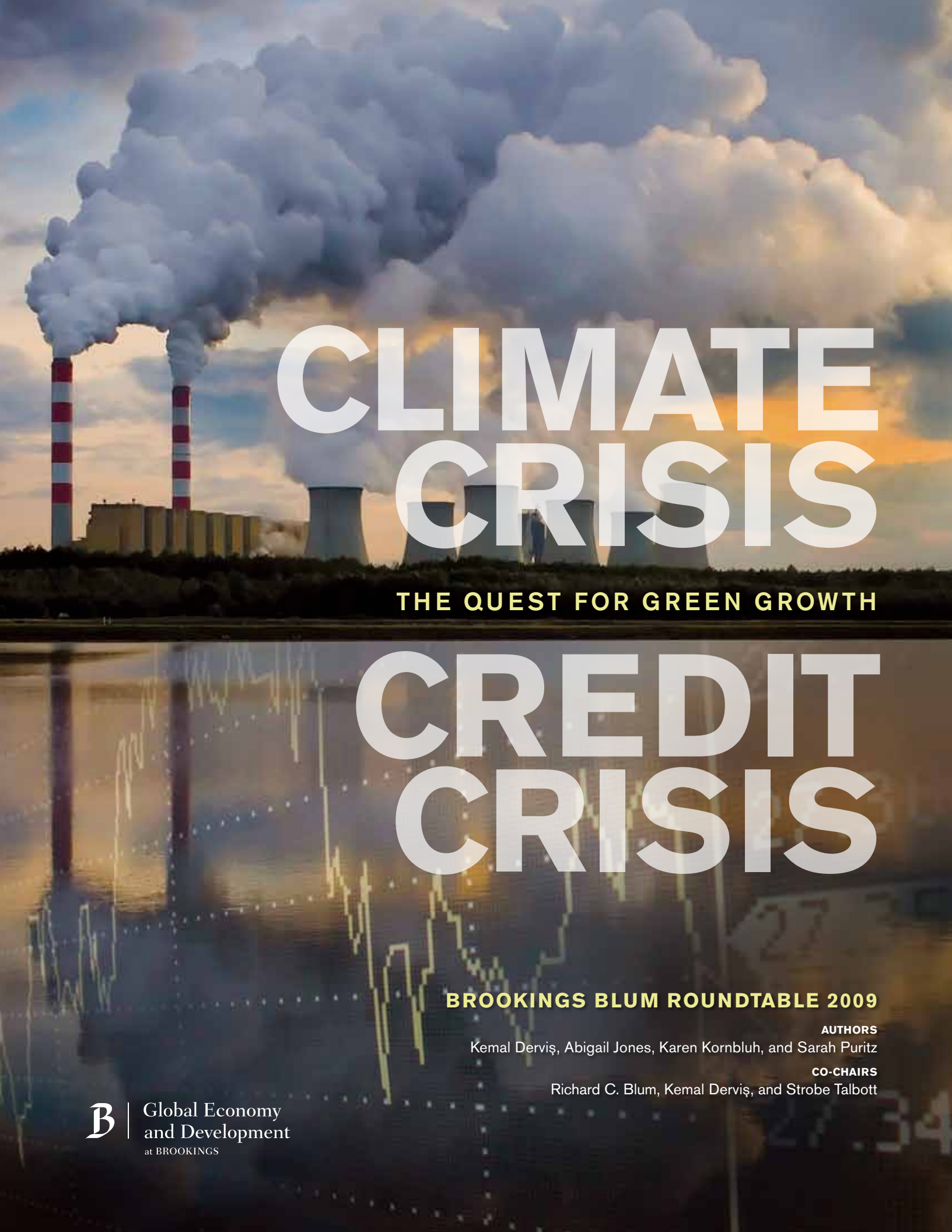

CLIMATE CRISIS

THE QUEST FOR GREEN GROWTH

CREDIT CRISIS

BROOKINGS BLUM ROUNDTABLE 2009

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Global Economy and Development at BROOKINGS

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The Blum Center for Developing Economies focuses on finding solutions to the most pressing needs of the world's poor from its base at the University of California, Berkeley, with activities spanning a number of the university's campuses, including Berkeley, Davis, San Francisco, and the Lawrence Berkeley National Laboratory. The Blum Center's innovation teams are working to deliver safe water and sanitation in eight countries, life-saving mobile services throughout Africa and Asia, and new, efficient energy technologies. In addition, the Center's academic minor in global poverty and practice gives undergraduates the requisite knowledge and real-world experience to become dynamic participants in the fight against poverty.

Photo by Alex Irvin

A Blueprint for Transatlantic Climate Cooperation: *(from left to right)* William Antholis (Brookings), Cem Özdemir (Alliance '90/The Greens), John Podesta (Center for American Progress)

Foreword

From July 30 to August 1, 2009, roughly forty preeminent policymakers, practitioners, and business leaders from around the world convened for the Sixth Annual Brookings Blum Roundtable in Aspen, Colorado, to advance concrete strategies for tackling climate change in the midst of a global economic downturn. Starting from the premise that climate solutions must create jobs and opportunities for economic empowerment, and that strategies to revitalize the global economy must be both climate conscious and climate resilient, the roundtable sought to forge win–win solutions to tackle two of the world's most pressing challenges.

The roundtable was hosted by Richard C. Blum and the Brookings Institution's Global Economy and Development program, with the support of honorary co-chairs Walter Isaacson of the Aspen Institute and Mary Robinson of Realizing Rights: The Ethical Globalization Initiative. Previous Brookings Blum roundtables have focused on U.S. foreign assistance reform (2004); the private sector's role in development (2005); the complex ties between poverty and the natural resource curse, youth bulges, and corrupt institutions (2006); the expanding role of philanthropy and social enterprises in international development (2007); and building climate change resilience in the developing world (2008). Reports from those expert gatherings are available at www.brookings.edu/global/brookings-blum-roundtable.aspx.

Rather than summarize the conference proceedings, this essay—like those from previous years—seeks to weave together the informed exchanges that emerged during the three-day discussion and to build on last year's in-depth examination of the links between global climate change and poverty alleviation. A companion set of policy briefs, "Climate Change Policy: Recommendations to Reach Consensus," which provides timely and concise recommendations for global policymakers, is available at www.brookings.edu.

Acknowledgments

The roundtable was made possible by a generous grant from Richard C. Blum, chairman of Blum Capital Partners and founder of the Blum Center for Developing Economies, with additional support from the Markle Foundation. The roundtable's organizers extend special thanks and appreciation to Sandy Burke, Eileen Gallagher, Merve Gurel, Katie Short, Anne Smith, and Amy Wong of Brookings for ensuring its resounding success. Thanks are also due to Shankar Sastry of the University of California, Berkeley, for constructive input on the invitee list, Peggy Clark of Realizing Rights: The Ethical Globalization Initiative for assistance in crafting the agenda, and Brookings colleagues William Antholis and Adele Morris for welcome assistance in developing the conference agenda and for very helpful comments on a draft of this report.

Introductory Note

The publication of this report was postponed to incorporate the outcomes of the Fifteenth Conference of the states that are parties to the United Nations Framework Convention on Climate Change (UNFCCC), which met in Copenhagen from December 7 to 18, 2009. As the Sixth Annual Brookings Blum Roundtable concluded in August 2009, there were high hopes around the world, given the Kyoto Protocol's approaching expiration, that historic steps would be taken in Copenhagen toward a new, legally binding, comprehensive international treaty tackling many of the key obstacles from previous negotiations—from carbon emissions targets to technology transfer policies. But these hopes started to fade during the fall of 2009.

As it turned out, the UNFCCC Copenhagen conference confirmed these limited expectations. Rather than a comprehensive, decisive way forward, it produced the Copenhagen Accord, a brief political declaration that sets out broad principles but does not really deal with the key sticking points blocking progress toward a low-carbon world economy. The accord fell short of the high expectations preceding the conference—it does not stipulate emission caps, does not provide details for financing or for technology transfer, and is not legally binding. However, given that the conference was on the brink of collapse 48 hours before its concluding session, one might nonetheless step back and review the accord's positive implications for future cooperation in the fight against climate change.

Although it is not comprehensive, the Copenhagen Accord takes historic steps that previous negotiations were not able to reach. First, with the accord, for the first time nearly every country in the world—all but 6 of the 193 countries represented at the conference—has officially recognized the importance of climate change and the key building blocks required to curb it. Second, the accord signifies a universal recognition of most scientists' view that it would be prudent to limit global warming to 2°C above preindustrial levels to substantially reduce the risk of irreversible changes in the world's climate.

These symbolic agreements may seem trivial, but they are an essential basis for effective international cooperation on mitigating climate change—as shown, for instance, by the unprecedented participation of more than a hundred heads of state in Copenhagen, which brought a new level of legitimacy to the effort. Headway was also made on two crucial challenges plaguing previous negotiations: financing for developing countries, and transparency in reporting emission reduction efforts. The Copenhagen Accord contains a collective commitment by developed countries to provide $30 billion in short-term funding for immediate action until 2012 and $100 billion annually in long-term financing by 2020. The accord also makes progress in establishing a method for measurement, reporting, and verification, which many view

Photo by Alex Irvin

(from left to right) Ernest Aryeetey (Africa Growth Initiative, Brookings), Helen Clark (United Nations Development Program), Raymond Offenheiser (Oxfam America)

as essential for any binding agreement to be effective (as well as a major prerequisite for the U.S. Congress to pass pending legislation relevant to these issues). And even though it is a political declaration lacking detail, the accord will most likely form the basis for ongoing negotiations; yet it must be immediately fleshed out before the next conference of the parties to the UNFCCC in Mexico City at the end of 2010.

Perhaps Copenhagen's most telling outcome was to reveal the inadequacy of the current international process for confronting climate change. Because the UNFCCC conferences are run under UN system rules—whereby all countries have an equal voice, without any weighting by population, resources, or willingness to deploy these resources—any country can call a halt to the proceedings by making a procedural objection during plenary sessions. Furthermore, all final decisions must be made unanimously. Although universal representation is laudable and gives the process global legitimacy, in Copenhagen the rules' constrictions allowed minor climate change actors to stop all progress.

