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An Opportunity for U.S. Leadership

Carter F. Bales and Richard D. Duke

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Containing Climate Change

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HUMAN ACTIVITY is causing irreversible harm to the environment. The level of carbon dioxide and other greenhouse gases in the atmosphere exceeds preindustrial levels by nearly 40 percent and is rising rapidly. This blanket of heat-trapping gases is already largely responsible for increasing the earth's average surface temperature by 0.7 degrees Celsius. If current fossil-fuel-consumption trends continue, average surface temperatures could rise by as much as 6.4 degrees by 2100, according to the Intergovernmental Panel on Climate Change. Even under the IPCC's most optimistic scenario, temperatures will still rise by 1.1–2.9 degrees before century's end. An increase of more than two degrees could have serious adverse impacts, including the extinction of many plant and animal species or even the collapse of entire ecosystems.

The economic costs of unchecked global warming will be severe. Precise quantification is difficult given the myriad uncertainties and subjective judgments involved in making such calculations. In 2007, the IPCC estimated that global warming could lead to continuing global GDP losses of one to five percent and even greater losses at the regional and local levels. Climate change is also beginning to create major security risks. *The Age of Consequences*, a report released in 2007

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by the Center for Strategic and International Studies, noted that if the planet warms by 1.3 degrees by 2040 (which is what current projections indicate will occur), there will be “heightened internal and cross-border tensions caused by large-scale migrations; conflict sparked by resource scarcity . . . ; increased disease proliferation . . . ; and some geopolitical reordering.”

Containing climate change will require reducing the current levels of greenhouse gas emissions not only in the United States and other wealthy countries but also in rapidly developing nations such as China. Per capita emissions in the United States today are four times as great as those in China and 20 times as great as those in India. But China has already overtaken the United States as the world’s largest overall emitter of carbon dioxide. Even if the wealthy countries cut their total greenhouse gas emissions by 80 percent by midcentury, aggregate emissions from the developing countries cannot be permitted to continue increasing long after 2020, or expected warming will exceed the critical threshold of two degrees Celsius. The international community must therefore urgently implement a durable global strategy to address the climate threat.

The least developed countries are by far the most vulnerable to climate change. Increased flooding could wipe out low-lying areas in countries such as Bangladesh, and worsening drought would devastate countries in sub-Saharan Africa. Emerging industrial powerhouses, such as China, are also highly vulnerable to the fallout from global warming, including extreme weather, disease, and reduced agricultural productivity. Yet these countries are understandably loath to bear the burdens of transitioning to clean economies while wealthy countries continue to pollute apace.

Launching an effective regime for containing climate change presents an opportunity for U.S. leadership. The United States must strive to bring developing nations into a system that establishes a common price for energy and industrial emissions—making pollution an expense rather than an externality—and create a framework for wealthy nations to help finance pollution-reduction programs in poorer countries. Before that, however, the United States must match Australia, Canada, the European Union, and Japan by committing to sharply reducing its own emissions.

UNCAPPED POTENTIAL

THE UNITED STATES can learn a great deal from Europe's experience with a carbon cap, but it should not mimic the EU's model. In 2005, the EU established the Greenhouse Gas Emission Trading Scheme to limit emissions from the power and industrial sectors. The cap-and-trade concept was sound: establish a cap on annual greenhouse gas emissions that would become more restrictive over time, issue a new tradable currency in the form of pollution allowances (with the amount in circulation equal to the maximum permitted emissions for each year), and require all major polluters to remit to the government allowances equivalent to their total emissions each year. Companies able to reduce their emissions through greater efficiency or by cleaning up their energy sources could then sell any excess allowances to lagging companies—thereby establishing a price on carbon pollution.

But the model's initial implementation was flawed. Lacking proper emissions-tracking data, and duped by member states' efforts to shelter their industries from real cuts, the EU established an artificially high baseline pollution level for companies. The result was a market flooded with more carbon allowances than were needed to cover actual emissions. This caused the price of allowances to crash to near zero during the first trading period, which ran from 2005 to 2007.

