



Building a

# Pro-Development Global Strategy

on Climate Change

by Alan Oxley with foreword by Mike K. Moore

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### **About the Author**

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he world faces a great decision: How to address climate change—which is universally recognized as posing a threat to our global ecosystems—while doing so in a way that encourages true global participation and allows for continued growth and development in poor countries.

As in its other work, World Growth and its chairman, Alan Oxley, aim to bring balance to the debate over trade, globalization, and sustainable development. They believe that policies require local leadership and global connectedness. Environmental policies should empower entrepreneurs to solve problems for local communities through economic development and new technology, and ensure that the poor don't carry too much of this burden.

So it should come as no surprise that this new report, "Building a Pro-Development Global Strategy on Climate Change," strives for a Multi-Track, collaborative and non-regulatory solution from which the world can benefit, not self harm.

Mr. Oxley argues that it is possible to secure global consensus, impose an equitable economic burden, support development priorities, and facilitate adaptation as well as mitigation—and deliver tangible reductions in emissions.

We are close to the start of the first and very short 2008-2012 commitment period under the Kyoto Protocol, and it is argued that few Annex One signatories will achieve their mandatory targets to reduce emissions to 1990 levels. Emissions trading schemes have been started and are meeting with mixed success, but no structure exists to link trading schemes globally. Meanwhile, the world's largest emitters refuse to sign up to make mandatory emission reductions under Kyoto.

The self harm arguments of the United States, Australia and fast growing nations like China and India are understandable. So too is the demand to take effective action by other nations, in which the people increasingly demand a climate change response.

But few in China would support the US\$297 billion cost of implementing Sir Nicholas Stern's recommendations that all countries introduce a carbon tax or an emissions permit system, just to stabilize the concentration of greenhouse gases (GHG) in the atmosphere. That represents an economic cost of 37.1 percent as a share of household income. In the United States the cost, according to this new report, would be US\$443 billion, an economic cost, as a share of household consumption, of 9.1 percent.

I have great confidence that the world can respond to major challenges, as it has before. Unfortunately, it is never easy.

Mr. Oxley now poses us with a challenge to meet climate change with a Multi-Track approach, to be agreed upon by parties to the United Nations Framework Convention on Climate Change; to set out goals agreed by all members and especially major emitters; let countries adopt strategies which fit their economies and recognise their different per capita carbon intensities. This approach should encourage specific programs to cut emissions, and commit governments to annually reporting to the world on how they are performing.

The challenge with this and every other proposal is implementation, audit and a mechanism to handle disputes over progress towards agreed goals. This ought not to be beyond us, and the first necessity is total transparency and goodwill so that nations, businesspeople and bureaucrats are held to account. In

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fact, this can protect them from some of the gathering storms of protest and protectionism that are threatening this important process and our important goals.

Around the world, billions of individuals say they are also prepared to take personal action. Markets, consumers, investors, and the people will penalize companies and countries that do not rise to meet this challenge. Young people everywhere see this as the issue of our age and we should remind ourselves and them that efficiency is just another word for conservation and that just passing laws, in itself laudable, will not of itself do the job. We must also ensure that whatever we do does not give rise to new market distortions as unintended opportunities for new forms of protectionism and all it entails.

We now need to unleash our ingenuity and ability to respond to major challenges. If all action is local, then a Multi-Track response, in which each nation agrees to take effective local actions, is worth considering.

Rt Hon. Mike K. Moore Former Prime Minister of New Zealand and Director-General of the World Trade Organization August 2007

### **II. Executive Summary**

#### Search for a New Consensus

The commitments in the Kyoto Protocol to reduce greenhouse gas emissions expire in 2012, and a new global strategy to address climate change is required; this was recognized by the leaders of the G8 at the Heiligendamm Summit in June 2007.

There also appears to be consensus that work on this strategy might begin when Parties to United Nations Framework Convention on Climate Change meet in Bali, Indonesia in December 2007. If it does, the new strategy will not appear overnight; the Kyoto Protocol took several years to negotiate, and major differences over it remain.

The challenge is to forge a climate change strategy that is pro-development. With between one and two billion people still living in poverty, developing countries insisted from the time the Framework Convention was negotiated that no climate change measures should be adopted which prevented countries from giving priority to economic development. The need to balance environmental and developmental factors continues to be the single most important issue over policy on climate change.

On current settings, there are two general options for a new global strategy. The first is to replace the Kyoto Protocol with similar but tougher measures for compulsory reduction of greenhouse gas emissions, principally by regulating consumption of energy. The second is to promote collaboration among governments to adopt technologies and systems that reduce greenhouse gases. These won't secure global consensus.

A key lesson from Kyoto is that a successful global strategy must have global support. That will not be achieved unless the strategy is pro-development. New thinking is required.

### The Development Dimension

The biggest source of greenhouse gas emissions is combustion of fossil fuels to generate energy. The leading strategy in the Kyoto Protocol is to reduce consumption of energy, and in the Protocol it was an obligation only for developed parties. However, the backers of Kyoto have always indicated developing countries should at some point commit to reduce emissions.

Ninety percent of energy in the developing world is produced from biomass: over 2 billion people do not have electricity. Growth and improved living conditions like less disease and longer lifespan requires more electricity. The International Energy Agency estimates that global electricity production will increase 50 percent by 2030, with most of the increase coming from the developing world. And as production of energy increases, so too do greenhouse gas emissions.

Although developing countries repeatedly secure commitments in the U.N. that development needs will not be compromised by measures to reduce greenhouse gases, proposals which do so continue to be advanced, like that from the British Treasury economist, Sir Nicholas Stern, who recommended in 2006 that the world economy forego one percent in economic growth annually to meet the cost of containing and reducing emissions of greenhouse gases.

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The cost of the Stern proposals is much more than the one percent per year of GDP for economies in which dependence on carbon is high. The annual cost to China is estimated at between 14.3 percent and 16.9 percent of GDP; for India 10.6 percent to 12.3 percent; and for Brazil between 3.7 percent and 7.5 percent. As such, cuts of the dimension proposed by Stern would cut growth dramatically in most economies.

Cuts of the order proposed by Stern would significantly impede strategies to lift the 1.2 billion people living on less than one US Dollar a day out of poverty. A high percentage of those people live in India and China. As the Chinese National Reform Development Commission noted in its report in June 2007 on China's approach to climate change:

"In the history of human beings, there is no precedent where a high per capita GDP is achieved with a low per capita energy consumption". The Kyoto Protocol is now widely regarded as a failure.

(It) has delivered only limited benefits to developing countries; has demonstrated the high cost of mandatory emissions targets; and has failed to build a global consensus on a strategy to tackle climate change.

Evidently no climate change strategy will secure global support if that is the consequence.

### Lessons from the Kyoto Protocol

The Kyoto Protocol is now widely regarded as a failure. It has not laid down a long term strategy to tackle climate change; has not met its targets to reduce global emissions of greenhouse gases; has not created a global system of emission trading (and, where parties have set up regional systems pursuant to the Protocol, as in the European Union, the inherent difficulties of establishing such systems has become apparent); has delivered only limited benefits to developing countries; has demonstrated the high cost of mandatory emissions targets; and has failed to build a global consensus on a strategy to tackle climate change.

Nevertheless, the leading suggestion to replace Kyoto is effectively a Mark II Kyoto with deeper, compulsory cuts in emissions over a longer period and a mechanism gradually extending to developing countries obligations to reduce emissions. The next most current idea is to replace Kyoto with another global capand-trade system where greenhouse gas emissions are capped and permits to emit gases are traded among parties. In principle there is little difference between the two options, as the Kyoto Protocol is already a form of cap-and-trade.

The idea of global emissions trading has acquired a fashionable cache, appealing to free market economists and arbitrageurs alike. It has become an elaborate distraction. The impracticalities of establishing a global system are enormous as insights from experience of regional trading of emissions in the E.U. under the Kyoto Protocol reveal. Significant problems include high volatility in prices, lack of monitoring of compliance and lack of certainty about fair trading. The role of emissions trading was always secondary—

to smooth the impact of the primary process which is to reduction of emissions. Attention needs to focus on getting the primary process right.

Kyoto didn't. The key takeaways from the Kyoto experience were: One, that climate change strategies need to recognize that the interests in every economy are different (Kyoto failed to respect the injunction in Article 4.2 of the UNFCCC to do so); two, global regulation of economic activity and use of energy will not work; and three, strategies will not be supported if parties do not consider the impact of obligations are economically equitable.

### The World Beyond Kyoto

Debate over the Kyoto Protocol has left an impression that it is the climate change policy universe. It is not. This is a serious misperception in the climate change debate. As this report shows, hundreds of millions of dollars are being spent in the public and private sector to tackle climate change. Important regional and national programs have been overlooked.

The economies that account for half of the world's greenhouse gas emissions have established the most innovative effort yet to tackle climate change. It has had little airplay. In 2005, Australia, China, India, Japan, South Korea and United States formed the Asia-Pacific Partnership on Climate and Clean Development. They have developed eight programs in the Partnership to develop practical approaches and strategies to reduce emissions, however, none entail regulation of energy. Research has demonstrated that the activities planned for this partnership in general should be able to achieve reductions in emissions comparable to those sought in the Kyoto Protocol and without a development liability.

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In addition there are important bilateral programs, like the US-China Methane Capture Program, as well valuable contributions by the private sector.

### **Crafting a New Strategy**

To be successful, a global climate change strategy needs to satisfy five criteria. It should:

- Enjoy consensus among countries which account for a substantial majority of global greenhouse gas emissions;
- Support national development objectives;
- Demonstrate tangible short term results;
- Allow countries to regard the cost of the impact as spread equitably; and
- Facilitate adaptation and mitigation.

Neither a Mark II version of the Kyoto Protocol, nor a new global cap-and-trade model will satisfy those criteria. Developing countries will not accept global regulation of energy production or energy economic activity which is central to successful development strategies. Economies with high carbon dependency will not accept strategies that cause impacts which seem inequitable.

Is global consensus around the Asia-Pacific model of voluntary collaboration an alternative? This seems unlikely. There is a strong desire among a number of countries, particularly in Europe, to see an international system of binding commitments to regulate climate change activities.

### A Multi-Track Approach— The Only Practical Post-Kyoto Option

Fresh thinking is required, and a Multi-Track approach is proposed. Parties could select the track or tracks they wished to follow to within broad goals laid down within the Framework Convention.

The UNFCCC (Article 1.b) lays the basis for a Multi-Track approach – each party is required to prepare a regular report on measures to mitigate emissions and strategies to adapt to climate change. If some parties wished to regulate energy, including in concert with others, that would be recognized as meeting the broad goals, as would strategies developed by others following the voluntary collaborative or national program tracks.

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To give bearing to the Multi-Track approach, broad goals to be achieved by climate change policies would need to be developed, and kept indicative to give developing countries the flexibility they require.

Two objections are anticipated. The first is that large reductions in emissions are required sooner rather than later (as envisaged in the Stern report) to mitigate increasing emissions in the long run. A voluntary system like this is unlikely to deliver the deep cuts required.

The assumption underlying in this is taken as given among many climate policy specialists, but it does not represent mainstream thinking among economic analysts and development experts. It is reflected in "The Copenhagen Consensus" among leading global development experts in 2004 that modest reductions in emissions in early years will be adequate and that it is more cost effective for countries to meet the costs of mitigation and adaptation several decades or a century later when all societies will be wealthier. As well, experience to date demonstrates that national action and global collaboration does deliver reductions in emissions.

The second objection is that there will be no compulsion in the Multi-Track model. The retort to that is that if there were compulsion, there will be no climate change strategy. Global solutions to global problems will only work if crafted within the reality of how global politics work.

The level of concern about climate change, particularly in the industrialized world, is understandable. However, so is the concern in the developing world about lifting the bottom billion of the world's people out of poverty. This is not a question of difference of perception between people in the developed and developing worlds. There is great concern about poverty in the industrialized, as evidenced by the Live Aid concerts in 2007.

