TA project resulted in studies on, and training materials for, CDM project preparation and the influential publication <i>Implementation of the Kyoto Protocol: Opportunities and Pitfalls for Developing Countries</i> (presented at COP6).
2001–2006	Promotion of Renewable Energy, Energy Efficiency and Greenhouse Gas Abatement (TA 5972-REG)	This technical assistance project produced a new inventory of CDM-eligible projects in 18 countries in the Asia and Pacific region.
November 2001	UNFCCC COP7, Marrakech	At the COP, ADB sponsored a donor consultation

Date	Activity/Project	Description/Details
	Donor consultation meeting	meeting on clean energy and climate change abatement and adaptation activities in the Asia and Pacific region, attended by both by multilateral and bilateral institutions. ADB also participated in other COP sessions.
2002 to present	Renewable Energy, Energy Efficiency and Climate Change Program (REACH)	This program is supporting expanded attention to renewable energy and energy efficiency options and other responses to climate change with financing from the governments of Canada, Denmark, Finland and the Netherlands.
December 2002	Bangladesh Dhaka Clean Fuel Project Approved (Loan 1942, \$42.4 million)	The project advanced the use of clean energy sources for the transport sector by creating infrastructure for the supply of CNG fuel for public and private vehicles in Dhaka.
August 2003– July 2006	Clean Development Mechanism Facility (CDM Facility)	The CDM Facility at ADB was established to mobilize additional resource and technology flows to DMCs for projects reducing greenhouse gas emissions and conforming to sustainable development objectives.
September 2003	Southeast Asia Forum on Greenhouse Gas Mitigation and Sustainable Development	ADB cosponsored this forum which examined links between greenhouse gas mitigation and local economic and environmental benefits.
December 2003	UNFCCC COP9, Milan Seminar on CDM Facility	ADB sponsored a side event on the “Clean Development Mechanism Facility at the ADB” and gave a statement during the High Level segment that emphasized the growing importance of financing through carbon markets.
2003–2005	Climate Change Adaptation Program for the Pacific (CLIMAP) (TA 6064-REG)	This technical assistance project reviewed Pacific climate change adaptation concerns and responses and developed a systematic risk-reduction approach based on case studies presented in the seminal publication <i>Climate Proofing: A Risk-based Approach to Adaptation</i> .
2005 to present	ADB Energy Efficiency Initiative	This initiative identifies opportunities for wider ADB involvement in financing clean energy investments and capacity building in the Asia and Pacific region, with an annual target of \$1 billion by 2008.
2004–2006	Institutionalizing the CDM in Indonesia (TA 4501-INO)	Reviewed the CDM process in Indonesia and the potential to finance clean energy projects.
February 2005	Seminar on the Kyoto Protocol: New Opportunities for Investing in Cleaner Development	ADB hosted a seminar on implications of the Kyoto Protocol for the Asia and Pacific region, at which the ADB President gave a keynote speech on “New Opportunities for Investing in Cleaner Development”.
December 2005	UNFCCC COP11/MOP1, Montreal Seminar on REACH program achievements	ADB Vice President hosted a side event on “Enabling the CDM in Asia and the Pacific: Promotion of Renewable Energy, Energy Efficiency, and Climate Change Abatement” and announced the Carbon Market Special Initiative for Asia.
January 2006	Asia–Pacific Partnership on Clean Development and Climate, Sydney	ADB President was keynote speaker at the inauguration of the Asia Pacific Partnership on Clean Development and Climate at the New Opportunities for Investing in Cleaner Development meeting.
2006 to present	ADB Sustainable Transport Initiative and Clean Air Initiative for Asian Cities	The Sustainable Transport Initiative was inaugurated, building on work of CAI-Asia to expand ADB’s understanding of, and support for, low-carbon and low-air polluting transport technologies and investments.
November 2006	UNFCCC COP 12/MOP2, Nairobi	ADB sponsored a side event on “ADB’s Innovative Financing for Clean Energy” and participated actively in other events and sessions.