The EU also squandered an opportunity to raise revenue that could have helped underwrite the transition to a clean-energy economy: instead of selling the allowances to emissions-intensive industries, it opted for the politically expedient path of giving them away. Many of these industries, particularly the power sector, reacted by double dipping: they took the free allowances and still raised prices on consumers, resulting in billions of euros in windfall profits. Moreover, the EU trading scheme covers only an eight-year period and permits heavy reliance on low-cost Clean Development Mechanism credits derived from abroad. These CDM credits originated as part of the Kyoto Protocol; they are carbon offsets offered to rich-country firms in exchange for the financing of emissions-reduction projects in developing countries. Consequently, European industries have largely avoided the long-term capital investments required to reduce the carbon intensity of the EU's power and industrial sectors. And despite undergoing an arduous

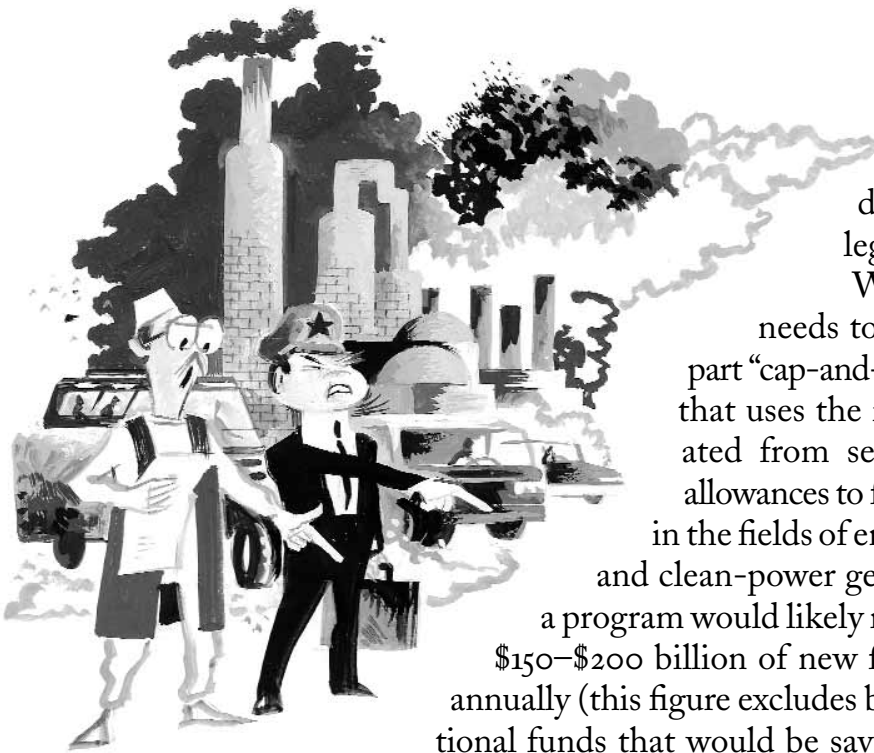
review process, claims that emissions reductions in developing countries are CDM-related are not always authentic. In fact, nearly three-quarters of the credits slated for CDM approval come from projects that already provide some level of economic return, such as energy efficiency or wind power, meaning that it is difficult to know whether companies in developing countries would have undertaken these projects anyway, without rich-country financing.

The CDM market also rewards developing countries for failing to implement policies that would curb their greenhouse gas emissions, such as reducing subsidies for fossil fuels (estimated to exceed \$200 billion annually in developing countries according to a 2007 United Nations report). A government has less motivation to raise energy prices or impose stringent energy-efficiency standards, let alone join an agreement capping energy and industrial emissions, if delaying reforms allows it to sell more CDM credits to wealthy-country firms. EU member states are now actively debating sharp restrictions on the importation of CDM credits for the post-2012 trading period; the United States should avoid relying too heavily on CDM-style offsets in the first place.

THE CARBON MONSTER

THE UNITED STATES is both a major carbon polluter and the world's leading innovator of environmental technology. U.S. leadership will therefore be indispensable in the creation of an international regime to contain climate change. To date, however, the U.S. government has hesitated to help establish an international system capable of channeling the necessary funds—roughly \$45 trillion, which is the International Energy Agency's estimated tab for cutting global fossil-fuel emissions in half by 2050 and holding expected warming below two degrees Celsius—into improving energy efficiency and developing clean-energy sources.