### III. Introduction

Global interest in tackling climate change has intensified. Aware that the commitments to reduce emissions of greenhouse gases set out in the Kyoto Protocol to the United Nations Framework Convention on Climate Change expire in 2012, and given general acceptance that the Kyoto Protocol has not been a success, new global approaches to climate change are being considered.

Global warming is a complicated subject. The science is complex and the economics challenging. It is not common in either discipline to try to specify with certainty what will happen over 10-20 year periods, let alone to look ahead 100 or 200 years. While much attention has been focused on the science and economics, not enough has been devoted to what can practicably be achieved in intergovernmental arrangements to handle climate change.

We do not have a World Government, and no one foresees that in a reasonable timeframe. The capacity of the global community to act collectively on international public policy is limited. There is little effective global regulation, and on matters of development and environment and there are deep differences within the community. There is strong case to be made that the international community overreached itself with its ambitions for the Kyoto Protocol.

This paper reviews where we are today and seeks to define an answer to the question: "How can a prodevelopment global strategy to tackle climate change be achieved?"

Research has demonstrated that the activities planned for this partnership in general should be able to achieve reductions in emissions comparable to those sought in the Kyoto Protocol and without a development liability.

## IV. The Problem-Developing a Pro-Development Strategy on Climate Change

### The Problem

The international community signaled its determination to address the risks of global warming when it adopted the U.N. Framework Convention on Climate Change (UNFCCC) at the U.N. Conference on Environment and Development (UNCED, popularly known as the Rio Earth Summit) in 1992. At UNCED, and during the drafting of the UNFCCC in the lead up to it, the dominant question was how to develop a strategy to tackle climate change that did not stymie programs that promoted economic development.

The endeavor has not been successful. The Kyoto Protocol was adopted as the global strategy based on the framework in the Convention. The lessons from Kyoto are reviewed in a later section, but in summary, the strategy adopted – mitigation of emissions of greenhouse gases by global regulation of those emissions—did not win the support of a majority of countries who are and will continue to be the largest emitters of greenhouse gases.

The principal reason is that developing countries consider the strategy in the Protocol to reduce emissions – increasing the cost of energy to reduce the amount of energy generated and consumed – is inimical to their development objectives. Their national priorities are to eradicate poverty and to raise the living standards of their people. As the Chinese National Reform Development Commission noted in its report on China's approach to climate change in June 2007:

"In the history of human beings, there is no precedent where a high per capita GDP is achieved with a low per capita energy consumption".

Developing countries today generate around 40 percent of all greenhouses gases. Its share is predicted to increase as the economies expand to raise living standards. In light of the position of developing countries, the United States Congress decreed it would not support a treaty with a strategy which did not include all the world's major emitters of greenhouse gases.

Governments seem in agreement that a new global strategy needs to be developed. The challenge remains

virtually the same as that which faced Governments at UNCED in 1992 – how to develop a pro-growth strategy to tackle climate change.

Fifteen years later, the problem remains unresolved.

### The Debate

**Development versus Environment** 

How to manage the dampening impact of measures to protect the environment on strategies to eradicate poverty and raise living standards was an issue from the outset of global efforts to tackle climate change. The developing countries were clear about how they saw things. Their condition for supporting the global blueprint to protect the environment as laid down in the Agenda 21 program at the Rio Earth Summit in 1992 was that the development imperative was not to be subject to environmental goals.

When it came to strategies to tackle global warming, the principle was articulated in Article 4.7 of the UNFCCC. It states specifically that, with respect to the position of developing countries, "economic and social development and poverty eradication are the first and overriding priorities of the developing country parties."

Since the UNFCCC 15 years ago, the Kyoto Protocol was negotiated to give pre-eminence to global regulation of emissions as the basis for a global strategy to reduce greenhouse gases. It came into effect in 2004, reflecting heightened global international interest in tackling climate change.

Over the same period, global concern also rose about improving the welfare of the more than one billion people living in poverty at the bottom of world society. The World Bank reported that 1.2 billion people live on less than one US dollar a day. In 2005, the U.N. Millennium Development Goals were adopted by the U.N. General Assembly. They restated the determination of the global community to provide decent standards of living for these people.

The focus of developing countries had not changed. In its 2007 report on strategies to tackle climate change, the Chinese Government noted "It is an issue involving both environment and development, but it is ultimately an issue of development".2

Global Regulation versus Global Cooperation A fundamental difference remains over what is the best strategy to tackle climate change. It is divided broadly between those who favor global regulation versus those supporting global cooperation.

The UNFCCC favored cooperation. It envisaged all parties would develop strategies both to mitigate the impact of greenhouse gases and to adapt to the impact of climate change and would prepare national programs of action setting out those strategies. It also committed industrialized countries to work to an indicative target of reducing emissions to 1990 levels by the ends by 2000.

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The Kyoto Protocol shifted the emphasis to global regulation. It made the indicative targets specific and compulsory for industrialized economies, compliance was monitored and entitlements were lost if commitments were not met. Its focus was decidedly on mitigation, not adaptation.

There was an important development dimension to this. Adaptation is more development-friendly than mitigation. The latter requires some immediate reduction of standards of living in the near-term for a payoff that is well into the future. The former, on the other hand, prepares for a long-term response to a long-term impact and allows living standards to continue to increase in the short-term.

<sup>1</sup> http://www.unmillenniumproject.org/goals/index.htm

<sup>2 2007,</sup> National Development Reform Commission, People's Republic of China, "China's National Climate Change Program", page 3.

<sup>3</sup> The Protocol set out the specific each industrialized Party was to achieve between 2008 and 2012.

These proposals were roundly rejected by the leaders of the developing countries, as representing overwhelming opinion among them, as well as the US.

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The goal of the global regulatory model in Kyoto was to reduce the use of energy by raising its cost, directly impeding strategies that would increase growth, an essential prerequisite for reducing poverty. The proponents of regulation have been clear that the aim of the Protocol was to have all major emitters governed by this model of regulation.

### Trends in Climate Change Policy

Developing the Kyoto Model At the Conferences of the Parties to the UNFCCC in Buenos Aires (2003) and Montreal (2005), proposals were made to extend the Kyoto Protocol, principally by the E.U. They entailed:

• Setting of targets for more aggressive emission reductions. Kyoto generally obliges Annex 1 countries to cut their emissions to a general average of seven percent below their 1990 levels by 2012. There are proposals for further reductions of 20 percent by 2020 (from the E.U.), of 50 or 60 percent by 2050 (for example in the Stern report prepared for the U.K.), and by 90 percent (at *Live Earth* concerts sponsored by former U.S. Vice President Al Gore).

Enhancing the commitment of developing countries to reducing emissions. This idea has been proposed at meetings of the parties to the UNFCCC over several years.

These proposals were roundly rejected by the leaders of the developing countries, as representing overwhelming opinion among them, as well as the U.S. China and India have made clear they will not accept formal commitments to reduce emissions or adopt measures which reduce growth.<sup>4</sup> In 2005 the UNFC-CC parties agreed to consider possible new targets for reductions of emissions after 2012 but, in doing so, refused to agree to any new targets within the framework of the existing Kyoto Protocol.<sup>5</sup>

The only agreement reached was to conduct a dialogue on the issue. The first of four meetings for that purpose was held in Germany in May 2006 and the final held in Austria in August 2007. The results to date have been inconclusive, as there is strong opposition to extending or building on the Kyoto Protocol.

Creating a Global System to Cap-and-Trade Emissions

The stalling of the Kyoto Protocol has been followed by an upsurge of proposals around the world to introduce national and global systems to cap-and-trade emissions.

The unwillingness of the U.S. to accede to the Kyoto Protocol has stimulated calls from environmental groups for the U.S. to introduce a national cap-and-trade regime by issuing tradable permits to emit greenhouse gases. Several State governments have introduced schemes for trading such permits on a state-wide basis. There is also a proposal to link state trading schemes in the Western Region of the U.S.

<sup>4</sup> They have repeatedly stated their formal support for the Kyoto Protocol and their view that responsibility for reducing emissions of greenhouse gases should rest with the industrialized economies.

<sup>5</sup> In particular Japan and Canada

<sup>6</sup> They include California, Oregon and New Hampshire. Ten states in the Northeast have developed a regional initiative for permit trading which will enter into force in 2009. The States are: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Vermont.

<sup>7</sup> The members of the Western Region Climate Action Initiative are Washington, Oregon, New Mexico, Arizona, California, Utah and British Columbia, Canada.

The Australian Government, the other industrialized country that refused to accede to the Kyoto Protocol, has introduced a series of programs to reduce emissions in accordance with the target set for Australia in the Protocol. It has announced that it will introduce a national system of emissions trading.<sup>8</sup> There are reports that other governments including Japan and China are considering national cap-and-trade systems.

A common proposition element in these proposals is that they ultimately interlink to create a global system. The U.K. has proposed that arrangements be considered which would permit such trading arrangements outside the E.U. to link in with the European Trading System (ETS).

An international regime of cap-and-trade controls would be slightly different than the model created by the Kyoto Protocol since it promotes a cap-and-trade system. It would face the same problems as Kyoto including lack of acceptability to developing countries. As shown in Chapter VI, the implementation of any global emissions trading system will be problematic.

### **National Programs**

National programs to address climate change are extensive and generally underrated. Further details are provided in Chapter VII and Annex A. They have included funding of research and development into technologies and business processes that produce fewer emissions, particularly in those sectors that have been the traditional sources of greenhouse gas emissions. In the energy sector, this includes renewable energy technologies—such as wind, solar and nuclear power—as well as biofuels—such as ethanol.

A major focus has been on improved technologies for the use of carbon-intensive energy sources. They have included large research programs on the basic science behind the combustion of carbon-based fuels, more efficient technologies for generating electricity from coal, the capture and sequestration of carbon dioxide from industrial processes, and greater efficiency in the use of energy. Major programs to reduce and capture methane emissions have also been funded. Overall this research has demonstrated that very significant reductions in emissions of greenhouse gases could be achieved if major power consumers, such as India and China were to adopt the most advanced technologies in power generation, such as those used in Japan. As a consequence, all the major consumers of power, whether or not they are members of the Kyoto Protocol, have introduced important national programs to reduce emissions of greenhouse gases.

**International Collaboration** on Non-Regulatory Strategies

The most important example of international cooperation to promote non-regulatory strategies is the Asia-Pacific Partnership on Climate and Clean Development. Started in 2005, the Partnership brought economies responsible for emitting half or the world's greenhouse gases, notably the U.S., China, India and Japan, into a collaborative arrangement.<sup>10</sup>

Its members serve as joint leaders on individual programs on activities to reduce emissions of greenhouse gases. At present the Partnership consists of eight programs, which range from development of new technologies to adoption of existing technologies, and aims to improvement of business processes. The subjects covered range from generation of electricity to manufacture of cement. Further details are provided in Chapter VII and Annex A.

Overall this research has demonstrated that very significant reductions in emissions of greenhouse gases could be achieved if major power consumers, such as India and China were to adopt the most advanced technologies in power generation, such as those used in Japan.

<sup>8</sup> This follows decisions by Australia's six State Governments that they would introduce state emission trading schemes and would integrate them into a national system. A report commissioned by the Australian Government proposed that any national emission trading scheme be designed to mesh with any future international system.

<sup>9</sup> Charles River & Associates as commissioned by the International Council on Capital Formation.

<sup>10</sup> Other members included Australia and South Korea.

The Partnership has generated interest among other Governments with Canada and New Zealand expressing interest in joining.

A number of important bilateral arrangements have also been introduced to promote cooperation among national Governments in ways to reduce emissions. Notable is the agreement between China and the US to reduce emissions of methane. The U.K. has also committed to develop, with China, a low emission demonstration plant to generate electricity.