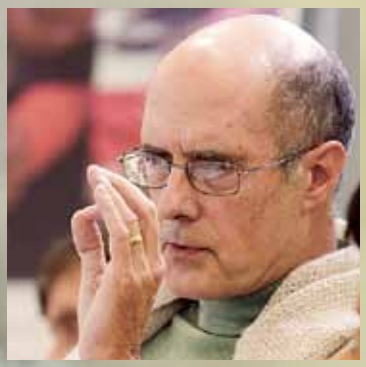
To avoid this continual probability of stalemate, future collaborative efforts on climate change should be calibrated to fit the particular task. For instance, discussions on how to cope with the potential consequences of climate change require much broader representation than those on how to eliminate its causes. Likewise, climate adaptation affects all countries, albeit at varied levels, but only a relatively small number of countries emit the majority of greenhouse gases (GHGs) into the atmosphere. Thus a much smaller, flexible forum is needed to effectively confront the key challenges of reducing GHG emissions—and, as Copenhagen proved, the current process is unlikely to result in a valuable cooperative agreement to tackle the massive risks posed by climate change.

In this context, effective forums for facilitating the global fight against climate change include the Group of Twenty (G-20), the Major Economies Forum on Energy and Climate, and the like, which have taken center stage in the wake of the 2009 worldwide financial and economic crisis. The nations that form the G-20 emit approximately 85 percent of global GHGs, making their meetings appropriate venues for climate change negotiations. And the global economy has already witnessed the efficiency gains from these smaller, more manageable leader-level meetings in Washington, London, and Pittsburgh, where leaders were able to make bold proposals, which were then reviewed and fine-tuned by formal national institutions and benefited from a much-accelerated process of implementation. Although the G-20 and other informal channels of governance cannot produce legally binding proposals, these recent events have shown that verbal intent shared on the global stage provides significant political momentum for achieving real progress.

This, of course, is not to say that the formal channels of governance are not essential. Although leaders can facilitate action by participating in informal channels such as the G-20 and the Major Economies Forum, their actual decisions are made through these formal channels at both the national and international levels. Yet to avoid deadlocked negotiations, as seen in Copenhagen, the informal channels can provide a streamlined process for proposals that can then be reported back to larger, globally representative bodies to gain broader support and produce a legal agreement. Thus, although the Copenhagen Accord is a first, small step in the right direction in addressing the risks and effects of climate change, a timely, rigorous, concerted effort using both the formal and informal channels of global governance will be essential to make real strides.

Converging Crises

Spurring Growth, Stabilizing the Planet



"We face a major challenge of public education about the urgency of stabilizing the Earth's climate before temperatures rise by 3.6 °F. Scientists believe that if global warming hits that tipping point, the consequences could be catastrophic and irreversible. If not our own fate, than the fate of our children is at stake. Citizens must recognize those stakes and understand the facts. That's the only way to get a critical mass of people supporting–or, if necessary, pressuring–their elected representatives to take the necessary action in time."

— Strobe Talbott
President, Brookings

As the global economy struggles to sustain its recovery from the deepest recession in sixty years, another challenge looms large: preventing the Earth from warming more than 3.6 °F, widely considered by climate experts as the acceptable level to reduce the risk of irreversible global damage resulting from climate change. To meet these challenges, we must look beyond our national borders, recognize that we face an uncertain future, and collaborate to ensure our collective well-being. Our success or failure will depend both on our timeliness and resolve—and will shape the fate of our planet for years to come.

Although tentative signs of recovery from the global financial and economic crisis are gaining strength, policymakers around the world are still grappling with the effects of the crisis on the real economy. In the United States, unemployment is still historically high and credit is still constrained. The International Labor Organization predicts that employment levels in those countries with a high gross domestic product (GDP) per capita will not return to precrisis levels before 2013.[1] And social protection programs are suffering as nations must find ways to cover budget shortfalls.

In the developing world, fragile social safety nets are putting ever larger populations at risk, as the economic bases for these nets are increasingly jeopardized as a result of the global crisis. Thus, foreign direct investment has suffered. The flow of remittances from workers abroad back to their home countries is estimated to have fallen by 6.1 percent to $317 billion in 2009, and the fall in commodity prices has sent many commodity-exporting countries into recessions.[2] In Sub-Saharan Africa, the World Bank's *Global Monitoring Report 2009* finds that "growth . . . will fall to 1.7 percent in 2009, from 5.5 percent in 2008, . . . [constituting] the weakest growth rate since the 1990s."[3] Previous growth decelerations in regions of the developing world have been associated with increases in poverty and in infant and child mortality, along with erosions in primary and secondary school enrollment—exacerbating intergenerational poverty. Because of this damage done by the crisis, it is all the more important that the recovery be inclusive and broad based.

Moreover, climate change science has raised the stakes. A growing number of scientists assert that earlier forecasts may have been too conservative and that the rate of climate change may be surpassing even worst-case scenarios. New evidence suggests that sea levels could rise more than twice as much as forecast in 2007 by the Intergovernmental Panel on Climate Change (IPCC) in its *Fourth Assessment Report*.[4] It is also true that some predictions, such as the one related to the melting of the Himalayan glaciers, were too alarming. Overall, however, the message is one of great uncertainty and large, long-term risks.

The climate change crisis is hitting the poorest countries hardest. According to the IPCC's 2007 data, in some African countries, agricultural yields could drop as much as 50 percent by 2020. By the 2080s, Africa's arid and semiarid terrain may expand by 5 to 8 percent, and its wheat production may cease entirely. Already, roughly a quarter of Africa's population is under high-water stress, and by 2020, that number is projected to approach between 75 to 250 million. Around the world, sea-level rise will disproportionately affect the world's poor, for approximately 14 percent of the developing world's population resides in coastal areas. By 2080, another 600 million people around the world could be pushed into acute malnutrition, an additional 1.8 billion people could be facing water scarcity, and nutrition and public health will likely deteriorate. Infectious diseases such as malaria will spread.[5] In short, the poorest developing countries, and the large proportion of the world's poor living within their borders, are most vulnerable to the threat of climate change.

It was against this backdrop that the world's leaders and climate experts gathered in Copenhagen to try to forge a comprehensive, international climate change treaty. As noted above, the end result was less than satisfactory. Because only modest gains were achieved in Copenhagen in technology transfer mechanisms, verification systems, and financing for developing countries and no real progress was made on curbing global GHG emissions, it is now essential that the international community act quickly to reinvigorate climate policy discussions.

Photo by Ralph Alswang

"We are in the midst of a terrible financial and economic crisis, but this crisis is also an opportunity. Had there been no crisis, we might not be investing the way we are in greening the economy. The need for stimulus, the need for countries around the world to devote 5 percent of GDP to new spending, has created an opportunity that may not have otherwise existed. To the degree that there is a silver lining to this crisis, it is in the fact the recession itself has reduced our [GHG] emissions growth, and we are making more progress in greening our economy."

— **Michael Froman**
Deputy Assistant to the President and Deputy National Security Adviser for International Economic Affairs, National Security Council and National Economic Council

Photo by Alex Irvin

Individual nations' domestic responses are also vital and cannot afford to be curbed by slowly recovering economies. In the near term, as governments begin to consider pulling back their economic stimulus efforts, green (that is, environmentally sustainable) fiscal policies—such as incentives for low-carbon research and development, and the reduction of subsidies for high-polluting technologies—are effective ways to spur clean, sustainable economic growth. In the long term, domestic and international climate policies must be sufficiently resilient to weather volatile economic conditions and changing political currents.

A Zero-Sum Game?

Economic development has long gone hand in hand with environmental degradation, leading to the perceived trade-off between environmental integrity and economic growth. Furthermore, meeting environmental challenges has traditionally been perceived as a luxury that only rich nations can afford. And indeed, climate change has largely conformed to these precepts; though the intensity of GHG emissions tends to diminish at high levels of income, overall emissions rise monotonically with income at every level. It appears, therefore, that carbon-intensive energy is a key ingredient in economic development—accompanied by damaging environmental effects. And as with sulfur dioxide emissions (which cause acid rain), developed countries have largely been the first movers on GHG abatement as a result of their capacity and resources, international obligations, and, critically, growing awareness and concern during the past decade about the adverse effects of a changing climate.

Yet economic conditions around the world are now recalibrating constituents' concerns. For instance, a majority of Americans recently told the Gallup Poll that economic growth should be given priority over environmental protection, even if the environment suffers to some extent—for the first time in Gallup's twenty-five-year history of asking the question.[6] And a January 2010 Pew Research Center survey on the public's priorities reports that global warming is now in last place, having dropped 10 percentage points, to 28 percent, from 2007.[7]

Meeting the climate change challenge in the midst of a slowly recovering economy reveals the wisdom in Albert Einstein's observation that "no problem can be solved from the same level of consciousness that created it." As long as the problem is perceived as a trade-off between improving living standards and the health of the planet, then the ability of countries to alleviate climate change will be severely constrained. Consequently, we must focus on policy initiatives that will enable climate solutions to create jobs and opportunities for economic empowerment and devise strategies to revitalize the global economy that can be both climate conscious and climate resilient.

"Because climate change transcends borders and requires collective action, all the traditional grievances of the North/South divide cannot be brought to bear on this issue. Time is not on our side and we stand to lose too much. It cannot be perceived as a zero-sum game."

— **Madeleine Albright**
Chair, Albright Stonebridge Group; former U.S. Secretary of State

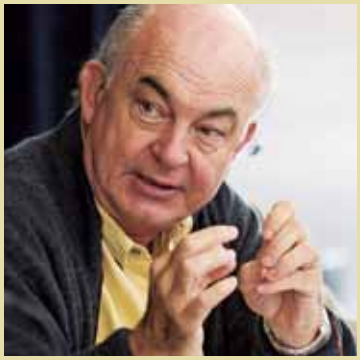


Photo by Alex Irvin

"Countries should not, but could conceivably, close their borders to trade and to financial flows. They cannot, however, close their borders to [GHG] emissions. That is what makes climate protection the ultimate global public good. Progress on this front could signal ways forward for some of the thorniest issues in global governance."