Fortunately, U.S.-based businesses are beginning to recognize the profit potential of clean-energy alternatives. In 2007, ten corporations and four environmental groups in the United States created the U.S. Climate Action Partnership. The group has called for a 60–80 percent cut in U.S. emissions by midcentury. Multiple states—starting in the Northeast and the West—are pursuing ambitious emissions-reduction



efforts. It is now time for decisive federal legislation.

Washington needs to follow a four-part “cap-and-invest” strategy that uses the revenue generated from selling pollution allowances to fund innovation in the fields of energy efficiency and clean-power generation. Such a program would likely result in at least \$150–\$200 billion of new federal revenue annually (this figure excludes billions in additional funds that would be saved by reducing subsidies to the U.S. fossil-fuel industry). That sum should be more than sufficient to transform the nation’s energy infrastructure. The legislative and administrative details of any new policies will have major implications for the overall cost of containing emissions. In order to avoid the pitfalls that plagued the EU’s experiment, Washington must get the rules right from the beginning.

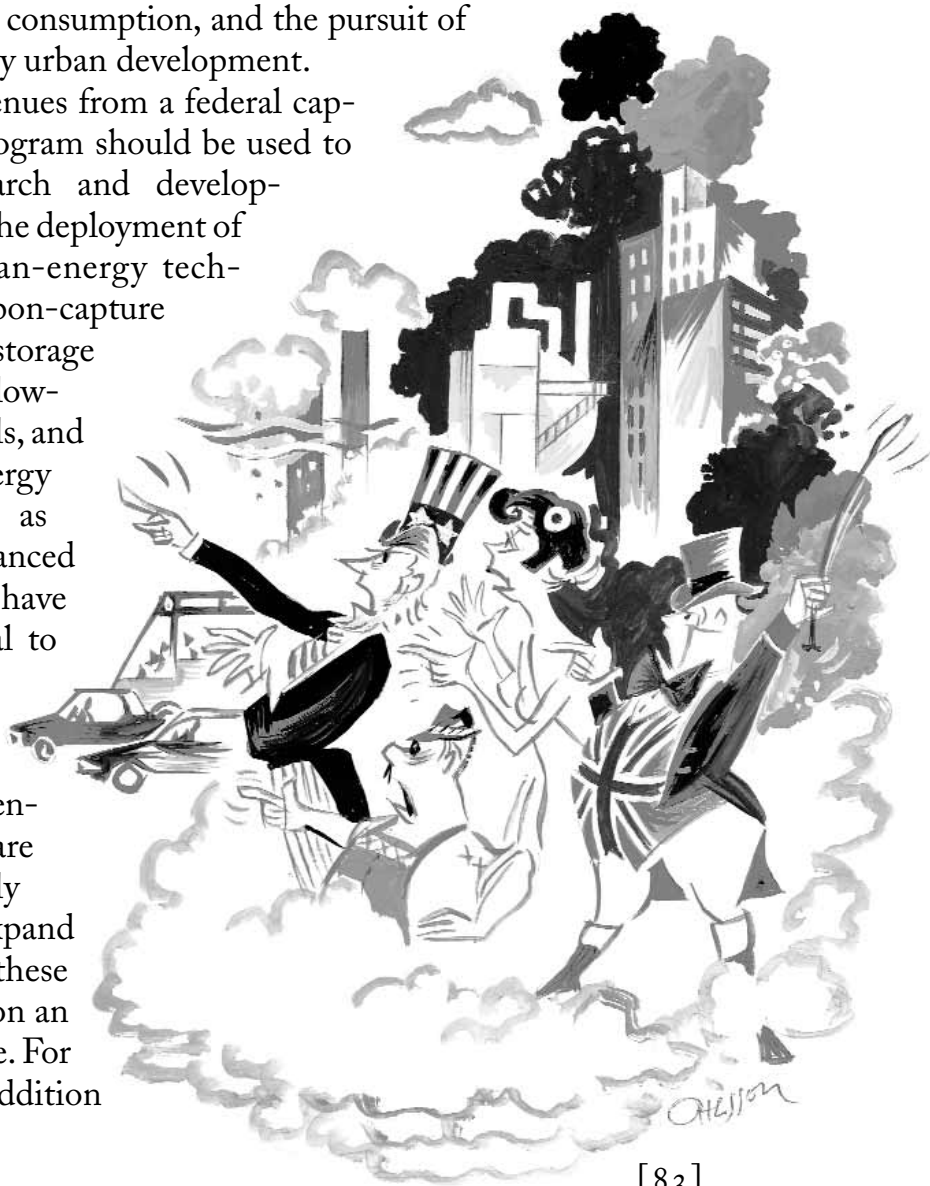
The first part of this cap-and-invest strategy will require the U.S. government to establish an effective carbon-trading system free of the problems that plagued the EU model. This means tracking emissions carefully in order to set the correct caps, limiting the use of CDM-style offsets, and assuring investors that this is not a transitory experiment but a system that will remain in place for many years. Rather than awarding windfall profits to certain industries by granting them free pollution allowances based on historical emissions levels, Washington should charge for the allowances and direct all revenues from their purchase toward projects that will benefit the public.