### The Reality

The commitments in the Kyoto Protocol to reduce greenhouse gas emissions expire in 2012 and there is no agreement on what, if any, action is to be taken after 2012 or by what means." Supporters of Kyoto want the model extended—more global regulation for deeper cuts and ultimately extending this regulation to developing countries. The debate has largely been about how deep cuts should be in future. It presumes this is the only strategy that can be followed. The reality is different.

Equally important, although less well publicized, are the measures that have been taken by national governments and the private sector to develop and promote technologies and business processes to reduce the intensity of greenhouse gas emissions from economic activity. Hundreds of millions of dollars have been committed to such efforts world-wide. Finally, the Asia-Pacific Partnership has developed an entirely different strategy, focusing on collaboration among governments and with the private sector.

The lesson from these experiences needs to be drawn upon to build successful strategies for the future. They are discussed later in this report. With that said, the overriding consideration upon which the success of any strategy will be judged is the extent to which it addresses the development dimension.

### V. The Development Dimension

Affordable energy is critical to development. Along with basic infrastructure like roads, it is one of the prerequisites to raising living standards. A brief review of the energy outlook for the global economy and developing countries is fundamental to appreciating the development dimension in global climate change strategies.

### The Energy Factor

In today's world, 1.6 billion people do not have access to electricity. Two in a half billion rely on biomass for day to day energy needs. Ninety percent of energy consumed today in developing countries is sourced from biomass, principally wood and agricultural waste. There is an important social dimension to this. In societies without electricity, social indicators for health and life expectancy are poor. Exposure to smoke and soot in closed environments is a major contributor to that statistic.

The International Energy Agency (IEA) expects global demand for primary energy to increase by about 50 percent between 2004 and 2030. Over 70 percent of this increase will derive from demand in developing countries, particularly Asia. China will account for 30 percent.

One factor driving this is higher growth rates among developing countries, with average annual economic growth among developing countries expected to be six percent. The second is higher energy intensity in developing countries. For example, one percent economic growth in the developing world usually requires a higher input of energy than in industrialized economies. Power generating systems are usually less efficient.

The IEA projects that coal will remain the dominant source of energy over the period, continuing to be the source of around 80 percent of global energy until 2030. Modern energy services, such as power derived from coal, will replace biomass in the developing world. The result is that greenhouse gas emissions from the energy sector are expected to increase by 55 percent between 2004 and 2030. Emissions are like-

<sup>11</sup> Article 3(9) of the Protocol implies that an extension was contemplated as it refers to the possibility of negotiating reductions for 'subsequent' commitment periods by amending Annex B, which sets out the national commitments for reducing emissions.

It is evident from the foregoing that global climate change strategies to reduce energy consumption from fossil fuels are difficult to reconcile with trends and demand for energy in the developing world.

ly to grow faster than energy demand as the carbon intensity of primary energy generation increases. By 2030, developing countries are expected to generate over half of global greenhouse gas emissions.

Yet, while the share of societies with access to electricity will increase, the total number relying on biomass is expected to rise to 2.7 billion by 2030 because of population growth. The task of eradicating poverty will remain on the global agenda for the rest of the century.

It is evident from the foregoing that global climate change strategies to reduce energy consumption from fossil fuels are difficult to reconcile with trends and demand for energy in the developing world. This has generated a significant debate about what mitigation strategies to adopt, in particular the relative importance of reducing emissions of greenhouse gases significantly in the short-term. The debate hinges on the extent to which the development dimension is incorporated.

### The Impact of Hiking the Cost of Energy

The advocates of the Kyoto Protocol always described the instrument as the "first step." It was known that modest regulation of energy output proposed in the industrialized world would have little impact on the level of greenhouse gases in the atmosphere.

International environmental non-governmental organizations, some European Governments, and leading figures consider the only solution is to regulate energy. The Kyoto Protocol aimed for an average

reduction of greenhouse gas emissions of industrialized economies of seven percent between 1990 and 2012. The European Union is proposing that until 2020, emissions of industrialized economies should be reduced by 20 percent. The U.K. Government commissioned Sir Nicholas Stern to assess what action should be taken. He advocated reducing emissions by all countries by 60 percent by 2050. Former U.S. Vice President Al Gore has started advocating reduction of emissions by 90 percent by mid-century

A vast amount of research has been undertaken, but much remains uncertain about the economic costs of cutting greenhouse gas emissions. Caution is warranted over any effort to make prognoses about very long-term economic trends. The Stern review is one of the most detailed and included an estimation of the costs. It concluded that complete abatement of greenhouse gas emissions by 2050 would cost no more than one percent of global GDP. It also estimated the economic benefits of abating GHG emissions at US\$85 per ton of CO<sub>2</sub> equivalent (CO<sub>2</sub>-e). Both estimates are at the extremes of the wide range for each in the economics literature.

While the severest effects of global warming are not projected to be felt for a century or two, Stern is of the school which argues that costs to constrain greenhouse gases should be met in advance. There is no consensus over this. Leading analysts such as Drs. William Nordhaus and William Cline in the United States<sup>15</sup> argue modest action in the short-term will be effective. Dr. Bjorn Lomberg argues that the social cost of draconian action in the short-term, reflected by delays in raising living standards in developing countries, will

A vast amount of research has been undertaken, but much remains uncertain about the economic costs and benefits of cutting greenhouse gas emissions.

<sup>12</sup> Stern, Sir Nicholas, 2006, *The Economics of Climate Change: The Stern Review*, HM Treasury, London, p. xii [accessed at www.sternreview.org.uk]

<sup>13</sup> Stern, op cit, p xvi.

<sup>14 (</sup>see Byatt et al 2006, Tol 2006 and Nordhaus 2006).

<sup>15</sup> See William R Cline, Center for Global Development and Institute for International Economics, the Copenhagen Consensus, 2004, "Meeting the Challenge of Global Warming" www.copenhagenconsensus.com

### Table 1

### **Economic Cost of Cutting GHG Emissions in Developing Countries**

	Economic Cost of GHG Cuts (mean estimate)	Economic Cost as Share of GDP (mean estimate)	Economic Cost as Share of Household Consumption (mean estimate)
Country	(US\$b)	(%)	(%)
China	297.2	15.4	37.1
Saudi Arabia	31.0	12.4	29.9
Vietnam	5.5	12.1	29.3
India	76.5	11.5	27.7
Thailand	17.8	11.0	26.7
Indonesia	26.6	10.3	25.0
Malaysia	11.8	10.0	24.1
Poland	19.2	7.6	18.3
Taiwan	20.3	6.3	15.3
Philippines	5.3	6.1	14.8
South Korea	39.0	5.7	13.8
Bangladesh	3.2	5.4	13.1
Singapore	5.6	5.3	12.7
Sri Lanka	0.9	4.7	11.4
Canada	45.1	4.5	10.9
Brazil	26.5	4.0	9.6
US	443.7	3.8	9.1
Spain	25.8	2.5	6.0
Germany	64.0	2.3	5.6
Hong Kong	3.8	2.3	5.5
Italy	37.6	2.2	5.2
Japan	97.5	2.1	5.1
South Africa	25.3	1.8	4.4
Source: World Growth			

be greater than the social cost of delaying stronger responses to the impacts of climate change over the longer-term.16

Doubts about the wisdom of deep, early global cuts in greenhouse gas emissions have been underlined by the Copenhagen Consensus. In 2004 the Danish Government asked eight leading economists, including four Nobel laureates, how best to spend US\$50 billion on solving various global challenges, including climate change. Their first step was to prioritize ten global development challenges.17 A key finding was that the

cost of implementing the Kyoto Protocol or taxing CO2 emissions would be greater than the benefit. 18

### **Cost of Stern Review for Developing Countries**

Stern's key recommendation was for all countries to introduce a carbon tax and/or an emission permit system to stabilize the concentration of GHGs in the atmosphere. We have, accordingly, estimated the economic costs of doing so for a selection of developing economies and compared their results with those for a cross-section of OECD countries. The data used were for 2004 and the details are in Annex B.

<sup>16</sup> Lomberg, Bjorn, "The Skeptical Environmentalist", Cambridge, 2001

<sup>17</sup> The ten issues where: Climate change; Communicable diseases; Conflict; Education; Financial Instability; Governance and Corruption; Malnutrition and hunger; Population - migration; Sanitation and health; Subsidies and trade.

<sup>18</sup> Lomberg, Bjørn, 2006, 'Climate change can wait, World health can't, mimeo, Copenhagen Consensus Centre, Frederiksberg, Denmark, 2 July [accessed at www.copenhagenconsenus.com]

# A key finding was that the cost of implementing the Kyoto Protocol or taxing CO2 emissions would be greater than the benefit.

For a consistent comparison, we have expressed the estimates as shares of GDP and of household consumption. The latter reflects the expectation that most of the burden would ultimately fall upon households. If Stern's valuation of the economic benefit of abatement is right, our estimates provide a good first approximation of the cost of comprehensive and immediate implementation of the cuts.

Of the 23 countries examined, China had the highest cost of carbon as a share of GDP at 15 percent, while Saudi Arabia and Vietnam were each around 12 percent. For India, Thailand, Indonesia and Malaysia, the cost averaged from 10 to 12 percent of GDP. For the Philippines, Bangladesh, Sri Lanka and Brazil, it was between 4 and 10 percent of GDP. None of the rest was under 2 percent.

When expressed as a share of annual household consumption, the pattern is very similar, although the average level is naturally higher. China had the highest share of household consumption (37 percent), followed by Saudi Arabia (30 percent) and Vietnam (29 percent). India, Thailand, Indonesia and Malaysia were somewhat lower but still over 24 per cent. The Philippines, Bangladesh, Sri Lanka and Brazil were between 9 and 15 percent. Of the rest, all were over 4 percent.

These results illustrate the extent of the adjustment that significant emission cuts would impose on developing countries. Although our analysis was static in nature, the sheer size of the adjustment combined with the lack of access to the sophisticated technologies required for a speedy transition mean that economic growth in the developing world would be adversely affected for a substantial time.

### The Energy & Development Equation

It is not an option to propose a strategy that reduces the capacity of any nation to expand energy production in its economy. Yet, that would be the effect of requiring developing countries to significantly reduce emissions of greenhouse gases.

In its national strategy to address climate change, the Chinese Government has pointed out the carbon intensity per person in China is well below that in industrialized economies. <sup>19</sup> China has set targets to reduce emissions per capita, but growth in China will result in a significant increase in total emissions.

As the analysis in Annex B shows, dependence of leading, high-growth developing countries on coal and oil is set to increase. There are no viable, cost-effective alternative energies available that can be used as a substitute for these carbon based fuels in the foreseeable future. Even nuclear power, the only power source available in unlimited capacity, cannot be deployed to a sufficient degree in the foreseeable future to substitute for fossil base fuels.

Although our analysis was static in nature, the sheer size of the adjustment combined with the lack of access to the sophisticated technologies required for a speedy transition mean that economic growth in the developing world would be adversely affected for a substantial time.

19 2007, National Reform and Development Commission, Beijing "China's National Climate Change program". P.19.

### VI. Lessons from the Kyoto experience

#### **Excessive Ambition**

The Kyoto Protocol rested on an extremely ambitious idea—to put in place a global regime to regulate emissions of greenhouse gases by setting mandatory targets for Governments to meet over agreed periods of time. The Protocol also sought to use market forces to minimize the cost of the global limit on emissions. This was to be achieved by allowing for emission permits for greenhouse gases to be traded internationally.

The Kyoto Protocol was fundamentally flawed. As one of the leading climate change economists in the U.S., Dr. William Nordhaus of Yale University recently noted,

"its objective of reducing emissions relative to a baseline of 1990 emissions for high-income countries..... lacks any connection to ultimate economic or environmental policy objectives."<sup>20</sup>

Reasons for this failure are many, but ultimately, parties negotiating Kyoto could not come to a consensus over final economic or environmental objectives. The negotiators defaulted to a second or even last best solution—they built a mechanism into an international treaty without agreement on the goals.