— **Kemal Derviş**
Vice President and Director, Global Economy and Development, Brookings

A Terrible Thing to Waste

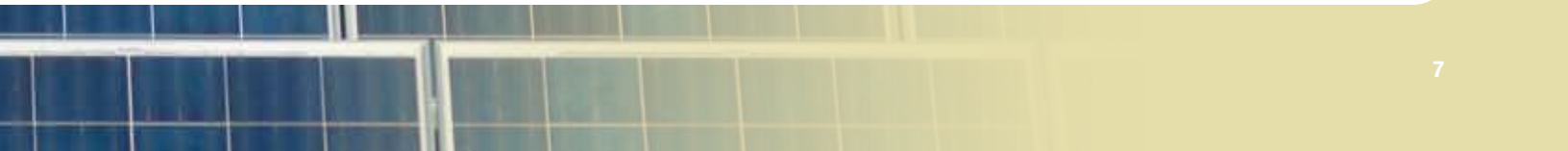
In *Nonzero: The Logic of Human Destiny,* Robert Wright argues that humans have, over time, learned to grapple with increasing complexity, and in so doing, how to turn zero-sum problems into positive-sum solutions. At this moment in human history, such a hat trick is urgently needed—and increasingly possible. The ability to finance and deploy clean technology, for example, could create employment opportunities while simultaneously lowering GHG emissions. Likewise, promoting ecosystem services and forest conservation produces win–win opportunities for economic empowerment and carbon sequestration.

The need to rethink the prevailing paradigm for economic growth in the wake of the recent financial crisis has presented an opportunity to forge policies that at once meet urgent economic and social needs while finding a new, low-carbon path to prosperity and growth. Through domestic stimulus programs, many leaders are demonstrating that green growth is a valuable tool for continued prosperity, which is evident in the billions spent on green infrastructure investments. With China and the United States in the lead, key sectoral beneficiaries include rail transportation, water infrastructure, power grid expansion, and improved building efficiency.[8] Such investments are not without extra cost; in fact, it is sometimes argued that green policies will be followed by higher energy prices to be passed on to consumers, which could in turn threaten both labor demand and standards of living.[9] Price signals on carbon, however, have the power to unleash a wave of innovation and investment in green energy that will be needed to make clean technology cost-competitive and sustainable well into the future.[10] These transformative technologies could drastically change production chains, patterns of urbanization, agricultural practices, and the transportation sector—bringing with them opportunities, investments, and entrepreneurship that will offer multiple dividends for our future.

Domestic short-term stimulus efforts will not be enough. As the global economy recovers from the financial crisis, it is essential that green policies remain a key element of the global political response and that leaders work patiently to establish a comprehensive international agreement to address the risks of climate change. Such an agreement is required to lay the groundwork for a truly sustainable, long-term economic recovery. The difficulties at the Copenhagen conference reflect the challenges ahead; yet the potential cost of inaction is too great. The commitment of the new U.S. president, as reflected in his hard-won victory for climate legislation in the House of Representatives, is an important development, as is the Copenhagen Accord, which takes some important first steps toward cooperation on efforts to mitigate the consequences of climate change. Whether or not these steps can be converted into effective global action on climate change depends on leaders' ability to ratchet up international coordination efforts and to hash out the difficult details that have hampered previous attempts.

Failing to act creatively and in a timely fashion is not an option. It will produce an outcome that is far more costly than the status quo—according to the United Nations Environment Program, with the "business as usual scenario" estimate of 5 to 6 °C (9–10.8 °F) increase in temperature, "the world economy could sustain losses equivalent to 5 to 10 percent of global gross domestic product."[11] Although there may be some additional time because the financial crisis has caused a slowdown in growth and attendant contractions in energy demand and GHG emissions, too much is at stake to simply prolong negotiations and delay difficult decisions.

Delegation of Indonesia, at COP15 in Copenhagen, Denmark.



Growth after the Storm

Weathering the Financial Crisis

Photo by Alex Irvin

"For climate change negotiators, the financial crisis has shown that it is possible to mobilize large sums of money to avoid global meltdown. But mobilizing unprecedented resources to revitalize the economy required a catastrophic event–the collapse of Lehman Brothers–to focus people's attention and move policymakers into action. Rallying funds will not be the issue. Doing so absent catastrophic climate effects might be."

— **Rakesh Mohan**
Distinguished Consulting Professor, Stanford Center for International Development, Stanford University; former Deputy Governor of the Reserve Bank of India

Much of the world economy experienced a steep recession in 2008 and during the first half of 2009. Although the financial crisis has caused much darkness around the globe, its shadow is beginning to pass. Despite a sluggish recovery, the global economy appears to be expanding once again—although employment will continue to trail behind. Advanced economies are projected to expand by about 1.25 percent in 2010, following a contraction of 3.5 percent in 2009, while the International Monetary Fund projects that real GDP growth in emerging economies, led primarily by China and India, will reach almost 5 percent in 2010.[12] In some nations, the crisis has provoked a re-evaluation of government spending; in others, it has swept new political parties into office. Yet for all countries, the crisis has fundamentally shaken the global financial architecture, reshaped global governing institutions, and, in many respects, ushered in a new world order.

Already, the world is struggling to meet the Millennium Development Goals (MDGs)—the targets for human development agreed to by 189 world leaders in 2000. Today, more than 1 billion people are expected to be counted among the world's chronically hungry, jeopardizing the first MDG—to halve this proportion by 2015. More than 500,000 women still die each year from complications during pregnancy or childbirth, making the third MDG—reducing the maternal mortality ratio by three-quarters—almost impossible to attain. In Sub-Saharan Africa alone, the proportion of women who perish in childbirth has stayed virtually constant during the fifteen years since the MDGs were set.[13]

As a result of the global financial crisis, development challenges have been exacerbated. The World Bank estimates that 90 million more people will be living in extreme poverty by the end of 2010, roughly 60 million more people will have lost their jobs in 2009, and an additional 30,000 to 50,000 infants may perish in Sub-Saharan Africa.[14] And because the poor lack robust social safety nets to support them in hard times, they are especially vulnerable. Changing economic circumstances may force them to make life-altering decisions, like pulling their children out of school or selling precious livestock—choices that entrench poverty and propagate the same vicious cycle that the world is intent on remedying.

Managing Risk

The Climate Change Challenge

"The tenets of any post-Kyoto climate change agreement must support low-carbon economic growth in order to affirm each county's right to develop and to secure our planet for future generations. At its core, it must be a deal for development or there will not be a deal."

— Helen Clark
Administrator, United Nations Development Program; former Prime Minister of New Zealand

Photo by Alex Irvin

According to the Pew Center on Global Climate Change, carbon emissions have increased 145-fold globally since 1850 (the start of the Industrial Revolution)—from 200 million to 29 billion tons per year—and are projected to increase another 54 percent by 2030 in a business-as-usual scenario. Most emissions come from a relatively small number of countries. In 2005, twenty-five economies (counting the European Union members as one), accounting for 75 percent of the world's population and 90 percent of its GDP, emitted 84 percent of the world's GHGs; yet their per capita incomes at market exchange rates varied by a factor of 58, and their per capita carbon dioxide (CO_2) emissions differed by a factor of 46. The top six emitters—the United States, China, the European Union, Russia, India, and Japan—accounted for more than 60 percent of global emissions. Moreover, the United States and China alone accounted for 40 percent of emissions.[15]

Yet it is in the poorest countries—in regions that are least able to cope—where people are likely to suffer the most and the soonest from climate change's adverse effects. Climate stability is a textbook example of a global public good. A given quantity of heat-trapping gas emitted in Chicago, Istanbul, Beijing, or anywhere in the world will have the same effect on atmospheric concentrations. But the impact of these concentrations on climate in any given location will be quite different from one region to another.

For example, according to the Yale University economist Robert Mendelsohn, climate-driven changes in global agricultural output will acutely affect poor households in the developing world. Reductions will be especially severe in rain-fed crop farming, as distinct from irrigated farming and livestock management; for example, Chinese farmers on rain-fed farms will likely lose annual net revenue of $95 per hectare per 1 °C, while their African counterparts will lose $28.[16] Meanwhile, William Cline of the Peterson Institute for International Economics predicts that developing countries will suffer an average 10 to 25 percent decline in agricultural productivity under business-as-usual GHG emissions (discounting carbon fertilization). The poor will also suffer from heightened water stress and scarcity. Changed runoff patterns and continued glacial melting will have significant implications for water availability, interacting with already severe ecological pressures on water systems.[17] According to the IPCC, Central Asia, Northern China, and the northern part of South Asia face serious vulnerabilities associated with the retreat of glaciers whose river systems provide water and sustain food supplies for more than 2 billion people.

Climate change projections also point to intensified tropical storms, more frequent and widespread floods, and worsening droughts, for all of which the risks of disaster are skewed toward developing countries—whereas 1 in 1,500 people were affected annually by climate disasters in countries belonging to the Organization for Economic Cooperation and Development (OECD) between 2000 and 2004, in developing countries as many as 1 in 79 people were affected. Monsoon floods and storms in South Asia during the 2007 season displaced more than 14 million people in India and 7 million in Bangladesh. Globally, the 1 billion people who live in urban slums, on fragile hillsides, or on flood-prone riverbanks are among the most vulnerable to such extreme weather events.[18]

Climate change is also likely to adversely affect the health status of millions impoverished people with a low adaptive capacity. An increased prevalence of malnutrition is likely, while changing pathogens and vector-borne diseases will extend the reach of malaria and dengue fever. And though climate change will bring some health benefits—for example, fewer deaths from exposure to bitter cold—such benefits will be greatly outweighed by the many spreading cardiorespiratory, diarrheal, and infectious diseases, and increased morbidity and mortality from heat waves, floods, and droughts. The poor, though largely innocent bystanders as industrial countries emit massive amounts of GHGs into the atmosphere, will likely suffer the most immediate and devastating consequences of climate change.