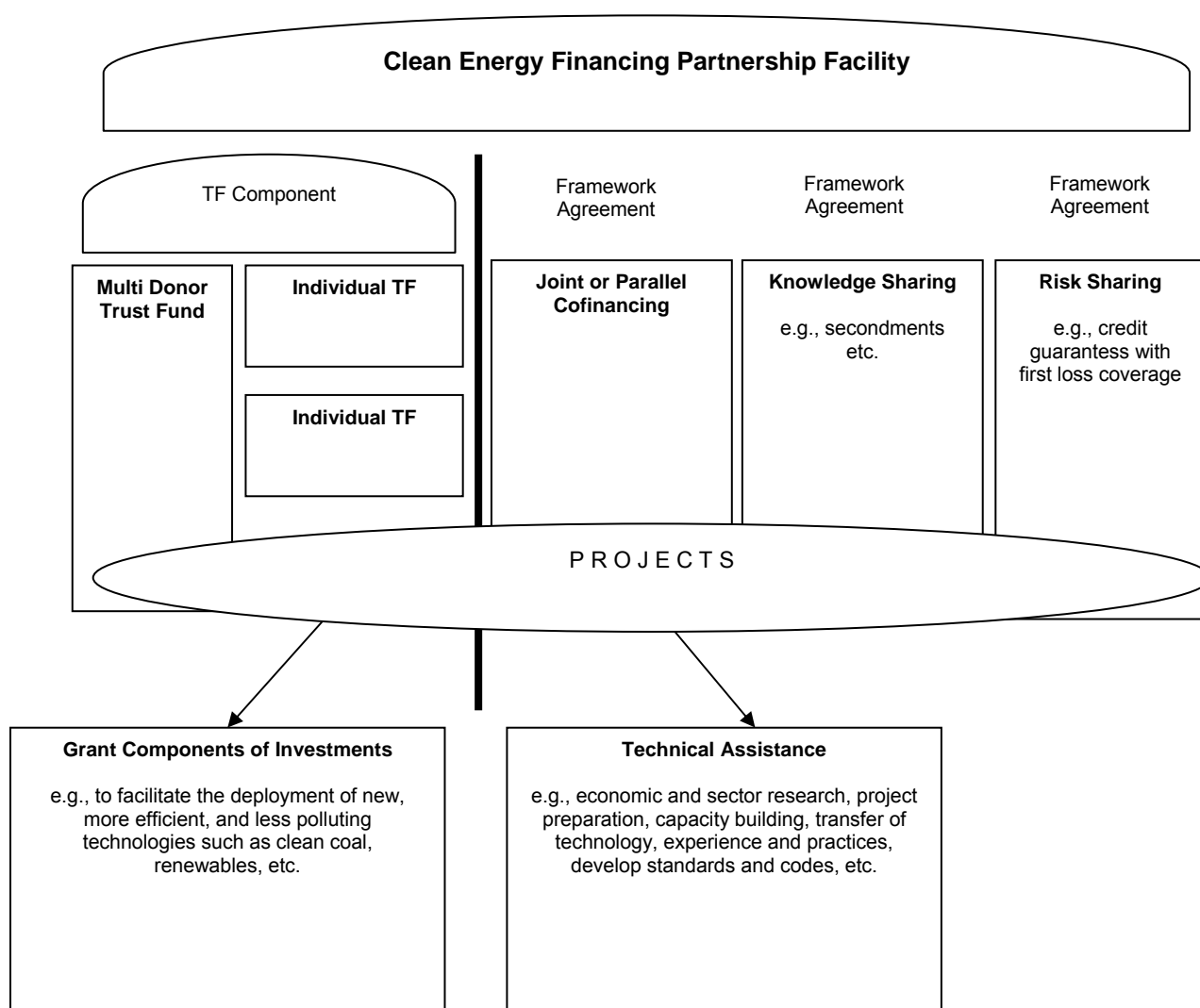
Date	Activity/Project	Description/Details
March 2007	Heads of International Financial Institutions Meeting, Chatham House, London	ADB President delivered speeches on “Asia’s Energy Needs and Climate Change-What Can Be Done?” and “Scaling Up Finance for a Low Carbon Economy: Key Obstacles and Opportunities”, and ADB joined the Framework for Public-Private Partnership to Address Climate Change.
2007 to present	ADB Carbon Market Initiative	ADB’s Carbon Market Initiative was inaugurated, with initial financing of \$150 million to provide financial and other support to developers and sponsors of projects with greenhouse gas mitigation benefits that qualify for CDM financing.
2007 to present	Promoting Climate Change Adaptation in Asia and the Pacific	A regional technical assistance project is initiated to support improved understanding of the consequences of climate change in the Asia and Pacific region and appropriate responses at the project, country, and regional levels.