Developing countries would only participate if they were exempted from any mandatory emissions targets. Accordingly, the Protocol's proponents had to accept the idea of a dual approach—one set of obligations for the industrialized and transition economies, and another for the developing economies. This in turn meant that some of the industrialized economies were not prepared to ratify the Protocol. The result was that two-thirds of global emissions ended up outside the system of mandatory emissions targets.

The negotiation over the Protocol was an effort by its proponents, primarily Governments in Europe, to secure agreement on a set of measures in the apparent hope that any gaps could be corrected with time. The result was a Protocol which had very limited commitments, a short life span, emission reduction targets that could not be met, and no commitment to fix the shortcomings.

The supporters of the Protocol misjudged the position of the developing countries in the hopes that a consensus to build a system of global regulation on energy based on this model could be forged or even forced.

### General Terms of the Protocol

The Protocol provides for reductions of emissions by industrialized economies, emissions trading, collaboration among parties to reduce emissions and measures to assist developing countries.

### **Kyoto Protocol – Key Provisions**

#### **Reductions of Emissions**

The Protocol obliges industrialized economies and any other who wish to assume the same obligations to reduce emissions of greenhouse gases to a level 7 percent below what they were in 1990 by 2012. They are obliged to begin the process of reduction by 2008. AS part of the process of negotiation over the Protocol, some special terms were agreed for some countries for whom it would have been more difficult to reach the target.

### **Trading in emission permits**

The Protocol makes provision for a global system to trade emission permits among parties. It also provides for developing countries to be able to create some permits.

### **Collaboration among parties**

It seeks to foster collaboration between industrialized countries and developing countries by providing for "joint implementation" of measures to reduce emissions. It also provides for establishment of a "Clean Development Mechanism" which would approve projects in developing countries to reduce emissions. The "Mechanism" would approve creation of carbon credits as part of the financing of the project which could be sold to companies in countries which had accepted obligations to reduce emissions.

### Measures to assist developing countries

The Protocol encourages developing countries to take national action to reduce emissions and commits to provide technical assistance and finance to developing countries to assist them to reduce emissions.

<sup>19 2007,</sup> National Reform and Development Commission, Beijing "China's National Climate Change program". P.19.

<sup>20</sup> Nordhaus, William D, "After Kyoto: Alternative Mechanisms to Control Global Warming", FPIP Discussion Paper, March 2006, www.fpip.org

### Impacts of the Protocol

The Protocol failed to meet any of its immediate policy goals

### Fails to Reduce Global Emissions

The Protocol has not secured any reductions in global emissions. World emissions of energy-related greenhouse gases in 1990 were estimated at 21.2 billion metric tons. The level of emissions on current trends by 2015 is estimated to be 33.9 billion metric tons. There are four reasons for this.

- The United States which accounts for 23 percent of global emissions has refused to accede to the Protocol.
- Emissions by non-OECD countries are estimated to rise from 9.8 billion metric tons in 1990 to 19.2 billion metric tons by 2015, lifting their share of global emissions from 46 percent to 56 percent. This is a reflection of their higher average rates of growth than those of industrialized economies.
- Emissions from European countries are scheduled to rise from 4.1 billion metric tons in 1990 to 4.6 billion metric tons in 2012. This is likely to occur because the E.U. is forecasted to miss its Kyoto targets.
- Finally, there are no cost competitive technologies to substitute for fossil energy. As a result, reducing emissions requires reductions in fossil fuel use which would cause serious economic damage and therefore is politically impractical.

The Protocol carried only an implication that it lay down a long-term strategy with a provision to consider a follow-up phase of commitments. The Parties to the Protocol have initiated such discussions but unless developing countries change their positions, the only possible basis for extension in the future will be if industrialized parties agree to extend their commitments to reduce emissions.

Delivers Few Benefits for Developing Countries
The leading instrument to provide assistance to developing countries was the World Bank's Global Environment Facility (GEF).<sup>21</sup> Between 1991 and June 2007, the GEF dispersed a total of US\$2.54 billion to finance 653 projects to assist developing countries to reduce emissions and adapt to climate change. It currently disburses about US\$250 million a year on climate change projects to approximately 148 countries.<sup>22</sup> In contrast the World Bank disbursed US\$7.83 billion for development policy lending in 2005-06 alone.<sup>23</sup>

The Protocol has not secured any reductions in global emissions. World emissions of energy-related greenhouse gases in 1990 were estimated at 21.2 billion metric tons. The level of emissions on current trends by 2015 is estimated to be 33.9 billion metric tons.

There are also questions about the allocation and effectiveness of the funding provided by the GEF. One study found a disproportionate focus on supporting introduction of renewable energy projects in developing countries and very limited focus on improving energy efficiency in the larger developing economies where the greatest gains in reducing emissions of greenhouse gases can be found.<sup>24</sup>

The record on project approvals under the Clean Development Mechanism (CDM) is similarly mixed. The regulatory framework established to approve CDM projects carries such high level of political risk that very little commercial finance would support CDM projects. <sup>25</sup>

Initially, very few projects were approved. To date, some 738 projects had been registered with the CDM

<sup>21</sup> Originally a World Bank initiative, the GEF is now managed by the Bank, the UNDP and the UNEP.

 $<sup>22\,</sup>$  See http://thegef.org/default.aspx

<sup>23</sup> World Bank, 2006, Annual Report 2006, Operational Summary, Washington, DC

<sup>24</sup> Oxley, Alan, and Macmillan, Steve, 2004, *The Kyoto Protocol and the APEC economies*, Australian APEC Study Centre, Monash University, Melbourne

<sup>25</sup> CDM projects require cumbersome approvals, not only by the host authorities, but also by committees of intergovernmental officials specifically constituted by the Secretariat to the Convention (Nishizawa 2005).

Executive Board, involving a total of 157.2 million certified emission reductions (CERs), and another 30 projects were in the process of being registered. The measure of success in the CDM is how much money is invested. So far the projects approved for consideration in 2006 represent just US\$122.9 million.

A major concern about the CDM is that the original criteria for approval, namely that they would have been commercially viable in their own right, are not being satisfied and that financing ends up on virtually concessional terms, drawing funds from other development objectives to the CDM projects.

# There is growing evidence that the cost of meeting targets to reduce emissions under the Kyoto Protocol has been greater than was originally estimated.

### **Creates High Cost for Reducing Emissions**

There is growing evidence that the cost of meeting targets to reduce emissions under the Kyoto Protocol has been greater than was originally estimated. The European Commission has estimated that the cost of meeting the Kyoto targets for member states to reduce emissions was around 0.6 percent of E.U. GDP.<sup>27</sup> Independent research demonstrates the cost to E.U. economies is likely to be much higher. The cost to Spain in 2010 is estimated at 3.1 percent of GDP, 2.1 percent of GDP for Italy and 0.8 percent of GDP for Germany.<sup>28</sup> There are also reports that Japan and Canada are unlikely to meet their targets to reduce emissions because of the high cost.<sup>29</sup>

### Fails to Build an International Consensus

The aspiration of the proponents of Kyoto to build on it as a "first step" has not succeeded. There is no sign that the U.S. Administration or the U.S. Congress will propose that the U.S. accede to the Protocol.<sup>30</sup> Developing countries have also rejected overtures from European representatives since the Kyoto Protocol came into effect to accept binding commitments to reduce emissions.

### Cap-and-Trade Problems

Worldwide, free market economists have lauded the provision in the Kyoto Protocol to adopt emissions trading to spread efficiently the cost of capping emissions. Initial estimates of the cost of global measures to reduce greenhouse gases were that the cost to the global economy would be much higher if there was no trading. The effectiveness and feasibility of global emissions trading is now being questioned.

Because it is clear the Kyoto Protocol is floundering, proposals have been made in a number of countries to introduce a system of cap-and-trade as an alternative. Intellectually, there is little distinction, as Kyoto was an example of a cap-and-trade system.

The experiences to date under Kyoto have demonstrated fundamental problems that are likely to prevent cap-and-trade systems from succeeding.

Arbitrary Regulation of Energy Consumption
The consumption of products which generate green-

The consumption of products which generate greenhouse gases has to be constrained by a regulatory cap on the volume of those emissions before a market in emission permits could emerge. The cap ensures there is a demand for emission permits and trading in helps to minimize the cost of the cap, as efficiently as possible.

- 26 UNFCC [United Nations Framework Convention on Climate Change], 2007, CDM Statistics website [accessed at www.unfcc.org]
- 27 EC [European Commission], 2007, 'Environmental economics', European Commission website, [accessed at http://ec.europa.eu/environment/enveco/climate\_change/highlights.htm
- 28 ICCF [International Council for Capital Formation], 2005a, 2005b, 2005c Kyoto Protocol and Beyond: the Economic Cost to Spain, ICCF, Brussels [accessed at http://www.iccfglobal.org/pdf/Spainfinal101705.pdf]
- 29 CBC [Canadian Broadcasting Corporation], 2007, 'Canada can be a leader in climate change battle: Harper', CBC World website, 4 June [accessed at http://www.cbc.ca/world/story/2007/06/04/harper-germany.html . In 2004, Japan's emissions greenhouse gases were 24 percent above its 1990 baseline (see http://www.eia.doe.gov/emeu/cabs/Japan/Environment.html ).
- 30 Following the Congressional mid-term elections in 2006, there appears to be a stronger inclination within the US Congress to tackle climate change but there is no indication that the US Senate is prepared to overturn the Byrd-Hagel Resolution (S. Res. 98). This resolution stated the 'sense of the Senate' on the issue of US ratification as follows: the US should not sign any protocol that did not include binding targets and timetables for developing as well as industrialized nations or that "would result in serious harm to the economy of the United States". It was adopted unanimously by the Senate (95-0).

# Countries which found the caps in the Kyoto Protocol unacceptable did so because the costs of regulating economic activity in this way were excessive.

Countries which found the caps in the Kyoto Protocol unacceptable did so because the costs of regulating economic activity in this way were excessive. In part this was because they were set without regard for the country's circumstances or its ability to meet them. The caps were set arbitrarily by a political process without a clear understanding of the implications involved.

### Price Instability of Emission Trading

The system for trading emission permits in sulfur dioxide (SO2) in the U.S. is frequently cited as the model for a global carbon emissions trading system. The SO2 scheme has, however, been shown to create high volatility in permit prices, even though the U.S. Environmental Protection Agency has the authority to issue additional permits to dampen price volatility but it has not worked.  $^{\scriptscriptstyle 31}$  Dr. Nordhaus notes the price of carbon prices in the SO2 market have fluctuated between US\$70 and US\$1550 per ton and in the European Trading System have varied around a band of plus or minus 50 percent, observing fluctuations like this are "extremely undesirable" in such economically strategic markets such as energy.<sup>32</sup> As Dr. Robert Shapiro, former economic adviser to President Bill Clinton notes, significant price volatility creates an additional cost for those who use the markets.

Drs. Nordhaus and Shapiro join a widening group of experts in the United States<sup>33</sup> who argue that a common global carbon tax would be a more effective tool than global systems of emissions trading. It is widely accepted among economists that a tax on production of greenhouse gas emissions would be a more effective tool to reduce emissions than a system of cap-and-trade inside a national economy. However, a global tax

of any sort would be exceedingly difficult for the international community to introduce and administer.

Necessary Institutional Structure Missing
Although the Kyoto Protocol provides for international trade in national emission permits, the international institutional structure required to support it does not exist.