Uncertainty Is No Reason for Inaction

The world is on a path toward more than doubling global atmospheric GHG concentrations—to 1,000 parts per million,

"Traditional modes of multilateral engagement are ill suited to meet the climate change challenge, since there is a clear disconnect between the pace of climate science and international negotiations. Coordinated action must take place on a condensed timeline. This is a uniquely difficult challenge for global governance, and one that will require flexible frameworks to accommodate changing circumstances."

— **Mark Suzman**
Director of Policy and Advocacy, Global Development Program, Bill & Melinda Gates Foundation

in CO_2-equivalent terms—by the end of the century, resulting in an average global temperature increase of roughly 10 °F. To have just a 50/50 chance of keeping temperature increases below 3.6 °F—the estimated level most scientists believe will substantially reduce the risk of the worst consequences of climate change—it will be necessary to stabilize concentrations at about 450 parts per million.

There is still a huge amount of uncertainty about the processes that mediate between GHG emissions, their concentration in the atmosphere, the effects of different concentrations on climate, and what changes in climate will mean for biodiversity, agriculture, sea levels, and the Earth's many other climate-dependent characteristics. There is also uncertainty as to how fast all these processes will unfold; in some cases, the phenomena seem to be happening faster than earlier IPCC reports had predicted. Uncertainty should not, however, be a rationale for inaction.

The catastrophic risks posed by climate change are such that despite the uncertainty surrounding the potential severity of its effects, precautionary action must be taken. Addressing climate change should not be perceived as a marginal investment decision aiming to smooth consumption or human well-being optimally over time, but rather as a crucial safeguard against the chance of disastrous, irreversible damage to our planet. In other words, though we do not know with certainty what will happen and when, we do know that catastrophic outcomes are *possible*. For example, the melting of the Greenland and West Antarctic ice sheets would cause large sea-level rises, which would change the world's physical and human geography. Changes in the thermohaline circulations (the "conveyer belt" of ocean heat that determines much of the Earth's climate) affecting the Gulf Stream would lead to dramatic changes in global weather patterns. Climate tipping points could be reached, unleashing self-reinforcing multiplier feedback effects—saturated carbon sinks, and releases of methane from arctic permafrost thawing—that could dramatically amplify temperature increases, to say nothing of the fact that the economic effects of unrestrained climate change are estimated to reach between 2 to 5 percent of the world's annual GDP by midcentury.[19] The global community acted quickly and decisively when experts sounded the alarm of a possible global influenza pandemic in the fall of 2009—not because the gravity of the situation was known but because the potential consequences were too horrific. Likewise, even a small possibility of catastrophic consequences resulting from climate change should be cause for immediate action.

Negotiating an International Response

To collectively meet the challenge of climate change and to stave off its worst effects, the international community gathered in Rio de Janeiro at the Earth Summit in 1992 to ratify the United Nations Framework Convention on Climate Change, which committed the ratifying countries to stabilize atmospheric GHG concentrations at a level that will prevent dangerous human interference with the climate system. The developed countries agreed to assist the developing countries and to reduce GHG emissions to 1990 levels by 2000. In 1995, the Berlin Mandate calling for the negotiation of binding targets led to the 1997 Kyoto Protocol to the UNFCCC, whereby the developed

Photo by Alex Irvin

"Building Africa's capacity to negotiate in Copenhagen will be critical to ensure that the post-2012 climate change agreement supports the continent's economic development and adaptation needs. To do so, we need to articulate our needs more coherently and systematically, to use science to support our position, and to advocate our case through targeted diplomacy. We must formulate a position for Africa that is truly representative of the multiple crises that Africa faces–and only Africans can do that."

— **Mo Ibrahim**
Chairman, Mo Ibrahim Foundation

countries agreed to emissions reductions averaging 5.2 percent below 1990 levels by 2008–12. Kyoto provided flexibility to meet targets through international emissions trading (that is, trading emissions allowances among countries with emissions targets), which credits emissions reductions from projects in the developed world (using what is known as Joint Implementation) and in the developing world (using the Clean Development Mechanism). One hundred and eighty-two countries have ratified Kyoto—but the United States rejected it in 2001, and because it is the world's largest GHG emitter, any effective climate negotiations will require its buy-in.

Subsequent efforts have continued, making some progress toward meeting the UNFCCC's mandate. At the thirteenth conference of the parties to the UNFCCC in Bali in 2007, the participants launched formal negotiations on strengthened action against climate change, known as the "Bali Roadmap," which included the "Bali Action Plan," outlining a new course of action to reach international cooperation on climate change. This plan, which was supported by the United States, called for "measurable, reportable, and verifiable" mitigation actions or commitments by developed countries, mitigation action by developing countries, and technology financing and capacity-building support for developing countries—culminating in an ambitious, negotiated treaty at the 2009 meeting in Copenhagen, which would enter into force before January 2013 to succeed the Kyoto Protocol. But now, in the wake of the limited Copenhagen outcomes, it is alarmingly clear that this action plan failed to produce an adequate agreement for a coordinated international response to the threat of climate change.

At the crux of the impasse stalling climate change negotiations are several key challenges: establishing how to account for comparable efforts to abate GHGs among developed countries; determining how rapidly emerging countries—which are set to account for the majority of future flows—will contribute to international abatement efforts; overcoming contentious issues centering on intellectual property rights and competitiveness concerns to develop and broadly deploy clean technologies; and determining how adaptation finance burdens are shared, how revenues are raised, how funds are governed, and the nature of any conditionality that might be attached to these funds.

On the heels of Copenhagen, it is clear that additional paths for progress on addressing climate change are needed. As noted above, the UN system is severely limited by the procedural rules outlined in its institutional charter, which have greatly hindered progress in international negotiations on climate change. Negotiations with representatives from every country on the globe may be appropriate for matters pertaining to climate adaptation, for example, but are not conducive for the intimate deliberations required for a relatively small number of countries to agree on mitigation issues such as reducing GHG emissions. This is where informal channels of governance and greater collaboration among international organizations can play a key part in facilitating international negotiations. Within the more flexible construct of the G-20, for instance, the leaders of the world's largest GHG emitters can form more personal relationships and focus on the detailed, thorny issues that prove too difficult to manage at the huge UNFCCC meetings. Although legally binding arrangements cannot be produced under informal governance mechanisms, the proposals that they can endorse streamline the process within the formal, treaty-based institutions.

In this respect, there also needs to be greater cooperative interaction among the international organizations. The risks posed by climate change threaten all aspects of our global health, including crop yields, water availability, the spread of infectious diseases, sea-level rises and storm surges, population displacement, and political stability. The international institutions most relevant to these issues—such as the World Health Organization, the World Trade Organization, the International Energy Agency, the Food and Agriculture Organization, the International Monetary Fund, and the World Bank—need to exploit their synergies and tighten their focus to encourage a global response to climate change.

Green Shoots

A Sustainable Recovery

"Supporting comprehensive clean energy and climate policies is an assured way to put our country back to work and on a path toward long-term economic prosperity. Investing $150 billion a year in the country's clean energy economy could create 1.7 million jobs in growth industries like retrofitting and constructing new energy-efficient buildings and manufacturing next-generation, plug-in hybrid and electric vehicles. The benefits of transitioning to a clean energy economy are available today. Action must be taken now for the American people, for our planet, and for our economy."

— **Maggie L. Fox**
President and Chief Executive Officer, Alliance for Climate Protection

Within the context of the world's concurrent financial and climate crises, how might we begin to conceive of an integrated effort to tackle both challenges in tandem? Domestically, this ambitious but crucial endeavor must begins with green jobs—with investing in green sectors of the economy that create net employment, both in the short term to stimulate needed growth and in the long term to ensure the sustainability of the national, and consequently global, economy. Internationally, it begins with a firm rededication of nation-states to work toward the policy conclusions needed to constructively move the fight against climate change forward. Only then can the price signals be put in place that will spur the level of innovation and investment required for the world economy's widespread, low-carbon growth. But it also starts by leveraging the inroads made by those local communities and nongovernmental organizations (NGOs) that are promoting low-carbon growth; even in the absence of a global treaty, to inform international climate change policies and to develop best practices that can be shared across regions and sectors. Though there will always be trade-offs, in the long run the transition toward a low-carbon economy can accelerate sustainable growth.

Climate Change Elixirs for the Ailing Economy

Analysts at the multinational bank HSBC estimate that the green portion of the $3.1 trillion fiscal stimulus is about $465 billion; though it is inherently difficult to accurately determine if an investment is truly green, this figure does give some indication of the relative opportunity and value governments see in low-carbon growth as a key lever for economic recovery. In this vein, China has invested 34 percent of its total economic stimulus budget on green investments; France, 18 percent; Germany, 13 percent; Mexico, 10 percent, the United States, 12 percent; South Africa, 11 percent; and, leading the pack, South Korea, 79 percent. Primary green investments have been made in modernizing the power grid, expanding rail systems, updating water and waste infrastructure, improving energy efficiency in new and existing buildings, and generating renewable power.[20]

For stimulus investments to yield short-term benefits, they must be labor intensive so as to create employment opportunities in the near term. Some green economic activities fit this bill. For example, many labor-intensive, shovel-ready opportunities in the energy-efficiency realm—such as weatherizing homes and installing solar panels—promise energy savings well into the future. Not only do these projects provide short-term employment opportunities, but they will also reduce the long-term cost of meeting climate change objectives. As the Harvard University economist Robert Stavins has cautioned, other areas, including green infrastructure, require more gradual change as a result of building codes, permits, and a general "not in my backyard" attitude. Thus, such projects are less consistent with the purpose of a short-term economic stimulus.