Second, the federal government must unleash the potential for cheap, efficient energy use by imposing minimum federal energy-efficiency standards. At the moment, electricity consumption in buildings accounts for over one-quarter of total U.S. emissions, yet landlords see no reason to invest in efficient appliances when it is the tenants who pay the

utility bills. The federal government should use funds from the cap-and-invest system to directly encourage the development and sale of high-efficiency appliances by rewarding those manufacturers and retailers that successfully market them. Washington should also reward those states that rapidly improve their energy efficiency. This performance-based federalism would allow states to compete for funds by implementing federal emissions goals through a combination of creative state and local initiatives, including the creation of ambitious building codes, the implementation of regulations that allow utilities to profit from helping their customers reduce energy consumption, and the pursuit of transit-friendly urban development.

Third, revenues from a federal cap-and-invest program should be used to support research and development on and the deployment of advanced clean-energy technologies. Carbon-capture and carbon-storage mechanisms, low-carbon biofuels, and renewable energy sources, such as solar and advanced wind power, have great potential to reduce greenhouse gas emissions.

However, potential investors are understandably reluctant to expand and roll out these technologies on an industrial scale. For example, in addition



to exposing themselves to economic risk and uncertain future regulations, potential developers of carbon-capture facilities would have to invest in educating regulators, winning the support of the public, and obtaining permission to build and operate their facilities, thereby incurring additional costs and paving the way for future competitors. Facing such daunting hurdles, investors have generally preferred to wait. Therefore, emerging clean technologies will need to be supported

A cap-and-invest strategy would allow the United States to develop a clean economy at little or no net cost.

by sustained federal subsidies until they become affordable enough to compete with products already on the market.

Finally, the U.S. government should take advantage of the carbon-reduction potential of the forestry and agricultural sectors. Projects within the United States that capture carbon in forests or reduce methane and nitrous oxide emissions from

the agricultural sector should be allowed to generate allowances for sale in the carbon market. As they are used to promote energy efficiency, federal funds should also be used to motivate states to invest in these sectors.

This four-part cap-and-invest strategy would allow the United States to move toward a clean economy at a negligible net economic cost. In fact, a recent study by the consulting firm McKinsey & Company suggests that the cost of reducing U.S. emissions by nearly 30 percent before 2030 will be close to zero if the federal government rapidly unleashes the full cost-savings potential of energy efficiency and innovation.

Nonetheless, reaching a deal on comprehensive cap-and-invest legislation in the United States will be politically challenging given the scale of the reforms certain industries would have to undertake. To manage this challenge, the United States will need to enshrine promises for future tax reductions or rebates in current legislation and gradually move from a cap-and-invest strategy to a “cap-and-dividend” approach. Under this system, once initial public investments have succeeded in creating major efficiency improvements and clean-power alternatives, an increasing share of the revenues from the sale of pollution allowances would be given back to consumers and businesses. This could provide an important macroeconomic boost and a tool for

policymakers to win the support of key constituencies. And even if political expediency leads to bad policies in the future—such as a price ceiling on carbon dioxide—the high volume of allowances in the system's initial years will yield a large revenue stream that can kick-start the transformation to a clean economy.