A small private international market for trading emissions has been established. The Chicago Climate Exchange (CCX) is a global market for trading greenhouse gas emission credits that opened in 2003. Its members make a legally binding commitment to meet annual emission reduction targets covering the six major greenhouse gases. Those who reduce their emissions below their target have credits to sell or bank, while those who exceed them have to purchase offsets from other members. By the end of May 2007, CCX members had realized cumulative savings of 23.7 million tons of CO<sub>2</sub>-e with trades totaling 1.8 million tons for the month at average price of US\$3.45 per ton.34 But this is considered to serve the market created by corporations and businesses purchasing credits for corporate affairs purposes (to demonstrate action to address climate change) and the limited requirements to meet limits on emissions of local regulators, as in some U.S. States. The volume of credits traded in this market is very small.

There is still no transparent and trustworthy institutional framework that can provide the assurance that an emissions permit issued in a particular jurisdiction has the underlying value that is claimed for it.

The Protocol has not secured any reductions in global emissions. World emissions of energy-related greenhouse gases in 1990 were estimated at 21.2 billion metric tons. The level of emissions on current trends by 2015 is estimated to be 33.9 billion metric tons.

<sup>31</sup> Shapiro, Robert J, 2007, Addressing the Risks of Climate Change: The Environmental Effectiveness and Economic Efficiency of Emissions Caps and Tradable Permits, compared to Carbon Taxes, American Enterprise Institute, 5,6.

<sup>32</sup> Nordhaus, op cit

<sup>33</sup> For example Richard Cooper at the Harvard School of Government.

<sup>34</sup> CCX [Chicago Climate Exchange], 2007, CCX Market Report, iv(5), May [accessed at www.chicagoclimatex.com

# The decision by the governments, which negotiated the Kyoto Protocol, to provide for a global system of trading emissions in greenhouse gases is one of the most poorly considered decisions ever taken by the international community.

Governments have to set up the national systems to issue the emission credits in the first place. What would restrain the temptation of governments to play politics with the issuance of credits? Experience with the European Trading System showed governments issued more credits than were needed in the first year of operation.

What would give a purchaser of a credit issued in another country confidence that the credit was valid and would hold its value? What would give confidence that a consistent standard of monitoring compliance was applied in all countries operating in the scheme? No such system was established in the E.U., as international regulation of national systems of issuance of permits is not feasible. No comparable system exists for other financial instruments. It must be assumed the markets would mark down the value of permits when confidence in them was low.

Recent reports demonstrate the commercial risks from market chicanery. The Enron case also demonstrates how cheating can occur in a well regulated system. If honest dealings can not necessarily be assured in the U.S. economy which has very sophisticated institutions to guarantee value on financial instruments and fair dealing in trading, it is impossible to contemplate how to create an international institutional structure which would generate the requisite degree of confidence to enable emissions trading among the 39 parties listed in Annex B of the Kyoto Protocol to occur, let alone how that could be delivered to a system with over 100 parties as would be necessary if a truly global system of trading were established.

The decision by the governments, which negotiated the Kyoto Protocol, to provide for a global system of trading emissions in greenhouse gases is one of the most poorly considered decisions ever taken by the international community.

### **Key Lessons from the Protocol**

The following conclusions can be drawn:

1. Strategies need to recognize that the interests in every economy are different.

Developing countries supported the Protocol because it permitted them to consider strategies that met their development needs. The same principle applies to differences in approach among industrialized economies.

2. Global regulation of economic activity does not work.

Commitments that incur significant costs and penalize economic growth will not be met by governments. Half of the Annex One countries are not expected to meet their targets under the Kyoto Protocol. There is no consensus among Parties to the UNFCCC to extend the system of global regulation of economic activity.

3. Strategies must be equitable to the participants.

Reducing emissions or slowing the growth in emissions is costly. Each country has to regard the economic cost of reductions as reasonable and equitable. The measure of that cost is a national judgment, not a common international benchmark

4. Countries want to adopt differentiated approaches.

To secure support, Kyoto had to provide for a dual track approach—industrialized parties committed to mandatory targets to cut emissions; developing countries pursued voluntary national strategies. Other approaches to reduce emissions have emerged outside Kyoto, particularly the Asia-Pacific regional strategy.

<sup>35 &</sup>quot;Beware the carbon offsetting cowboys," Financial Times, April 6, 2007, p. 4. "Industry caught in carbon credit smokescreen," *Financial Times*, April 6, 2007, p. 1.

### VII. Reducing Emissions Through Cooperative and Voluntary Action

Public discussion about options for climate change strategies have been almost exclusively focused on the Kyoto cap-and-trade model. This has left an erroneous impression that regulation of energy to mitigate greenhouse gas emissions is the only viable strategy to address climate change.

There has been other important collaboration in voluntary programs among governments as well as very significant programs of national action by governments, as well as some remarkable private programs. These programs have achieved valuable results but have received little public attention. A wider set of options to tackle climate change is available than is generally believed.

### Asia-Pacific Partnership on Clean Development & Climate

Officially launched in January 2006 in Sydney, the Asia-Pacific Partnership on Clean Development and Climate is the largest international program outside the Kyoto Protocol to address climate change. It brings together six Asian Pacific countries—Australia, China, India, Japan, Republic of Korea, and the U.S. – that account for around half of all global greenhouse gas emissions, and includes the major economies whose greenhouse gas emissions are projected to increase significantly in the future.<sup>36</sup>

It is an important approach to the problem, not just because its members emit more greenhouse gases than the parties to Kyoto, but because its goal and approach are different. The goal is to identify and develop technologies and processes that can reduce emissions and which can be adopted without incurring a penalty on economic growth.

The focus of the Partnership is not on how to regulate a reduction in emissions globally but on how to develop applied means by which reductions in emissions can be achieved by examining technologies, practices and systems in specific industries. The program engages the private sector directly. This is an efficient

## Programs of the Asia-Pacific Partnership on Clean Development and Climate

**Aluminium** (Chair: Australia; Co-Chair: U.S.A): The Partners have proposed seven projects with the aim of enhancing aluminium production through best practice use of existing equipment and technologies, continued development and deployment of new technologies as well as higher recycling. The peak aluminium bodies in the partner countries have agreed to cooperate on environmental technologies, energy efficiency, health and safety education, recycling education, product applications and environmental measurement and reporting.

**Buildings and Appliances** (Chair: Republic of Korea; Co-Chair: U.S.A): The building sector accounts for 20 to 40 percent of primary energy usage in Partner countries and they have the majority of global manufacturing capacity in a diverse range of appliances. Therefore the Partners aim to demonstrate technologies, enhance and exchange skills relating to energy efficiency auditing, share experiences and policies on best practices with regard to standards and codes, as well as labeling schemes for buildings, building materials and appliances.

**Cement** (Chair: Japan; Co-Chair: China): This task force has identified six initial projects to facilitate the uptake of best available technology and environmental management systems in Partnership countries through the deployment of energy-efficient and cleaner product formulation technologies, transfer of information and experiences on emerging technologies and addressing of barriers to the uptake of these technologies.

**Coal Mining** (Chair: U.S.A; Co-Chair: India): The Partner countries collectively produce approximately 65 percent of global coal output, and therefore have significant scope of improving the efficiency of the mining and processing of coal to contribute to emissions reductions. The task force, through its sixteen proposed projects, works to improve coal processing and developing new coal-based generation technologies, focusing on four principal themes, namely

Continues next page.

<sup>36</sup> DFAT [Department of Foreign Affairs and Trade], 2006, Asia-Pacific Partnership on Clean Development and Climate: Partnership for Action, Canberra

### (Continued from previous page)

- managing environmental impacts and rehabilitating the environment;
- health and safety efforts to achieve zero harm;
- economic resource recovery to maximize resource recovery through more cost-effective and efficient extraction technologies; and
- workforce planning and skills development to ensure an adequate and competent workforce.

**Steel** (Chair: Japan; Co-Chair: India): The Steel Task Force aims to facilitate the uptake of best available technology, practices and environmental management systems in Partnership countries together with increased recycling. The Task Force also aims to assist with the provision of expert advice in relation to the opportunities to reduce greenhouse gas and other emissions via the introduction of existing and emerging technologies and identify any other opportunities.

**Cleaner fossil energy** (Chair: Australia; Co-Chair: China): The task force has identified five major themes for collaborative activities to build capacity and accelerate the development and deployment of cleaner fossil energy technologies.

## **Renewable energy and distributed generation** (Chair: Republic of Korea; Co-Chair: Australia): Its objectives include:

- facilitating the demonstration and deployment of renewable energy and distributed generation technologies in Partnership countries;
- promoting collaboration among Partners on research, development and implementation of renewable energy technologies;
- illuminating the financial and engineering benefits of distributed energy systems; and
- addressing challenges to the uptake of renewable energy and distributed generation technologies.

**Power generation and transmission** (Chair: U.S.A; Co-Chair: China): The overall goal is to improve the efficiency and environmental performance of power generation, transmission, distribution and end-use.

# Other research has demonstrated that wider adoption of modern technologies for generating power from fossil fuels can deliver superior cuts to those sought under the Kyoto Protocol.

way of discovering and developing processes and methods that can deliver effective results.

The Partnership builds on existing bilateral and multilateral initiatives and operates fully within the precepts of the UNFCCC. It seeks to address the increased energy needs and the associated challenges of local air pollution, energy security, and climate change, while recognizing that economic development and poverty eradication are overriding goals.

The partners formed eight public-private Task Forces to develop and implement action plans in five energy-intensive sectors: aluminum; buildings and appliances; cement; coal mining; and steel, in addition to three energy-supply sectors: cleaner fossil energy; renewable energy and distributed generation; and power generation and transmission.

When the Partnership was announced, it was criticized by environmental NGOs like Greenpeace because it did not set mandatory targets to reduce emissions. This criticism reflects the fallacy that only mandatory targets can reduce emissions. A detailed study of the strategy and programs of the Partnership found that it could achieve the sort of emission cuts which were the original ambition of the Kyoto Protocol.<sup>37</sup> Other research has demonstrated that wider adoption of modern technologies for generating

<sup>37</sup> ABARE [Australian Bureau of Agricultural and Resource Economics] 2006, *Technological Development and Economic Growth*, ABARE Research Report 06.1, Canberra

power from fossil fuels can deliver superior cuts to those sought under the Kyoto Protocol.<sup>38</sup> A report by Charles River and Associates concluded that if China achieved the energy efficiency of Japan (by utilizing existing technologies), it could reduce its current emissions of carbon dioxide by 50 percent.<sup>39</sup>

Other Voluntary Partnerships and Programs
Other programs for mitigation and adaptation are significant and are classified here as cooperative programs among governments, national government programs and private sector funded activities and listed below. Fuller detail is provided in Annex A.

### **Voluntary Programs and Projects**

### **Cooperative projects**

- US-China Methane Program:
- Carbon Sequestration Leadership Forum
- EU near-Zero Emissions Coal (nZEC) Project in China
- The European Climate Change Program

### **National programs**

- The US has a number of programs e.g. energy star, natural gas star along with sector based voluntary programs.
- China's National Climate Change Program (CNCCP)
- Japan's Cool Earth 50 Program
- Japan's Voluntary Emissions Trading Scheme
- Australia's National Climate Change Program
- The Mexico Greenhouse Gas (GHG) Program

### **Private Sector Initiatives**

- Exxon Mobil Stanford Program
- Virgin Group's Renewable Energy Initiative
- Clinton Foundation's Energy Efficiency Building Retrofit Program
- HSBC Climate Partnership

39 See Thorning op cit

38 Thorning, Margo, 2006, "The Impact of Voluntary Measures and the Asia-Pacific Partnership for Reducing Greenhouse Gas Emissions', Testimony before the U.S. Senate Committee on Commerce, Science and Transportation Subcommittee on Global Climate Change and Impacts, International Council for Capital Formation, Washington, DC [accessed at www.iccf.org]

### **VIII. Assessing Post-Kyoto Options**

### **Shaping an Effective Global Strategy**

Reviewing the lessons from Kyoto and the experience with other strategies to tackle climate change, the following principles are drawn as what should guide development of a global strategy on climate change which is regarded as effective and equitable, a prodevelopment strategy.