In all likelihood, the *wholesale* replacement of carbon-intensive activities with green activities would hinder economic recovery from the global crisis, given that nearly 40 percent of all jobs worldwide are in carbon-intensive sectors.[21] Yet strategic investments in ecosystem infrastructure, renewable energy technologies, and energy efficiency in both old and new buildings meet the crucial prerequisite of creating jobs and reduce any tendency to lock in new, inefficient capital stock that would make it more difficult and costly to achieve long-term environmental goals. A 2009 report from the Global Climate Network confirms that with the right policies in place, China could create more than 40 million new jobs in renewable electricity generation, services, and high-technology industries; Nigeria could add an additional 273,500 jobs in small-scale hydroelectric and gas technologies with little effect on jobs in competing carbon-intensive sectors; India could create 243,000 jobs by 2020 in wind energy development; and Australia could likely create tens of thousands of new construction jobs in rural areas.[22] In the United States, the Center for American Progress suggests that investing $150 billion in clean energy alone would create an additional 1.7 million jobs.[23]

Because enacting stimulus policies in the world's least-developed countries is not feasible given their limited means,

Photo by Alex Irvin

"When the Greens left power in 2005, roughly 1.8 million people worked in environment-related jobs and environmental technology commanded about 8 percent of the country's GDP. By 2020, projections indicate that green technology will account for 14 percent of GDP, which suggests that clean technology is one area that is still creating employment opportunities, even in the midst of the financial crisis. Germany is proving that green technology is a profitable growth industry."

— **Cem Özdemir**
Chairman of the German Green Party, Alliance '90 / The Greens

many have begun developing low-carbon growth strategies based on their nationally appropriate mitigation actions (NAMAs) and national adaptation programs of action (NAPAs). In a way that is consistent with a country's development strategy, NAMAs enumerate voluntary mitigation actions that move a developing country to green-growth pathways and contribute to global GHG abatement. Having been developed through the UNFCCC to identify priority adaptation needs, NAPAs are country-driven efforts that rank priority adaptation activities and projects and in many ways inform strategies to promote climate-resilient, low-carbon development. As of April 2009, thirty-nine of the forty-eight least-developed countries had developed NAPAs, yet few projects had been accepted for implementation due to insufficient funds and a lack of operational detail. Still, NAMAs, which present a blueprint for low-carbon growth, and NAPAs, which enumerate vulnerabilities, together could guide the world's poorest countries onto climate-resilient, green growth pathways. For though stimulus funds are largely out of the question in the developing world, it stands to increase employment opportunities as industries shift to expanding green sectors.

Developing and Deploying Technology

A key element of the green growth agenda is the development and deployment of clean technologies that will fuel economic development in a carbon-constrained world. These technologies include everything from solar power to hydrogen fuel cells to carbon capture and storage to desalination. And for these technologies to be truly transformative, they must be adopted by the world's largest carbon-emitting countries—that is, the rapidly emerging economies and the developed nations—which requires that they be cost-competitive, brought to scale, and effectively deployed.

Already, energy-related emissions of CO_2 from non-OECD countries exceed emissions from those belonging to the OECD by roughly 14 percent. But by 2030, energy-related CO_2 emissions from these same countries are projected to exceed those of the OECD countries by 77 percent. Most of the emissions growth in the rising powers will come from the consumption of fossil fuels (mainly coal, gas, and petroleum), which are feeding power generation and transportation needs.[24] As the *New York Times* columnist Thomas Friedman has written, "Anyone who looks at the growth of middle classes around the world and their rising demands for natural resources, plus the dangers of climate change driven by our addiction to fossil fuels, can see that clean renewable energy . . . is going to be the next great global industry."[25] President Barack Obama recognized this opportunity and necessity to pursue the competitive advantage in the global economy in his State of the Union Address, "[because] the nation that leads the clean energy economy will be the nation that leads the global economy. And America must be that nation."[26] For countries able to carve out a niche in the development and production of clean technologies, the economic gains could be massive, making cooperation on this issue incredibly difficult.

Because the demand for energy will grow significantly in developing and rapidly emerging economies, taking steps now to use energy more cost-effectively will yield multiple dividends in the long run. According to McKinsey & Company, increasing efficiency in energy use could "slow the growth of their energy demand by more than half over the next twelve years." This would lead to energy demand in 2020 that is 25 percent lower than otherwise predicted—a reduction larger than China's total energy consumption today.[27]

And the benefits go well beyond abatement; technology can be a powerful tool for development. Clean energy choices for home use in poor communities would have enormous health and human implications. More than half the world's population still relies on biomass fuel and coal for energy, which generate GHGs even more dangerous than carbon and which take a painful toll on social welfare. Thus, four thousand people die each day from indoor air pollution—a greater loss than from malaria. According to the World Health Organization, renewable energies offer the potential to electrify remote areas and to bring potable water to the more than millions who die each year from contaminated water or water-related diseases.

Yet because many of these countries

have a limited financial or technical capacity to adopt clean technologies within the requisite time frame, support for technology transfer is vital. Bilateral agreements, like the recent one for the U.S.-China Clean Energy Research Center, signal progress in promoting cooperative research and development on these essential technologies. In the aftermath of the Copenhagen conference, it is vital to reach an international agreement that will allow sending the requisite price signals to stimulate widespread investment by the private sector. For even though a number of forward-looking venture capitalists in Silicon Valley are now investing billions in next-generation synthetic fuels, cellulosic ethanol, and cars and cement factories that mitigate GHGs, investment in clean technologies will still need to be significantly ramped up to meet the additional $430 billion projected demand in 2020 for low-carbon technologies and energy efficiency in order to meet the benchmark of 3.6 °F.[28]

A key challenge for advancing technology transfer policies at the international level will be to clarify concerns regarding intellectual property rights. Because there is a dearth of conclusive evidence as to whether these rights are a barrier to diffusing clean technology across the range of key technologies, disagreements abound; though many developing countries are in favor of compulsory licensing, some officials of nations in the developed world fear that intellectual property right infractions, let alone compulsory licensing, could undermine incentives to develop and deploy clean technologies.[29] Countries will somehow need to balance their desire to reap the gains from becoming global leaders in renewable technologies with the greater need to maximize technology diffusion globally.

In addition to addressing challenges for technology transfer, progress must also be made to foster a conducive, enabling environment for the adoption of clean technologies—even for those technologies that are currently available. The International Energy Agency estimates that 70 percent of the GHG emissions reductions needed to halve global emissions by 2050 can be achieved with existing technologies, yet national policies hinder their absorption. Regulatory environments must be reformed, supportive infrastructures are needed, and financial incentives must be in place. The Copenhagen Accord cursorily mentions a "technology mechanism" to facilitate and accelerate the transfer of clean technology, but this is far from the detailed groundwork that was anticipated and is required.

Reducing Deforestation

Because forests soak up so much carbon, the carbon emitted when they are cut down or set ablaze accounts for nearly 20 percent of those global emissions due to human activities—a larger proportion than either the entire global transport or industrial sector. And for every acre of tropical forest that remains intact, 200 to 300 tons of CO_2 can be sequestered. Thus maintaining forests is a simple answer to the issue of how to combat climate change—but

a deceptively simple one. Though halting deforestation should be easier than rolling out electric cars or transitioning the electric grid, it has proven remarkably difficult to get the rules right so that the world community can move the incentives for the farmers and loggers who live in and among the world's forests in the direction of conservation.

Today, the world's tropical forests—which hold most of its forest carbon—are disappearing at the alarming rate of 5 percent a decade. Each year, more than 13 million hectares of forest are lost, along with countless, largely unknown species and ecosystem functions. And the problem is very concentrated; Indonesia and Brazil together are responsible for 50 percent of global deforestation, and thus these two countries are among the top five sources of climate pollution. A few dozen other developing countries in the tropics account for much of the rest.[30]

Global carbon markets and other financing mechanisms could provide cost-effective means to both reduce GHG emissions and generate income for impoverished forest-dwelling communities and forest-rich developing countries. Economic models predict a wide range of costs for forest conservation, clustered between $5 to $20 per ton of CO_2 equivalent, and Brazil's Amazon Fund allows other nations to help fund reductions in its national deforestation rate at a cost of $5 per ton of CO_2 equivalent.[31] This is substantially less than the current and projected allowance prices in developed-country carbon markets, and analyses suggest that overall demand could reach billions of tons of forest carbon assets between now and 2030. Between public and private mechanisms, U.S. government projections indicate that the climate bill passed by the House of Representatives in June 2009 would generate about $14 billion in annual funding by 2020 for reducing tropical deforestation.[32] The fact that today the forest carbon market is less than $100 million, and thus makes up only 0.16 percent of the $64 billion worldwide market for carbon-denominated assets, points to a tremendous efficiency loss.[33] It also highlights a missed source of development funding of more than $30 billion a year.[34]

Moreover, deforestation puts the poor at greater risk from climate change.[35] The World Bank reports that 90 percent of the poorest of the poor—those living on less than one dollar a day—depend on forests for part of their food, fuel, or livelihoods. Forests tend to soak up rainwater and release it slowly, thereby acting as a natural defense against flooding and drought. Forests can improve water quality by filtering harmful pollutants, pathogens, and sediment that can cause illness in people and livestock.

When the Kyoto Protocol was being negotiated in 1997, a number of roadblocks thwarted efforts to fully incorporate forests into it: the perceived impermanence of forest-sequestered carbon (resulting in temporary, nontradable GHG emissions credits); the fear of "leakage" or emissions beyond the boundaries of the forestry project (for example, if logging demand stays constant, deforestation might simply be displaced and not averted); the perceived inability to demonstrate "additionality," or that deforestation would have occurred without forest carbon incentives; and concern about the expansion of the sphere of projects eligible for emissions crediting beyond afforestation and reforestation. The result has been costly; just 0.09 percent of annual emissions reductions in Kyoto's Clean Development Mechanism for the developing world come from forestry projects.[36]

Although the Kyoto Protocol failed to provide incentives to reduce deforestation, high hopes were placed on the Copenhagen UNFCCC conference to succeed in pushing forestry forward. And even with the muddled negotiations in Copenhagen, there was clear progress on the initiative known as Reducing Emissions from Deforestation and Degradation (REDD). The leaders recognized the "crucial role of reducing emission from deforestation and forest degradation" and

Photo by Alex Irvin

"Although there is still quite a bit to be done, best practices in forest conservation for carbon sequestration are emerging that link deforestation programs to national economic development plans, integrate key industry players, and include vulnerable, forest-dwelling communities to ensure they participate fully in the process and benefit from it. These mechanisms are working now, and there's every reason to believe that avoided deforestation projects can work very successfully going forward."