THE LOW-EMISSIONS BANDWAGON

ONLY AFTER the United States commits to cleaning up its own act can it credibly push for an international regime to contain greenhouse gas emissions worldwide. A 2008 International Energy Agency study estimates that even if strict caps push the carbon price above \$200 per ton in wealthy countries by 2050, annual global carbon output by that time would be triple the level required to hold warming below two degrees Celsius unless developing countries also curbed their emissions. That is why developing nations must be enlisted quickly as responsible stakeholders in the fight to solve this problem.

Some observers consider the creation of a comprehensive international regime too daunting and have instead proposed interim measures, particularly “cooperative sectoral approaches.” This involves financially rewarding developing countries for beating sector-specific benchmarks, such as a certain number of tons of carbon dioxide released per unit of electricity produced. Such an approach would likely be easier to negotiate and implement, but it would miss major opportunities, such as designing energy-efficient buildings or expanding public transportation. Moreover, it indefinitely exempts all developing countries, even booming ones, such as China, from any sort of commitments. These countries are unlikely to accept a binding regime capable of forcing long-term emissions reductions if they are offered alternatives that provide benefits to them without asking for anything in return.

A more forceful global regime that decisively confronts worldwide greenhouse gas emissions is necessary. It must involve developing countries in a fair, long-term scheme with binding emissions caps for all—and soon. Every week of delay means the construction of two more coal-fired power plants in China and similarly detrimental investments in carbon-intensive energy infrastructure across the world.

An international emissions-containment regime, replacing the Kyoto Protocol, should cut global carbon emissions in half while moving toward equal per capita emissions rights across the world by 2050. The basic terms are clear: wealthy countries will have to help poorer countries cover the added costs of transitioning to clean-energy economies and help them reduce emissions from deforestation and agriculture. No country should have an indefinite right to pollute more than others simply because it is wealthier. Those countries that pollute more on a per capita basis should simply pay more. The eventual goal should be to reduce average per capita fossil-fuel emissions from the 2005 level of 4.3 tons to 1.5 tons—even as the world population expands by nearly 50 percent and per capita economic output nearly triples. This should hold expected warming below the two-degree threshold, so long as deforestation and other greenhouse gas emissions are controlled.

Under this plan, wealthy countries would commit to progressively stricter emissions caps, ensuring an 80 percent reduction from 2005 levels by 2050. Developing countries with high emissions, such as China, would receive easy-to-meet caps through 2020, granting them tradable pollution rights up to the emissions levels currently projected for them by the International Energy Agency. After 2020, each heavily industrialized developing country would be required to freeze its cap at its currently projected 2020 emissions level. Once the wealthy countries have brought their average per capita emissions down to the level of the major developing countries, countries such as China would commit to progressively stricter caps in line with the commitments of the wealthy countries.

This would give Beijing an immediate incentive to start reducing emissions below current projections, freeing up allowances for sale in the global carbon market. After 2030, however, China would have to assume a declining cap. Skeptics may wonder why China would choose to participate in such a system. The answer, in short, is that China could easily stay below the emissions levels projected for it by the International Energy Agency because it would spend less on abatement efforts than it would receive from selling carbon credits to the rich countries.

Wealthy countries will have to employ some expensive measures, such as switching from coal to natural gas, to reduce their emissions.

But China can begin reducing its emissions today—relative to forecast growth trends—using highly cost-effective measures, such as lowering its fossil-fuel subsidies and enforcing tougher energy standards, both of which would benefit its economy to boot. Beijing could further reduce the country's emissions by taking more forceful measures, such as imposing tight caps on emitters in the power and industrial sectors and permitting them to trade allowances directly with their counterparts in Europe, bypassing governments. Beijing could also alter its taxation system to include a carbon tax, which would further encourage energy efficiency and the production of clean energy (China already has the fastest-growing wind-energy market in the world). Added benefits to pursuing such measures would be China's reduced dependency on volatile fossil-fuel supplies and a decline in pollution-related deaths in the country (estimated at over 600,000 per year according to a 2007 World Health Organization study).