An effective strategy should:

Enjoy consensus among countries which account for a substantial majority of global greenhouse gas emissions.

The atmosphere is a global commons. Action to prevent environmental damage to it by human activity must of necessity be global. No government regulations can control any part of the atmosphere. So to reduce impacts on the atmosphere generated by human activity requires collaboration by governments whose states can regulate a substantial majority of that human activity.

Support national development objectives.

Action to protect the environment is not costless. Greenhouse gases are generated by activities which generate prosperity and raise living standards. The largest countries in the world have the largest number of poor. They are also committed to lift those people out of poverty. Any climate change strategy must enable countries to pursue national development objectives. There is also an environmental dividend in this approach. Numerous studies demonstrate that the wealthier a state is, the more effectively it can manage the environment and have the adaptive capacity to adjust to whatever climate occurs in the future.

Demonstrate tangible short term results.

Most believe that climate change strategies should reduce emissions in the short- term. The debate is over how big reductions should be. While some urge deep reductions, there are persuasive arguments that modest cuts in the short term will be effective.

### Table 2

### **Assessing The Effectiveness of Global Climate Change Strategies**

Secure Global Consensus	Support Development Priorities	Deliver Tangible Reductions in Emissions	Regard Cost as Equitable	Facilitate Adaptation
NO	NO	NO	YES/NO <sup>41</sup>	NO
s NO	YES	YES	YES	YES
	Global Consensus NO	Global Development Consensus Priorities  NO NO	Global Development Reductions Consensus Priorities in Emissions  NO NO NO NO	Global Development Reductions Cost as Consensus Priorities in Emissions Equitable  NO NO NO NO YES/NO41

Allow countries to regard the cost of the impact as spread equitably.

The level of carbon intensity among economies varies greatly. The burden of the adjustment will be greater for the more carbon intense economies, wealthy and poor. Countries must be able to consider that the cost of the strategy falls equitably. The measure of this will not be the comparative cost to economies but the comparative impact on their populations.

Facilitate adaptation and mitigation.

The UNFCCC recognized facilitation as well as mitigation. For some countries, climate change strategies need to have high priority for adaptation.  $^{40}$ 

Assessing existing strategies

This analysis shows two general strategies have been followed to date – the Kyoto model of regulating emissions and voluntary models of non-regulatory collaboration.

These strategies are assessed against the criteria for a successful strategy in the matrix below. Neither can satisfy all the principles for an effective, pro-development global strategy on climate change. The regulated model fails to deliver on several criteria and the idea of general voluntary cooperation would not be acceptable those Governments who firmly believe regulation is necessary.

<sup>40</sup> The Chinese government observed in its strategy to address climate change, released in June 2007, that more focus was required on adaptation.

<sup>41</sup> Despite binding legal commitments under Kyoto to achieve reductions, it is clear some Annex I countries will not. On that precedent the risk of non-compliance in a successor cap and trade model may also not deliver tangible reductions, like Kyoto.

### IX. A New Approach the Multi-Track Strategy

### A Broader Approach Required

The previous analysis shows that neither the regulatory approach, either with short-term and or long-term commitments and with or without deep short term commitments, nor the voluntary collaborative approach, straddles the spectrum of positions in the global debated on how to shape an effective and pro-development strategy which will secure broad consensus.

There is a straightforward option which straddles both camps and meets all of the criteria for a successful global strategy. It is a Multi-Track Strategy whereby parties lay out broad goals for a climate change strategy then select the track which suits them best to meet that goal.

A similar concept is embedded in UNFCCC in Article 1.b where parties are required to develop and implement their own national strategy to address climate change. The Framework Convention reflects the only global consensus today on how to tackle global warming. It makes eminent sense to build on it.

In the approach envisaged here, Governments would collectively identify general goals for climate change strategies, but in terms which enjoy consensus. These goals would be adopted as general program by parties to the UNFCCC. General goals for what the climate change strategy aims to achieve would have to be indicative, not mandatory, and broad goals for mitigation should probably be a mix of qualitative and quantitative, not solely quantitative, if consensus were to be secured. Adaptation should be covered as well as required by the UNFCCC.

Parties to the UNFCCC would then develop national programs to achieve those goals. They would also be obliged to adopt the strategies that best fit their circumstances, in particular their level of development and the degree of carbon dependence and intensity in their economies.

Those who want to use regulated controls on energy consumption to meet goal could do so, in national administration and in conjunction with other parties if they wished. If some wanted to continue to use the Parties to the UNFCCC would then develop national programs to achieve those goals. They would also be obliged to adopt the strategies that best fit their circumstances, in particular their level of development and the degree of carbon dependence and intensity in their economies.

Kyoto Protocol to harmonize regulatory approaches with others, there is no reason why they could not. Similarly, those who wanted to participate in a collaborative arrangement like the Asia-Pacific Partnership would be free to demonstrate reductions of emissions through that program. And those who wished to demonstrate mitigation and adaptation through national programs could use that avenue. Some might use all three avenues.

There would need to be an obligation on parties to regularly report on progress in meeting goals, and it would be wise for parties to review and revise the general goals every two years to enable the strategy to be adjusted to take into changing circumstances and new research.

### **Connecting to the UNFCCC**

Agreement by members of the United Nations to implement a Multi-Track strategy to tackle climate change could be a subsidiary instrument of the UN Framework Convention on Climate Change. Its purpose would be to demonstrate action by parties to the Convention to fulfil the Convention's goals. The instrument could take several forms, ranging from a set of Agreed Guidelines to a formal Protocol. The nature of the instrument should ideally be determined after the substance of the Strategy has been agreed.

### **Criticisms**

Two basic objections are anticipated. The first is that large reductions in emissions are required sooner rather than later (as envisaged in the Stern report) to mitigate increasing emissions in the long run. A voluntary system like this is unlikely to deliver the deep cuts required.

The degree of conviction, no matter how firm, must be tempered with the necessary judgment about what the global community can or will do when determining the practicality of propositions for strategies that are expected to secure global support.

The assumption underlying this is taken as given among many climate policy specialists, but it does not represent mainstream thinking among economic analysts and development experts as noted in this report. There is well developed and expert thinking which advises that modest reductions in emissions in early years will be adequate and that it is more cost effective for countries to meet the costs of mitigation and adaptation several decades or a century later when all societies will be wealthier. Experience to date also demonstrates that national action and global collaboration does deliver reductions in emissions.

Attitudes on how much action should be taken and how quickly are strongly held. The degree of conviction, no matter how firm, must be tempered with the necessary judgment about what the global community can or will do when determining the practicality of propositions for strategies that are expected to secure global support.

Whenever the global community has been required to address this question, it has always decided that when environmental strategies are implemented they must accommodate the development imperative of the international community. The principal reason the Kyoto Protocol failed is that too many people overlooked this fundamental requirement.

The second complaint is likely to be that the Multi-Track strategy has no compulsion. The retort to that is simple; if there were compulsion, there would be no climate change strategy. Global solutions to global problems will only work if crafted within the reality of how global politics work.

### X. Conclusion

The international community has re-embarked on the search for a global strategy to manage climate change. It will not succeed unless it steps outside of the narrow framework in which climate change policy has been discussed and adopts a new approach.

The new approach to climate change must produce a pro-development strategy. If it does not, the failure of the Kyoto Protocol will be repeated.

This report proposes a new approach—a Multi-Track Strategy for climate change.

The building blocks for this strategy have been in front of us for some time. They lie in part in the UN Framework Convention on Climate Change. They also lie in the experience, success and failure of those previous and current efforts to address climate change.

We have also seen strong, global affirmation, as in the U.N. Millennium Development Goals, of the need to get the world's poorest billion off the bottom rung of human society.

The level of concern about climate change, particularly in the industrialized world is understandable. However so is the concern in the developing world about lifting people out of poverty. This is not a question which simply divides people between the developed and developing worlds. There is great concern about poverty in the industrialized world, as evidenced by the Live Aid concerts in 2007. Indeed it is noted that viewing audiences for the Live Aid conferences seemed considerably larger than those for the Live Earth concerts.

### Annex A

### Voluntary Programs and Partnerships to Address Climate Change

Following are details of leading programs for voluntary action to address climate change referred to in Chapter VIII. They are grouped as cooperative programs among governments, national government programs and private sector funded activities.

### **Cooperative Projects**

### U.S.—China Methane Program

The Methane to Markets Partnership is an international initiative with the goal of reducing global methane emissions to enhance economic growth, promote energy security, improve the environment, and reduce greenhouse gases.

A U.S.-led initiative, the Methane to Markets Partnership is a major element of a series of international technology partnerships advanced by the Bush Administration on hydrogen, carbon sequestration, fusion and advanced nuclear power technologies, with the aim of developing and deploying new energy technologies to help reduce emissions and greenhouse gas intensity in the context of sustained economic growth. The Partnership calls for collaboration among developed countries, developing countries and countries in transition, as well as active participation of the private sector.

Under this multilateral Partnership, the U.S. Environmental Protection Agency (US-EPA) plays a lead role building on its success of the voluntary domestic methane partnership programs. It is engaged in capacity building and project implementation activities in China to facilitate cost-effective, near-term methane recovery and use as a clean energy source.

In the coal sector, US-EPA funds the China Coalbed Methane Clearinghouse. The Clearinghouse, housed by the China Coal Information Institute, provides information and logistical support to private businesses and foreign and domestic government agencies interested in coal bed methane and coal mine

methane development in China. With access to the third largest coal-bed methane reserve in the world<sup>42</sup> along with being the world's largest coal mine methane emitter, China has the potential to capture and use methane as a clean energy alternative in a cost-efficient manner.

China passed a renewable energy law in May 2005, providing for a feed-in tariff for renewable technologies, and established grid feed-in requirements as well as cost-sharing mechanisms. More recently in May 2006, U.S.-based engine manufacturer- Caterpillar Inc. was awarded a US\$58 million contract in China to supply power generation equipment for the world's largest coal mine methane fueled power plant. The project is the result of collaborative efforts between the public and private sectors through the Methane to Markets Partnership. Once completed, the project is expected to have helped avoid an estimated greenhouse gas emissions equivalent to emissions from one million cars annually. At the conclusion of the U.S-China Strategic Economic Dialogue (SED) meeting in May 2007, both parties agreed to develop up to 15 large-scale methane capture and use projects for coal mines in China over the next five years.<sup>43</sup>

### $Carbon\ Sequestration\ Leadership\ Forum$

Carbon Sequestration Leadership Forum (CSLF), launched in early 2003 by the U.S. Department of State and the U.S. Department of Energy, is a voluntary climate initiative of 21 developed and developing nations plus the E.U. They collectively account for about 75 percent of all manmade greenhouse gases emissions.

The program focuses on the development of improved cost-effective technologies for the separation and capture of greenhouse gases for its transport and long-term storage, as well as overcoming the barriers to deployment of these technologies across the globe.

### E.U. near-Zero Emissions Coal (nZEC) Project in China

A Joint Declaration on Climate Change was issued between China and the E.U. in the September 2005 meeting held at Beijing. A key element of this partner-

<sup>42</sup> People's Daily Online, < http://english.peopledaily.com.cn/200512/03/eng20051203\_225406.html>

<sup>43</sup> US Department of State, International Information Programs,

<sup>&</sup>lt; http://usinfo.state.gov/xarchives/display.html?p=washfileenglish&y=2007&m=May&x=20070524155301lcnirellep9.307498e-02> the control of the

ship involves the near-zero emission coal project which aims to significantly reduce the climate change impact from coal-fired electricity generation in China. With a funding commitment of £3.5 million, the U.K. is taking the lead in the first phase of this initiative, which involves a 3 year feasibility study, examining the viability of different technology options for the capture and storage of greenhouse gases emissions from power generation in China.