— **Mark Tercek**
President and Chief Executive Officer, The Nature Conservancy

endorsed the "immediate establishment of a mechanism including REDD-plus."[37] Yet despite this promising language, a meaningful legal text had been shelved because the conference produced no legally binding outcomes.[38] Thus, leaders must work swiftly to establish the mechanism for reducing deforestation endorsed in the Copenhagen Accord.

Notwithstanding the shortcomings of the Copenhagen conference, progress in three main areas has been made outside the UNFCCC negotiations to help put in place the needed price signals for carbon abatement. First, the international community has learned a great deal since the inception of the Kyoto Protocol and thus can point to a number of projects in the voluntary market that are demonstrating that technical challenges are not reason enough to abandon REDD. For instance, in 1997 the Noel Kempff Mercado Climate Action Project (NKMCAP) was forged as a partnership between the Government of Bolivia, the Nature Conservancy, American Electric Power, BP Amoco, PacifiCorp, and the Friends of Nature Foundation (a Bolivian NGO). NKMCAP spans 1.5 million acres of Bolivian tropical forest and is expected to sequester roughly 5.8 million tons of CO_2 over three decades.[39] To overcome concerns about the permanence of carbon sequestered through NKMCAP, the Noel Kempff Mercado National Park was expanded to include the project area and a permanent endowment was established to fund protection activities, thereby

Photo by Alex Irvin

"Responsibilities for forest policy are spread across a number of ministries including agriculture, energy, environment, and transportation. This fosters schizophrenic policy. Harmonization across ministries is needed to avoid incoherence and ensure that gains made in one sector are not eroded by policies in another."

— **Carlos Manuel Rodríguez**
Vice President for Conservation Policy, Conservation International; former Minister of Environment and Energy of Costa Rica

increasing the probability of maintaining a healthy, standing forest site. To limit leakage, NKMCAP partnered with bordering communities to develop a sustainable management plan, under which they applied for legal land title to limit the risk of uncontrolled forest conversion. Any leakage that did occur was then deducted from the claimed carbon savings. And finally, to address concerns regarding additionality, NKMCAP demonstrated that without funds generated from the project, logging in the park would have continued.[40]

Second, the voluntary forest carbon market has coalesced around a number of key standards, including the Climate, Community & Biodiversity (CCB) Standards, as well as in national and regional carbon markets, to regulate REDD-plus and forest carbon initiatives. The CCB Standards are particularly instructive in that they evaluate the effects of land-based climate change mitigation projects from climate, social, and environmental standpoints, ensuring that projects achieve multiple development and climate ends. Currently, several dozen projects in both the developed and developing worlds are using the standards to improve project design, and a number of governments, including China, are using them as an effective means to guide sustainable forestry initiatives.[41]

Third, key national and regional climate programs are moving toward provisions that would generate sizable new resources for the conservation of carbon-rich tropical forests in developing nations. If signed into law, the American Clean Energy and Security Act would annually mobilize millions of dollars for forest conservation, for U.S. emitters could seek up to 5 percent of their reductions in overseas forest projects. California has already enacted climate legislation that creates economic incentives for forest conservation, including, potentially, in the tropics. And after a decade of resisting the integration of the forestry sector into climate policy, the European Union is now indicating that it would consider earmarking a portion of allowance auction revenues generated through the European Emissions Trading system to REDD-plus activities.

Key challenges remain to ensure that much of the learning at the local level informs national, regional, and international agreements. To forge those systemic links, there must be clear channels of communication and comprehensive representation at the negotiating table, forest-dwelling communities must be empowered to shape policies, and new financial mechanisms must be designed to connect local communities to international polluters and aggregate small-scale forest conservation efforts for a global market.

Ultimately, effective forest policy will require a holistic, cross-sector approach to ensure that inroads made in one sector are not undermined by policies in another. Government agencies will need to cooperate. Policies will need to be aligned. The key will be to recognize that forest management is no longer solely an environmental issue. Rather, at its core, it is about sustainable land management in support of food security and economic prosperity.

Guiding Lights

Agents Poised to Deliver Results

Photo by Alex Irvin

"Effective leadership is the key to achieving breakthroughs at Copenhagen. Yet leaders are only as effective as their toolkit. To be successful, leaders need to understand their constituents, present a common and consistent narrative, and underscore the economic opportunities that challenge affords."

— **Timothy E. Wirth**
President, United Nations Foundation; former U.S. Senator

The challenges of pursuing green growth initiatives are great, but the risks of not doing so are even greater, and opportunities to address them are within our grasp. And whether these compounding gains are undertaken by government institutions, the private sector, civil society, or local communities, visionary leaders will be needed to move from negotiation to implementation, from research to project development, and from advocacy to mobilization. And this leadership will require unlikely coalitions and an unprecedented commitment to deliver on the promise that low-carbon growth holds for our future.

Leadership from Governments

Visionary leadership is needed from world leaders in both formal and informal governance channels to overcome some of the most contentious sticking points in the international climate negotiations. The Copenhagen Accord is a political declaration, and world leaders must now turn its intentions into verifiable actions. They must continue working to reach an agreement on the unresolved issues and facilitate the codification of those solutions into international law.

Outside the global framework, many nations (including major emerging economies) have embarked independently on developing low-carbon growth strategies. For example, China's current five-year plan aims to reduce the energy intensity of its economy by 20 percent by 2010 and to increase the share of renewable energy in its primary energy supply to 15 percent by 2020. India plans to launch a National Solar Mission as part of its National Action Plan on Climate Change that would increase its solar capacity by 2020 to 20 gigawatts—more than twice the current installed capacity in the United States. India plans to bring one-third of its land under forest cover by 2012 and to upgrade its energy efficiency standards and building codes. The European Union, a longtime leader on climate change mitigation, has committed to reduce its GHG emissions 20 percent below 1990 levels by 2020 (or 30 percent, if others pledge equivalent targets), to increase its renewable energy use to 20 percent of its overall energy mix by 2020, and to adopt a binding target to improve its energy consumption efficiency by 20 percent from projected 2020 levels. Norway will increase its target to 40 percent below 1990 levels in 2020 if there is an international agreement. For its part, Japan has pledged to cut its emissions by 25 percent relative to 1990 levels and to increase the share of renewable energies to 10 percent of its total, primary energy supply by 2020. Australia has set a renewable energy target of 20 percent by 2020 and will invest roughly $5 billion in developing and commercializing clean energy technologies. Although these commitments were unable to bridge the divisions over the international climate change agreement in Copenhagen, they do demonstrate that many nations recognize the severity of the climate change challenge, their own vulnerability to it, and their resolve to meet it.

In addition to setting national GHG emissions goals and laying the groundwork for facilitating meeting climate change mitigation needs in the world's poorest countries, leadership is needed from governments to engage the private sector in the fight against global climate change. Even in the absence of an international climate treaty or national cap-and-trade regime, public funds can be leveraged to engage the private sector through public–private partnerships that promote green businesses and create employment opportunities.

Thus far, leadership has come from all levels of government. In fact, municipal and state governments have largely been the first movers on this front. For instance, the Berlin Energy-Saving Partnerships, a collaboration between the City of Berlin and the *Fortune* 500 company Johnson Controls, has since 1999 been promoting energy savings by public buildings and has reduced the city's energy costs by roughly $7.5 million annually. The City of Chicago and the energy service provider Excelon have teamed up since 2000 to reduce peak load electricity use and advance the city's solar energy industry. Thus far, the Chicago Solar Partnership has reduced the city's CO_2 emissions by roughly 1,500 tons annually and has helped Excelon avoid costly alternatives for delivering energy during times of peak demand. Since 2002, the U.S. nonprofit World Resources Institute

Photo by Alex Irvin

"In many African countries, there is a gap between the states' interest in pursuing low-carbon economic growth and their capacity to develop suitable policies. In response, governments have begun investing in local research institutions and are working with civil society to think through climate-proofed growth strategies. We have a long way to go, but important first steps have been made and awareness is on the rise."

— **Ernest Aryeetey**
Director, Africa Growth Initiative, Brookings; Director, Institute of Statistical, Social and Economic Research, University of Ghana

and Mexico City have partnered to reduce traffic congestion, traffic accidents, and air pollution by retrofitting the city's diesel bus fleet; by implementing the Bus Rapid Transit system, which can accommodate more passengers for less than one-tenth the cost of an equivalent light-rail system and in half the time of a conventional bus; and by promoting walking and cycling as forms of sustainable transportation.[42]

Public policies also have an essential role to play in creating the enabling environment needed to catalyze clean technology, green businesses, and forestry practices that work for the poor. This includes everything from minimizing risk to liberalizing trade to assigning property rights—including those of the poor, as the economist Hernando de Soto has persuasively argued. For example, an analysis by the World Bank concludes that removing tariff and nontariff barriers in eighteen major developing countries would increase the flow of efficiency, wind, and solar technologies by, respectively, 64, 23, and 14 percent. Potential inroads could be made through a reinvigorated Doha Development Round of the negotiations for the World Trade Organization, which since 2001 has been working to reduce or eliminate tariff and nontariff barriers to "environmental goods and services."

Whether leaders are operating at the international, national, or local level, they must function with a protracted time horizon. Even in the midst of a tentative global financial recovery, greening the global economy will take time, patience, and creativity. It will require augmenting capacity to predict and plan for future climate effects if growth is to be sustainable, and it will take coordinating actions across projects and sectors.

Multilateral Leadership

Even well-conceived low-carbon national growth strategies will require funding in the world's poorest countries to get projects off the ground. And in the absence of a global climate treaty, multilateral institutions have been instrumental in channeling funds to advance progress. These funds have been used to address vulnerabilities, build capacity, and construct everything from low-carbon energy facilities to barriers against the rising sea.