As a further inducement to developing countries, wealthy countries should offer three powerful deal sweeteners. First, they should commit to a more ambitious 2050 emissions-reduction target of 90 percent below 2005 levels (rather than the 80 percent target) as soon as the major emerging economies accede to the regime. As reaching a 90 percent reduction would be extremely difficult, these countries would likely have to buy allowances abroad, thus injecting cash into developing-country economies. Second, they should earmark a share of the revenue they earn from selling in-country pollution allowances for investment in abatement initiatives in the forestry and agricultural sectors in developing countries, as a strategy to help reach overall greenhouse gas abatement goals. Studies suggest that tropical deforestation accounts for roughly 20 percent of global emissions due to the burning or degradation of dense carbon-rich forests. Methane and nitrous oxide emissions from the agricultural sector in poor countries account for at least another 10 percent of global emissions. If the wealthy countries committed 20 percent of their allowances to such projects, roughly \$50 billion per year would go to these initiatives.

The time has come for the United States to lead the fight against global warming at home and abroad.

This would be sufficient to fund sharp reductions in deforestation, encourage the planting of trees, and control many agricultural emissions. Third, wealthy nations should devote a gradually increasing share of the revenue they raise from their domestic cap-and-trade systems to funding projects that would help the most vulnerable signatory nations adapt to the unavoidable impacts of climate change.

There are incentives for all countries to participate in such a plan. Wealthy nations would benefit by tapping into less costly abatement opportunities abroad. Developing nations would benefit from capital inflows that could help them modernize and expand their clean-energy infrastructure and protect their forests. And most important, this plan has the geographic reach to stanch the current hemorrhaging of greenhouse gases in China and other rapidly developing economies, offering a fighting chance to contain this global threat.

THE TRIUMPH OF THE COMMONS

IMPLEMENTING SUCH a system will not be easy. Developing countries will need administrative support to track their fossil-fuel consumption and the associated emissions. They may also need help crafting domestic policies that encourage emissions reductions. There is also likely to be political resistance in the United States and other wealthy nations. The prospect of sending tens of billions of dollars a year to developing countries—much of it to China—will not go over easily on Capitol Hill, where displeasure over the U.S. trade deficit is already acute. Eventually, as rapidly developing countries, such as China, meet tighter caps, smaller, poorer signatories will become the largest carbon-credit exporters, and China will receive less. This prospect should reduce political opposition to the system. Moreover, these financial flows would provide an international macroeconomic shock absorber, with more funds from wealthy countries automatically flowing to developing countries when the former economies are booming and the latter are slackening. For example, a country such as India would have more allowances to sell during a recession due to slowed industrial production; revenues from these allowances would help stabilize its economy.

Finally, and perhaps most daunting, is the question of enforcement. A country such as China could simply choose to pull out of the

international emissions-containment regime, undermining it completely. Therefore, the incentives to remain must be strong, and the price of departure must be high. Even before the caps become stringent, it is possible that a developing country experiencing an unanticipated economic boom will need to purchase allowances. In such circumstances, signatories should be permitted to borrow from future pollution allocations.

As the developing countries face increasingly stringent caps, the primary enforcement strategy for dealing with countries that exceed their caps will be the threat of temporary exclusion from the climate regime and the loss of future access to carbon-credit export markets. Uncooperative nations would also lose access to rich-country investments in the forestry and agricultural sectors, as well as climate-change-adaptation assistance. Most fundamentally, they would jeopardize the collective benefits of the international regime. If these incentives prove unpersuasive, the wealthy countries could always consider imposing tariffs on carbon-intensive imports, such as steel or cement, from countries that fall out of compliance with their emissions caps.

The time has come for the United States to lead the fight against global warming at home and abroad. Both U.S. presidential candidates have signaled that if elected they will take on the challenge of climate change as one of their top priorities. An international emissions-containment regime would serve the nation's economic interests by promoting innovation and opening up new markets for U.S. technology and services. Moreover, it would allow the United States to escape the most damaging economic and security consequences of global warming and help shield the world's most vulnerable societies from this unprecedented threat. 🌍