### The European Climate Change Program

The second phase of the European Climate Change Program (ECCP II) was launched on 24 October 2005. A successor to the E.U.'s first climate change program, ECCP II aims to explore further cost-effective options for reducing greenhouse gas emissions within the framework of the E.U.'s strategy for increasing economic growth.

The programme consists of several working groups:

- ECCP I review (with 5 subgroups: transport, energy supply, energy demand, non-CO<sub>2</sub> gases, agriculture);
- Aviation;
- CO<sub>2</sub> and cars;
- Carbon capture and storage;
- · Adaptation; and
- E.U. Emission Trading System review.

### **National Programs**

China's National Climate Change Program (CNCCP) On June 2007, the government of China announced its National Climate Change Program (CNCCP), which outlines China's objectives, basic principles, and key areas of actions, as well as policies and measures to address climate change for the period up to 2010. The key elements of the CNCCP are as follows:

A number of key principles underpin China's effort of addressing climate change. This includes, among others, addressing the issue of climate change within the framework of sustainable development; placing equal emphasis on both mitigation and adaptation to climate change; following the principle of "common but differentiated responsibilities" with developed countries taking the lead in reducing greenhouse gas emissions and providing financial and technical support to developing countries; and integrating climate change policy with other national programs to ensure a coordinated approach.

The overall objectives of China's national climate change program are to control the emission of greenhouse gases through promotion of energy conservation and efficient utilization, developing renewable energy, and increasing forest coverage rate. Other objectives include enhancing adaptation capacity by strengthening farmland infrastructure, natural forest conservation and implementing key ecological restoration programs; strengthening scientific research and technology innovation on energy development, conservation and clean energy; and raising public awareness on climate protection and strengthening the institutions and mechanisms to address climate change.

### Japan's Cool Earth 50 Program

Prime Minister of Japan, Mr. Shinzo Abe announced in May 2007, a new climate change proposal. The strategy proposes three pillars.

- The first is a long-term strategy for a 50 percent reduction of global emissions by year 2050 as a common goal for the world. This would be achieved through international cooperation in technological innovations for low-emission energy generation, more efficient use of alternative energy sources and nationwide initiatives at creating a low carbon society.
- The second pillar is a mid-term strategy for establishing an international framework to address global warming beyond 2013, based on three principles:
  - Participation of all major emitters of greenhouse gases;
  - The flexibility to take into account the circumstances of each country;
  - A balance between environmental protection and economic growth; and
- The third and final pillar proposes to launch a national campaign to ensure that Japan achieves its Kyoto Protocol target of reducing emissions by 6 percent from the 1990 baseline level.

In realizing the above goals, Japan aims to extend its support to the developing countries which agree to actively participate to Japan's proposals to reduce greenhouse gas emissions. New financial mechanism will be created for such assistance, which will be larger in size as well as more long-term in nature. It will also actively develop and expand the Cebu Declaration which formulates energy conservation

goals among other things, for improving global energy efficiency, and promote international efforts to expand the safe and peaceful use of nuclear power.

Japan's Voluntary Emissions Trading Scheme
Launched in May 2005, the scheme seeks to achieve a
cost-effective and substantial reduction in greenhouse
gas emissions, and accumulate knowledge and experience relating to domestic greenhouse gases emissions
trading.

Under the scheme, companies participate voluntarily by pledging concrete emissions reduction targets and the Japanese ministry of Environment subsidizes the installation cost of greenhouse gases emissions reduction equipment to help businesses that are actively attempting to reduce greenhouse gas emissions. In the case of non-compliance by companies, the subsidy is to be refunded to the ministry. A total of ¥2.6 billion (approx. US\$23.6 million) have been allocated from the budget for this subsidy.<sup>44</sup>

In September 2005, the Japanese Ministry of Environment selected 32 companies and corporate groups as participants in this Voluntary Emissions Trading Scheme based on their cost-effectiveness for this program. As part of this scheme, companies are also allowed to trade greenhouse gases emission quotas to meet their reduction targets. In October 2006, carbon credits were traded between domestic companies for the first time in Japan with Nippon Electric Glass Co. selling 200 tons of greenhouse gases to Funai Consulting Co. under the Voluntary Emissions Trading Scheme.<sup>45</sup>

Australia's National Climate Change Program
The Australian government launched its climate change policy in July 2007, which details the government's long term domestic climate change strategy. The policy aims at achieving global reductions in emissions while maintaining Australia's economic strength. The government is committed to a long term 'aspirational' goal for reducing emissions, by setting goals which are both environmentally and economically robust in 2008.

An Australian Emissions Trading System (AETS) will subsequently be introduced by 2012, to be administered through a single national regulator within the Treasury portfolio. The system establishes a forward price for greenhouse gas emissions and will represent the primary mechanism for achieving long term emissions reduction goal. Legislation for mandatory energy and greenhouse gas emissions reporting will be introduced by end of 2007.

Under its climate change policy, the Australian government has also supported various investments in renewable energy with funding in excess of A\$3.5 billion. In addition, the government has announced A\$126 million for a new Australian Centre for Climate Change Adaptation aimed at improving stakeholders' understanding and response to climate change impacts. More recently, the government has announced a A\$336 million program which will provide up to A\$50,000 for every school in Australia to install solar hot water systems and a rainwater tank.

The Mexico Greenhouse Gas (GHG) Program

The Mexico Greenhouse Gas (GHG) Program is a voluntary national public-private initiative launched in 2004 through an agreement between the Mexican Secretariat of Environment and Natural Resources, the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD).

The program provides a range of technical tools and training to develop the capacity of companies in accounting for and reporting their greenhouse gas emissions, providing information about baseline emissions and helping companies identify the potential areas of opportunity to reduce emissions. Twenty-seven companies in Mexico are currently participating in the program, including those from the most-energy intensive sectors. In February of 2006, fifteen companies under the program who collectively represented about 25 percent of the total national emissions generated by industrial processes<sup>46</sup>, were recognized for publicly reporting their greenhouse gas emissions.

<sup>44</sup> International Emissions Trading Association website http://www.ieta.org/ieta/www/pages/index.php?IdSitePage=962.

<sup>45</sup> http://www.planetark.com/dailynewsstory.cfm/newsid/38583/story.htm.

<sup>46</sup> http://www.wri.org/newsroom/newsrelease\_text.cfm?nid=355

### **Private Sector Initiatives**

As is widely recognized, the involvement of the private sector is vital for building capacity, transferring technology, and promoting investment to help combat climate change in a sustainable manner. The following are some of the initiatives embarked on by the private sector to address the challenge of future energy needs and climate change. The list, while not exhaustive, is representative of action being taken outside of government frameworks.

### Exxon Mobil Stanford Program

Stanford University-based Global Climate and Energy Project (GCEP) is one of the largest privately funded low-greenhouse-gas-energy research efforts in the world. Sponsored by four energy-sector companies, namely Exxon Mobil, General Electric, Schlumberger and Toyota, financial contributions to the project are estimated to reach US\$ 225 million over a period of ten years, with Exxon Mobil as the largest sponsor planning invest up to US\$ 100 million. The project aims to undertake fundamental and pre-commercial research on a wide range of technologies that offer the potential to supply and use energy with significantly reduced greenhouse gas emissions.

Virgin Group's Renewable Energy Initiative
Sir Richard Branson's Virgin Group made a 10-year,
US\$3 billion commitment to renewable energy initiatives in September 2006, at the Clinton Global
Initiative headed by former U.S. President Bill Clinton.

The Group has committed to invest all future profits from its airline and train businesses into renewable energy initiatives both within the company and in other investments in new biofuel research and other projects to tackle emissions related to global warming. As part of this initiative, the Group has created Virgin Fuels.

With initial funding commitment from the Virgin Group of up to US\$400 million over three years, this investment unit is expected to invest, on behalf of the Virgin Group, in new products and technologies that will help reduce greenhouse gases emissions and slow global warming.

Clinton Foundation's

Energy Efficiency Building Retrofit Program

A global Energy Efficiency Building Retrofit Program,

a project of the Clinton Climate Initiative (CCI), was announced in May 2007. The program has brought together four of the world's largest energy service companies, five of the world's largest banks, and sixteen of the world's largest cities, in an effort to reducing energy use in buildings.

The four energy companies—Honeywell, Johnson Controls, Inc, Siemens and Trane—will conduct energy audits, perform building retrofits, and guarantee the energy savings of the retrofit projects. The five financial institutions—ABN AMRO, Citibank, Deutsche Bank, JPMorgan Chase, and UBS—will finance the first generation of retrofit projects, each committing to arrange \$1 billion for this effort. Sixteen of the world's largest cities have agreed to participate in the first round of the program, offering to implement activities to make their municipal buildings more energy efficient.

### HSBC Climate Partnership

In collaboration with the Climate Group, Earthwatch Institute, Smithsonian Tropical Research Institute (STRI) and World Wildlife Fund (WWF), HSBC recently created a five-year, US\$100 million partnership to respond to the threat of climate change worldwide. This investment, the largest ever corporate donation to each of these four environmental institutes, aims to help some of the world's big cities namely Hong Kong, London, Mumbai, New York and Shanghai to respond to the challenge of climate change; create 'climate champions' worldwide to undertake research; conduct large-scale field experiment on the long-term effects of climate change on the world's forests; and help protect some of the world's major rivers such as the Amazon, Ganges, Thames and Yangtze from the impacts of climate change.

### ABN AMRO Renewable Energy Fund

ABN AMRO committed to creating a renewable energy private equity fund to make major investments in renewable energy and energy efficiency companies. This fund, a part of the Clinton Global Initiative, was formally launched in June 2007.

ABN AMRO has committed to invest up to US\$63 million from its own account, with the remaining funds to be raised from institutional investors. The fund will also seek to measure the reduction in greenhouse gases emission created by its investments.

## Annex B Energy Realities and Economic Development

### **Energy Demand**

The 2006 World Energy Outlook released by the International Energy Agency has projected global primary energy demand to increase by just over 50 percent between 2004 and 2030 (IEA 2006).

Over 70 per cent of this increase (or 35 percentage points) is expected to come from developing countries, particularly those in Asia. China alone will account for 30 percent of the change (or 15 percentage points). Both population and economic growth will be faster in the developing countries than in the developed ones and energy demand there will increase strongly as a consequence.

Economic growth is one of the most important determinants of the growth in primary energy demand. Much of the growth in global economic activity over the period to 2030 is expected to occur in the developing countries of Asia (IEA 2007). GDP growth in the Asian developing countries is expected to average nearly 6 percent a year, thereby providing a significant stimulus to global energy supply.

The stage of economic development and the standard of living that individuals enjoy are also important determinants of aggregate energy demand. As a consequence energy intensity in the developing world is generally significantly higher than it is in the developed countries. This means that one percentage point of economic growth in the developing world generally requires a significantly higher input of energy to produce the output in question.

Carbon fuels are expected to dominate the energy outlook to 2030. Indeed their domination will intensify slightly over this period—increasing from 80 to 81 percent of global primary energy demand.

While the share of oil in global primary energy demand is expected to drop, the share of coal is expected to rise. As a consequence coal is expected to experience the biggest increase in demand, mainly for power generation, with 80 percent of the increase in coal demand occurring in China and India.

### **Energy Supply**

Meeting this increase in global primary energy demand will require substantial investment in the supply infrastructure.

More than half the required global investment over the period to 2030 will be needed in the developing countries, where energy supply is growing strongly. For example, China alone needs to invest nearly US\$4 trillion, or some 18 percent of the global total.

Although steady progress is being made in developing countries to expand the access of households to modern energy services, many people still rely heavily on wood and agricultural wastes (biomass) for their energy needs. At present biomass accounts for over 90 percent of household energy consumption in developing countries.

Around 2.5 billion people use biomass to meet their day-to-day energy needs and this is expected to increase to 2.7 billion—or one-third of the global population—over the period to 2030 due to population growth. There are still 1.6 billion people who do not have access to electricity. This needs to fall to less than one billion, if the Millennium Development Goals are to be met.