Thus far, the global community's multilateral financing efforts have primarily taken the form of three funds created under the auspices of the UNFCCC and managed by the Global Environment Facility (GEF): the Least Developed Country Fund, the Special Climate Change Fund, and the Adaptation Fund. The GEF has also started to fund small-scale adaptation projects through its core account and is managing a three-year pilot program for adaptation planning. The GEF has mobilized roughly $330 million for adaptation through these funds, yet much of this funding has yet to be disbursed, and the least-developed countries are often disadvantaged in accessing the money because they do not meet eligibility criteria or lack the capability to apply.[43] The Copenhagen Accord resulted in the establishment of the Copenhagen Green Climate Fund to help developing countries adapt to and mitigate the effects of climate change; but like all the proposed initiatives coming out of Copenhagen, swift action is required to translate this idea into action.

The World Bank has also developed the Climate Investment Funds—including the Clean Technology Fund and the Strategic Climate Fund—as an interim measure, with the dual aim of scaling up assistance to developing countries and expanding the development community's knowledge of climate change in the developing world. As of September 2009, twelve donor nations had pledged roughly $6.3 billion to these funds to enhance resilience, pioneer renewable energy, and encourage the transfer of clean technologies. For example, the Clean Technology Fund is financing energy efficiency work and the development of renewables in Turkey and wind energy in Egypt, while the Strategic Climate Fund is funding the Pilot Program for Climate Resilience, which will provide incentives to incorporate climate risk into development planning, a Forest Investment Program, and a Scaling Up Renewable Energy Program.

As needed monies are raised, discussion continues about the structure and governance of these funds. The developing nations, which view adaptation assistance as compensation from polluters to which they are entitled, insist that allocation decisions be made by national governments or, at a minimum, by global bodies in which they as

Photo by Alex Irvin

"There is a clear disconnect between our aspirations and our current capacity to address climate change across many development organizations. In most cases, we're fighting our knowledge base, and we especially need more and deeper knowledge on strategies to tackle the impacts of a changing climate. So many, including the World Bank, are now engaged in a tremendous amount of learning. Ensuring that this knowledge is shared across organizations is an essential part of coalescing around best practice in time to meet the needs of the poorest."

— **Katherine Sierra**
Vice President for Sustainable Development, World Bank

developing countries have majority representation. Balancing the donor countries' desires for control, accountability, and supervision with the developing countries' demands for greater voice and control remains a significant challenge. For its part, the World Bank–operated Pilot Program on Climate Resilience is breaking new ground, although it is far too early to gauge its success. With recipient countries in the driver's seat, the World Bank is attempting to help nations build resilience and adaptation dimensions into their national, fiscal, and sectoral planning. Recipient countries develop the strategy, whereas the World Bank gives their adaptation plans budget support rather than project support. If successful, this pilot will demonstrate that budget support mechanisms could be effective vehicles in meeting adaptation needs in the developing world in a manner that circumvents some of the more contentious issues surrounding the governance of adaptation funds.[44]

Multilateral organizations have also proved to be effective aggregators of knowledge. A number have developed Web-based databases that allow both practitioners and policymakers to access spatially referenced knowledge on climate change adaptation—from sector-specific interventions to the latest policy and scientific research. For instance, the World Bank maintains the Climate Change Adaptation Portal and a consortium of organizations maintains the Adaptation Learning Mechanism, both of which are websites designed to share information on good practices and create networks on climate change adaptation in communities around the world. Challenges remain to ensure that platforms can operate at a narrow bandwidth to reach those with only limited online resources and that information is accessible on cellular telephones, which are increasingly available throughout the developing world.

In the end, pursuing climate-resilient growth will require a dramatic shift in the prevailing development paradigm; poverty alleviation must remain paramount, but *how* it is achieved will figure more prominently than in decades past. Such an outlook, which must be based on the precepts of climate justice, requires that development organizations both determine and incorporate a set of principles concerning environmental sustainability and climate change into a new vision for development. The major development institutions must work to mainstream this thinking into their programs and missions. Doing so will go a long way in helping to create the kind of narratives that leaders need to promote green growth.

Leadership from the Private Sector and Civil Society

Although governments must take a lead role in ushering in the era of green growth, the fight to rejuvenate the global economy and address the calamitous risks posed by climate change can only be won with active leadership from the private sector and civil society.

Corporate engagement in building a green economy can take many forms along many avenues. Investing in green growth offers tremendous opportunities to enhance the long-term sustainability of any business. Activities will need to be climate-proofed to withstand the adverse effects of a changing climate; moreover, they will themselves need to be low carbon all along the value chain to meet what will likely be national GHG emissions caps across all developed countries. And in contrast to the grueling pace of brokering climate deals at the international and national levels, the private sector has the power to act nimbly, innovate, shape public opinion, and bring profitable technologies to scale now.

Occasionally, a company's core business activity will fuel the green economy—for example, a wind turbine factory, a solar power provider, an energy-smart electronics producer, or a plug-in car manufacturer. In other cases, the climate and employment dividends will come from the corporation's role in mobilizing governments to take action. In either case, only cooperation between the private sector and other actors will enable the world community to turn the tide on climate change.

The Brookings Institution and Harvard University scholar Jane Nelson has described three challenges and opportunities that are encountered by corporations—and also NGOs—working to green the global economy. First, and of greatest importance, is an organization's obligation to do no harm—to ensure that the

Photo by Alex Irvin

"Financing climate change adaptation is only as effective as the institutions that manage and deliver the funds. Official development assistance will likely need to play a key role, along with new sources of finance, in building this institutional capacity upfront so that when larger sums start coming down the pike they will be spent well, managed in a way that meets appropriate fiduciary standards, and satisfies international oversight mechanisms, donor governments, and recipient country constituents."

— **Raymond Offenheiser**
President, Oxfam America

enterprise itself has a low-carbon footprint and that it does not perpetuate reliance on carbon-intensive energy. New accountability mechanisms have been established in recent years to help everyone from corporations to concerned citizens manage this "do no harm" imperative—including a wide array of carbon disclosure initiatives—from the Greenhouse Gas Protocol to the Global Reporting Initiative to the Carbon Disclosure Project—that assist in creating an inventory of GHG emissions and devising a strategy to reduce one's footprint. Furthermore, a number of global codes and voluntary principles focused on integrating green growth into the work of companies and NGOs have also emerged, for example, the UN Global Compact's "Caring for Climate" platform.

A second category of engagement is through pure investment—particularly for adaptation finance in the developing world and for clean technology development and deployment. With the UNFCCC suggesting that more than 85 percent of the financial flows needed to support climate change challenges in the developing world will need to come from the private sector, it will be essential to make investments profitable. And in the energy sector alone, the International Energy Agency has estimated that investments of $45 trillion will be needed worldwide up to 2050 to halve global GHG emissions. Business undoubtedly has unparalleled resources and know-how to innovate and create the kind of solutions that are needed across the spectrum. The challenge will be to make these solutions affordable within the requisite time frame.

Many leading businesses are harnessing their core corporate competencies and individual value chains to increase climate change resilience in the developing countries where they operate. On water, for example, Unilever, Coca-Cola, Alcoa, Rio Tinto, Shell, BP, DuPont, and PepsiCo offer valuable models of comprehensive stewardship or sustainability strategies, which aim not only to manage the water footprint of the company's own sourcing and manufacturing operations but also to support community water initiatives and more systemic efforts to improve watershed protection and management. And in the agricultural sector, such agribusiness leaders as Unilever, Syngenta, DuPont, Monsanto, Nestlé, Groupe Danone, McDonald's, and Starbucks have developed comprehensive, sustainable strategies along their different commodity value chains, including efforts to support farmers in developing countries in their livelihoods and, increasingly, in adapting to climate change.[45]

One of the most innovative and rapidly growing areas of private sector engagement in climate change adaptation is the development of insurance and other risk-transfer financing solutions to help low-income countries, communities, and small businesses reduce their vulnerability to climate change. These products range from microinsurance programs and index-based agricultural insurance for poor farmers to multi-million-dollar calamity funds, and catastrophe bonds and pools at the level of national governments. Here, various kinds of organizations are playing a leadership role—including global insurance and reinsurance companies, such as Swiss Re and Munich Re; a number of NGOs and foundations in the developed world, such as Oxfam and the Rockefeller Foundation; and many microfinance institutions, cooperatives, rural banks, and emerging market companies in developing countries, often in partnership with multilateral development banks, the United Nations, and bilateral agencies.[46]

Others are also beginning to cash in on green technologies. According to Clean Edge, a clean technology market research firm, global revenues from solar photovoltaics, wind power, and biofuels expanded from $75.8 billion in 2007 to $115.9 billion in 2008. New global investments in energy technologies—including venture capital, project finance, public markets, and research and development—expanded by 4.7 percent, from $148.4 billion in 2007 to $155.4 billion in 2008, according to the research firm New Energy Finance. And the clean technology sector is now one of the largest recipients of venture capital—alongside biotechnology, software, and medical devices—with clean energy alone bringing in $3.35 billion in the United States in 2008. Globally, venture capital and private equity investments in clean energy totaled $13.5 billion in 2009 alone.

A third level of engagement is for

Photo by Steve Ladner Photography

"Resilience is best defined as the ability to plan for, to survive, to recover from, and importantly, to thrive in the face of an already changing climate. Yet building resilience isn't only a key element of climate planning. It really is a key part of development strategy going forward."

— **Judith Rodin**
President, The Rockefeller Foundation

Photo by Alex Irvin

"If we're going to survive beyond 2050, we must embrace a world of 'we.' Recognizing our common bond is the key to catalyzing international action to achieve climate justice."

— **Mary Robinson**
President, Realizing Rights: The Ethical Globalization Initiative; former President of Ireland

organizations to figure in the broader public policy dialogue—advocating robust action at the international level and pushing national legislatures to pass comprehensive climate change bills. Many have teamed up within the business community through campaigns like We Can Lead, others have partnered with civil society through coalitions like the United States Climate Action Partnership, and still others have pursued partnerships with local governments through organizations such as the Climate Group. From TckTckTck and 350.org to the Indian Youth Climate Network and the Alliance for Climate Protection, civil society coalitions formed a powerful voice in Copenhagen pressing for robust action to effectively and comprehensively meet the climate change challenge. Although the outcomes of the conference were less than satisfactory, the collaboration of these organizations has helped to bring a new sense of urgency to efforts to address the climate change challenge. Since Copenhagen, their alliance has given an important impetus to keep international negotiations focused on working toward comprehensive action.