ADB = Asian Development Bank; ALGAS = Asia Least-Cost Greenhouse Gas Abatement Study; CAI-Asia = ; CDM = Clean Development Mechanism; CNG = ; COP = ; DMC = developing member country; MOP = ; MW = megawatt; PRC = People’s Republic of China; TA = technical assistance; UNFCCC = United Nations Framework Convention on Climate Change.

CLEAN ENERGY FINANCING PARTNERSHIP FACILITY

Under its Energy Efficiency Initiative, ADB has established the Clean Energy Financing Partnership Facility (CEFPF). The CEFPF is designed to finance: (i) smaller energy efficiency investments that require quick and efficient transactions; (ii) technology transfer costs of clean technologies for a small number of high demonstration impact, large interventions that will catalyze deployment of clean energy technologies; and (iii) grant assistance for activities such as developing the knowledge base and incentive mechanisms, advocacy, institutional capacity building, project preparation, and establishment of the monitoring and evaluation mechanisms.

CEFPF consists of a multi-donor trust fund, a series of bilateral trust funds,¹³ and framework agreements with other development partners for cofinancing, knowledge sharing, risk sharing. The conceptual framework of CEFPF is outlined below.



¹³ In line with ADB's Financing Partnership Strategy that was approved by the Board on 18 July 2006 to decrease the proliferation of funds, ADB is encouraging donors to put their resources in the multi-donor trust fund for increased efficiency and efficacy.

**ESTIMATES OF ADAPTATION NEEDS AND MITIGATION PIPELINE
IN ADF COUNTRIES**

ADF Countries	Estimate ¹ millions USD	Loan Pipeline 2008-2010 millions USD
Afghanistan	100.00	155.00
Armenia	100.00	0.00
Azerbaijan	100.00	0.00
Georgia	100.00	0.00
Kyrgyz Republic	100.00	0.00
Pakistan	100.00	160.00
Tajikistan	100.00	45.00
Uzbekistan	100.00	0.00
Subtotal Central Asia	700.00	360.00
Mongolia	100.00	0.00
Subtotal East Asia	100.00	0.00
Cook Islands	9.00	0.00
Kiribati	12.00	0.00
Marshall Islands	9.00	0.00
Federated States of Micronesia	9.00	0.00
Nauru	9.00	0.00
Papua New Guinea	9.00	0.00
Samoa	7.80	14.00
Solomon Islands	9.00	0.00
Timor-Leste	9.00	0.00
Tonga	9.00	0.00
Tuvalu	9.00	0.00
Vanuatu	9.00	0.00
Subtotal Pacific	109.80	14.00
Bangladesh	75.00	160.00
Bhutan	7.50	22.60
Maldives	9.00	6.00
Nepal	100.00	75.00
Sri Lanka	100.00	1.00
Subtotal South Asia	291.50	264.60
Cambodia	129.00	0.00
Lao People's Democratic Republic	100.00	20.00
Viet Nam	100.00	0.00
Subtotal Southeast Asia	329.00	20.00
GRAND TOTAL	1,530.30	658.60

¹ Source: NAPAs and ADB Staff estimates.