### **GHG Emissions from the Energy Sector**

The projected increase in global energy demand will see GHG emissions from the energy sector increase by 55 percent from 2004 to 2030. Emissions are expected to grow faster than primary energy demand—reversing the trend of the past 25 years—as the carbon intensity of primary energy is expected to rise. In large part this reflects the strong growth that is projected for coal and oil usage in the developing countries.

Developing countries will account for over threequarters of the increase in global GHG emissions from the energy sector over the period to 2030. Their share of global emissions is expected to rise from 39 percent in 2004 to over half by 2030.

China alone is expected to account for about 39 percent of the global increase and will more than double over the period. Indeed China will overtake the United States as the biggest emitter by 2010.

### Annex C Impacts of Kyoto Protocol on Industrialized Countries

The International Council for Capital Formation has published a series of in-depth studies that analyze the broader economic impacts of the Kyoto emission cuts on Germany, Italy Spain and the United Kingdom. The studies were carried out by Global Insight Inc, an international economic modeling firm.

### Impact on Energy Market

On the basis the emission cuts would be fully passed on to consumers in increased energy prices, they would reduce real disposable incomes. Electricity prices would increase by between 13 percent (in Italy) and 35 percent (in the UK) in real terms by 2010. Over the same period, gas prices would increase by more than 40 percent in three of the countries and by 30 percent in Germany.

Since there are very limited opportunities to substitute alternative energy sources over these period, households and industry would both reduce their energy consumption. Industry would replace energy-consuming plants, equipment and vehicles so as to increase their energy efficiency. Where possible, industry would also move the production of energy-intensive goods to those countries that do did participate in the Kyoto emission cuts.

### Impact on Output & Employment

As a consequence of the increase in energy prices produced by the emission cuts, there would be substantial reductions in output and employment in each of the countries in question. Compared to not having the Kyoto emission cuts over the period to 2010, the loss of gross domestic product (GDP)—a broad measure of output—would range from just under 1 percent (Germany) to more than 3 percent (Spain) a year. In the case of employment, the job losses in 2010 would also be substantial. The biggest losses would be felt in Spain (around 600,000 lost jobs) with the smallest in Italy (just over 200,000 lost jobs). In Germany and the UK the job losses would be over 300,000.

Labor productivity would suffer in each of the countries. The other factors of production would be made less efficient by the increase in energy prices and some plant, equipment and vehicles would have to be prematurely scrapped, thereby lowering the overall amount of capital per worker. Thereafter investment would progressively increase the size of the capital stock and wit it the amount of capital per worker. Eventually this would restore labor productivity to its pre-Kyoto level.

The decline in household consumption and in residential investment compared to what would happen without the emission cuts would have a depressing effect on business investment.

## Annex D Cost of Emission Reductions to Developing Countries—Lessons from Sir Nicholas Stern

This Annex examines the key conclusions and policy recommendations of the Stern Review of the economics of climate change (Stern 2006). It also analyses their implications for a number of developing economies and compares their results with those for a selection of OECD countries at different stages of development.

### **Background**

The Stern Review has estimated the economic benefits and costs of action to restrict man-made emissions of greenhouse gases (GHG) into the atmosphere.

The economic benefits are the external costs of the emissions averted. The Stern Review put them at US\$85 per ton of CO<sub>2</sub> equivalent (CO<sub>2</sub>-e) (Stern 2006, p. xvi). As for the costs, the Review concluded they would be less than 1 percent of GDP by the year 2050 (Stern 2006, p. xii). Stern estimated the benefits and costs over two centuries and used a near zero discount rate to reduce them to a net present value. The result was an 'overwhelming' case for 'urgent' action by all (Stern 2006, p.i). Stern also considered any delay would be 'costly and dangerous' (Stern 2006, p. xvii).

<sup>47</sup> An external cost is one that producers and consumers do not take into account when deciding how much to produce and consume respectively. In the case of GHG emissions, the external costs are the prospective economic consequences of an increase in their concentration in the atmosphere.

The Review was strongly criticized for overstating the benefits and understating the costs and for using a near zero discount rate (see Byatt et al 2006 & Carter et al 2006). Stern's estimates and conclusions lie well outside the mainstream economic literature on this subject (Byatt et al 2006, Dasgupta 2006 & Nordhaus 2007).

### **Economic Costs for Developing Countries**

The Stern Review recommended that countries impose a price for carbon by way of a carbon tax or a

system of GHG emission permits. Doing so was '...an essential foundation for climate-change policy' (Stern 2006, p. xviii).

We have analyzed the economic costs of this recommendation for a selection of developing economies. In doing so we sought to take into account the responses of households and businesses to the changes in energy prices that would be brought about by the introduction of the carbon tax/emissions permit regime.

### **Table 3** Economic Cost of Cutting GHG Emissions in Developing Countries

	Economic Cost of GHG Cuts (low estimate)	Economic Cost as Share of GDP (low estimate)	Economic Cost as Share of Consumption (low estimate)	Economic Cost of GHG Cuts (high estimate)	Economic Cost as Share of GDP (high estimate)	Economic Cost as Share of Household Consumption (high estimate)
Country	(US\$b)	(%)	(%)	(US\$b)	(%)	(%)
China	275.7	14.3	34.4	318.7	16.5	39.8
Saudi Arabia	28.87	11.5	27.7	33.3	13.3	32.0
Vietnam	5.1	11.3	27.2	5.9	13.0	31.4
India	71.0	10.6	25.7	82.1	12.3	29.7
Thailand	16.5	10.2	24.7	19.1	11.8	28.6
Indonesia	24.7	9.6	23.2	28.5	11.1	26.8
Malaysia	11.0	9.2	22.3	12.7	10.7	25.8
Poland	17.8	7.1	17.0	20.6	8.2	19.7
Taiwan	18.9	5.9	14.2	21.8	6.8	16.4
Philippines	4.9	5.7	13.7	5.7	6.6	15.9
South Korea	36.2	5.3	12.8	41.9	6.1	14.8
Bangladesh	3.0	5.0	12.2	3.4	5.8	14.1
Singapore	5.2	4.9	11.8	6.1	5.6	13.6
Sri Lanka	0.9	4.4	10.5	1.0	5.0	12.2
Canada	41.8	4.2	10.2	48.4	4.9	11.7
Brazil	24.5	3.7	8.9	28.4	4.3	10.3
US	411.5	3.5	8.5	475.9	4.1	9.8
Spain	24.0	2.3	5.5	27.7	2.7	6.4
Germany	59.3	2.2	5.2	68.6	2.5	6.0
Hong Kong	3.5	2.1	5.1	4.0	2.4	5.9
Italy	34.8	2.0	4.9	40.3	2.3	5.6
Japan	90.5	2.0	4.7	104.6	2.3	5.5
South Africa	23.4	1.7	4.0	27.1	1.9	4.7

<sup>48</sup> The non-OECD economies included in the analysis were: Bangladesh, Brazil, China, Hong Kong, India, Indonesia, Malaysia, the Philippines, Taiwan, Thailand, Saudi Arabia, Singapore, South Africa, Sri Lanka, and Vietnam. The OECD economies were: Canada, Germany, Italy, Japan, Poland, South Korea, Spain, and the United States of America

For this purpose we used empirical estimates of the sensitivity of aggregate energy demand to price changes from the recent economics literature. A range of estimates was used that covered the experience of both developed and developing countries. Our analysis also took into account the fiscal implications of the regime and their interaction with the overall tax and public expenditure system.

In both cases the analysis was carried out on the basis of Stern's own valuation of the external cost of carbon. Our estimates were based on data for 2004 as it was the latest year for which internationally consistent data on energy production and consumption were available. We have compared the results for these developing countries with equivalent estimates for a cross-section of OECD economies.<sup>48</sup>

The Table on the previous page contains the results of the analysis.

We were, however, unable to account for the public administration and private compliance costs that would be imposed by the Stern carbon tax/emissions permit regime. These costs are likely to be substantial, particularly for developing countries that have relatively immature or underdeveloped systems of public finance. For this reason our estimates are likely to underestimate the total economic costs of imposing this regime.

To provide a consistent perspective on the relative scale of these costs across the countries in question, we have expressed them as shares of GDP and of household consumption from the relevant national accounts. Expressing these costs as a share of household consumption reflects our expectation that most of the economic burden of implementation is likely to fall upon household incomes ultimately, rather than on public services.

If Stern's valuation of the external cost of carbon is correct, these estimates provide a good first approximation of the loss of material welfare that is inherent in the comprehensive and immediate implementation of Stern's proposed GHG emission cuts. This loss is equivalent to the reduction in the broadest definition of the standard of living that everyone in those countries would experience as a consequence.

### Costs as a Share of GDP

Of the 23 countries that were examined, China would have had, by far, the largest economic cost of carbon as a share of GDP with an average of just over 15 percent, equivalent to around US\$300 billion a year in aggregate. China was followed by Saudi Arabia and Vietnam each with carbon costing just over 12 percent of GDP. This was equivalent to around US\$31 billion per year for Saudi Arabia and some US\$5.5 billion a year for Vietnam. In very large part these results reflect the relatively heavy reliance of these three countries on coal and crude oil. For example coal accounted for more than 70 per of Chinese primary carbon energy consumption in 2004, while the Saudi Arabian and Vietnamese economies relied more or less exclusively on coal and crude oil products.

For India, Thailand, Indonesia and Malaysia, the average economic cost of carbon fell in the range from 10 to 12 percent of GDP. For the Philippines, Bangladesh, Sri Lanka and Brazil, the average cost amounted to between 4 and 10 percent of GDP. Of the remaining eight countries analyzed, only South Africa had an average cost of carbon that was under 2 percent of GDP.

### Costs as a Share of Household Consumption

When the economic cost of carbon is expressed as a share of household consumption, the pattern is similar but the equivalent shares are naturally much higher. China had by far the largest share on average (37 percent) followed by Saudi Arabia (30 percent) and Vietnam (29 percent). In part, these results reflect the relatively small share of GDP that accrues directly to households in those countries, or alternatively the relatively high share of delivered as public services. The results for India, Thailand, Indonesia and Malaysia were somewhat lower but still in excess of 24 percent of household consumption on average. The Philippines, Bangladesh, Sri Lanka and Brazil had an average of between 9 percent and 15 percent. Of the other countries, all had an average share that was over 4 percent.

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### **About World Growth**

World Growth is a non-profit, non-governmental organization established with an educational and charitable mission to expand the education, information and other resources available to disadvantaged populations to improve their health and economic welfare. At World Growth, we embrace and celebrate the new age of globalization and the power of free trade to eradicate poverty and improve living conditions for people in the developing world.

### **Our Philosophy**

World Growth believes that helping the developing world realize its full potential is one of the great moral aims for those of us fortunate to live in the wealthy developed world. We also believe that a misdiagnosis of what ails the underdeveloped world has yielded policy prescriptions that have been useless or even harmful to the world's "bottom billion."

World Growth believes that there is enormous untapped human and economic potential around the world. In order to unlock that potential, and allow the poorest of the world's poor a better life, it is necessary to realize changes in institutions and policies that permit growth and human flourishing.

Instead of aid and handouts, what the populations of developing countries need are social and political institutions and infrastructure that foster productive economic activity and generate robust economic growth. These include, but are not limited to, property rights and protections, the rule of law, free markets, open trade, government accountability and transparency.

For too long, well-meaning governments, aid agencies and others have promoted policies that fail to address the true problems that afflict poor societies. As a result, too many people around the globe remained locked in pre-modern conditions where their talents and inherent capacities are shackled.

The people of the developing world are fully capable of helping themselves to ensure a more prosperous existence. The path to prosperity does not begin with handouts from the West. Instead it requires identifying the genuine obstacles to growth and highlighting paths to reform that will yield sustainable and lasting change.

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