Leadership
Can America Rise to the Challenge?
SEAL OF THE PRESIDENT OF THE UNITED STATES

The awarding of the 2009 Nobel Peace Prize to U.S. president Barack Obama for his "extraordinary efforts to strengthen international diplomacy and cooperation between peoples" has shown again that the world is looking to the United States to lead on international cooperation, and on climate protection, a key dimension of this cooperation. And the early days of the Obama administration have provided some welcome signs. As a first step, the Environmental Protection Agency (EPA) issued an endangerment finding against GHGs under the Clean Air Act that could lead to EPA regulation of GHGs should Congress fail to enact cap-and-trade legislation in the coming months. For its part, the House of Representatives has already passed the historic, if imperfect, American Clean Energy and Security Act, which would cut emissions to 83 percent below 2005 levels by 2050. Taken together with the $43 billion in spending on energy efficiency and renewable energy in the federal economic stimulus act passed in 2009, this would be the most ambitious energy policy undertaking the nation has ever seen. While the Senate considers its version of cap-and-trade legislation, the Clean Energy Jobs and American Power Act, there is a growing consensus among American politicians, businesses, and the public at large that climate change is a real problem—even if the debate is only beginning on how much and at what cost the government should act.

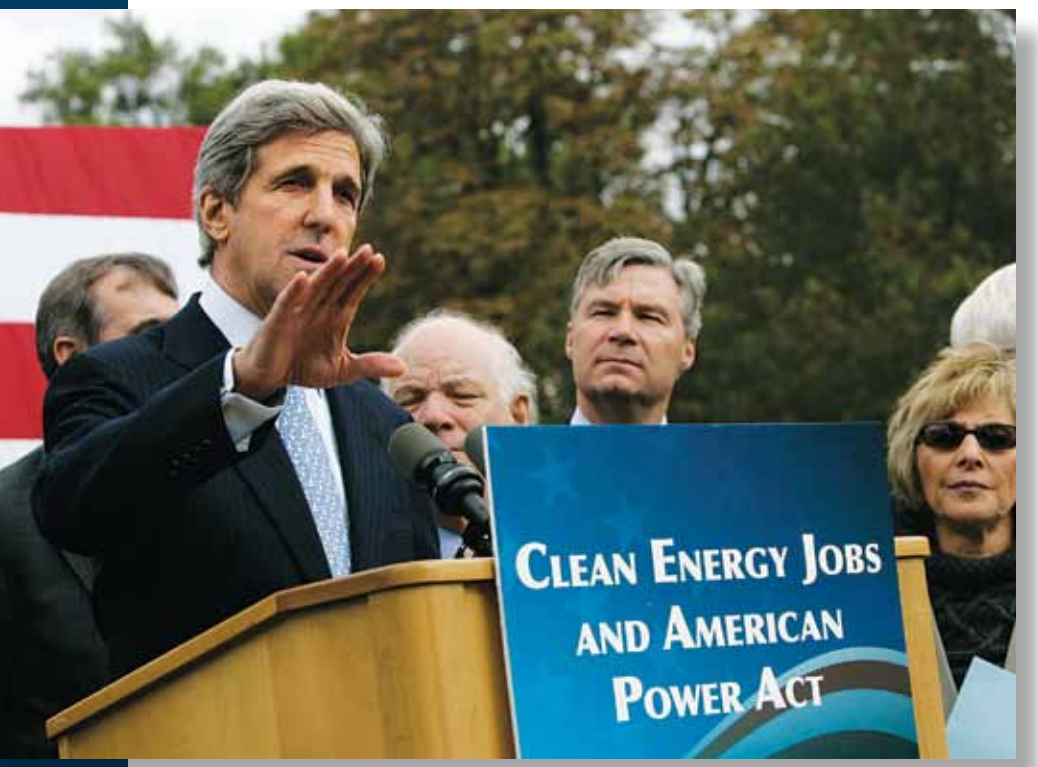
Overseas, the American president's popularity holds real opportunity. Since Obama became president, the approval rating of American leadership in the world has increased globally—from Bangladesh to Russia and from Syria to Cameroon.[47] Such popularity will only help to strengthen American efforts to constructively engage in international negotiations, to encourage the major economies to reach a consensus, and to secure greater gains for the world's 1.5 billion people living on less than $1.25 a day who stand to lose the most from the adverse effects of the changing climate. For as the Nobel Committee stated, "Only very rarely has a person to the same extent as Obama captured the world's attention and given its people hope for a better future."

Few things that the United States can do are more important for the international negotiation process than passing robust, comprehensive clean energy legislation as soon as possible—both to heighten U.S. credibility in the international negotiation process and to reduce GHG emissions. However, despite widespread criticism that without legislation in Congress, bargaining power in Copenhagen would be severely limited, the United States played a central role in the negotiations and development of the Copenhagen Accord. When President Obama arrived in Copenhagen, the negotiations were fractious and seemingly headed toward collapse. The president, along with leaders from China, India, Brazil, and South Africa, spent thirteen hours in discussions to hammer out the key issues that had been hindering negotiations.[48] There were two keys to breaking the stalemate. The first was the offer of $100 billion in financial aid from developed countries to assist poor nations with climate adaption and mitigation; this not only eased developing countries' apprehension but also put indirect pressure on China to cooperate. The second key was China's willingness to agree to a verification system under which all countries report their domestic actions taken to curb climate change, a principal demand of industrial countries and a major win for Obama's arsenal when trying to convince Congress to pass cap-and-trade legislation in the coming months. The agreement was then presented on a take-it-or-leave-it basis to the more than 190

"Americans have learned from the Europeans that the transformation of the economy from a high-carbon, fossil fuel base to a clean technology, low-carbon base, is one of opportunity. It's one of optimism. It's one that could create jobs. It's one that could create growth."

— **John Podesta**
President and Chief Executive Officer, Center for American Progress

Photo by Alex Irvin



nations in attendance, and the accord was "noted" in the final hours of the conference (only six countries registered dissent).

The United States played a key role in brokering the declaration at the Copenhagen UNFCCC conference, however imperfect it may be. The so-called BASIC group of countries—Brazil, South Africa, India, and China—also were instrumental in the international negotiations process, more so than at any previous UN climate conference. The shift in decisionmaking power to smaller groups highlights the inadequacies of the current UN system and underlines the need for informal channels of global governance to make climate change negotiations a priority. Many such opportunities already exist through, for example, the U.S.-China Strategic and Economic Dialogue, the U.S.-Mexico Bilateral Framework on Clean Energy and Climate Change, the Asia-Pacific Partnership on Clean Development and Climate, the G-20, and the Major Economies Forum on Energy and Climate. Progress was already made at the September 2009 G-20 summit in Pittsburgh, where leaders endorsed phasing out fossil fuel subsidies over the medium term, which is estimated to reduce GHG emissions by 10 percent by 2050. In addition, previous meetings of the major economies have yielded positive signs for technology transfer and emissions targets. The proposals endorsed in these smaller, more manageable forums have facilitated momentum in formal governance channels but still require major effort if they are to be translated into a legally binding climate change treaty.

Undeniably, the United States, as one of the world's two largest GHG emitters, and the largest per capita emitter among major countries, must take a leading a role in climate change solutions—and deliver on its promises. It emits approximately 23 tons of CO_2 per capita and ranks second in total GHG emissions only to China, which for its part emits about 6 tons of CO_2 per capita. As a historic and continuing contributor to climate change, the United States has an obligation to play a leading role in implementing domestic remedies and shepherding multilateral solutions—especially for the world's poor. America's global position requires these actions as much as its strategic economic and security interests.

"If the international climate change negotiations in Copenhagen are successful and we get on a path to stabilize our climate at 450 parts per million, we will have created a staggering energy consumer's benefit; global energy prices will be 18 percent lower if Copenhagen is successful–that's $750 billion per year in consumer savings. The U.S. share of that is over $150 billion a year. That's the dividend for Americans if we're successful in Copenhagen."

— **Hal Harvey**
Chief Executive Officer, ClimateWorks Foundation

Photo by Alex Irvin

A Bright Tomorrow

Here Comes the Sun

Photo by Alex Irvin

"I rarely have met a single young person who doesn't really care about their environment or alleviating poverty. I think we can be proud of the next generation and encourage them to make a difference."

— **Richard C. Blum**
Founder, Blum Center for Developing Economies; Chairman and President, Blum Capital Partners, LP

The global financial and economic crisis has shown that the future is unpredictable and that the nations and people of the world are interconnected in ways we do not always perceive—and the challenge of climate change reinforces these lessons and reveals the need for timely, worldwide coordination efforts. This lesson is especially important to remember as we try to cope with the uncertainties of climate change and its different effects on the developed and developing worlds. Thus, though people in Munich, Sydney, or Chicago may not feel the direct impact of climate change for three or four decades, people in Dhaka, Niamey, and San Salvador may be suffering its adverse effects in the coming decade. Our morality begs us to act, as does our long-term economic self-interest.

By investing in green sectors of the economy, we can create employment opportunities to stimulate needed growth and simultaneously ensure the sustainability of the global economy. We can push forward with the essential building blocks of an international climate change agreement to provide needed price signals to spur innovation and investment. We can promote clean energy technologies and sound forestry that involve the poor in our urgent efforts to abate GHG emissions in a way that improves livelihoods and reduces climate vulnerability. For as former vice president Al Gore and UN secretary-general Ban Ki-moon remind us,

"For millions of people from Detroit to Delhi these are the worst of times. Families have lost jobs, homes, health care and even the prospect of their next meal. With so much at stake, governments must be strategic in their choices. We must not let the urgent undermine the essential. Investing in the green economy is not an optional expense. It is a smart investment for a more equitable, prosperous future."[49]

No single person, organization, or country can meet these challenges alone. Only by working together on multiple fronts, compromising where compromise was once unthinkable, and seeing opportunities in moments of crisis can we deliver on the promise that sustainable, green growth holds for our economies, our planet, and our children.

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Published in March 2010.
Design/Production: MillerCox Design, Inc.

Global Economy
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