

The Climate Threat We Can Beat

What It Is and How to Deal With It

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FOR MORE than two decades, diplomats have struggled to slow global warming. They have negotiated two major treaties to achieve that goal, the **1992** UN Framework Convention on Climate Change and the **1997** Kyoto Protocol. And last year, at the UN Climate Change Conference in Durban, South Africa, they agreed to start talking about yet another treaty. A small group of countries, including Japan and the members of the European Union, now regulate their emissions in accord with the existing agreements. But most states, including the largest emitters of greenhouse gases, China and the United States, have failed to make much progress. As a result, total emissions of carbon dioxide, the leading long-term cause of global warming, have risen by more than **50** percent since the 1980s and are poised to rise by more than **30** percent in the next two to three decades.

The ever-increasing quantity of emissions could render moot the aim that has guided international climate diplomacy for nearly a decade: preventing the global temperature from rising by more than two degrees Celsius above its preindustrial level. In fact, in the absence

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of significant international action, the planet is now on track to warm by at least **2.5** degrees during the current century—and maybe even more. The known effects of this continued warming are deeply troubling: rising sea levels, a thinning Arctic icecap, extreme weather events, ocean acidification, loss of natural habitats, and many others. Perhaps even more fearsome, however, are the effects whose odds and consequences are unknown, such as the danger that melting permafrost in the Arctic could release still more gases, leading to a vicious cycle of still more warming.

All these risks are rising sharply because the traditional approach to international climate diplomacy has failed. For too long, climate science and policymaking have focused almost exclusively on emissions of carbon dioxide, most of which come from burning fossil fuels. Weaning the planet off fossil fuels has proved difficult, partly because expensive and rapid shifts to new energy systems could have negative effects on the competitiveness of modern economies. What is more, carbon dioxide inconveniently remains in the atmosphere for centuries, and so even keeping carbon dioxide at current levels would require deep cuts sustained over many decades—with economic consequences that states are unlikely to be willing to bear unless they are confident that their competitors will do the same. No permanent solution to the climate problem is feasible without tackling carbon dioxide, but the economic and geophysical realities of carbon dioxide emissions almost guarantee political gridlock.

A fresh start to climate diplomacy would emphasize that carbon dioxide is not the only warming pollutant. At least **40** percent of current global warming can be blamed on four other types of pollutants: dark soot particles called black carbon, methane, lower atmospheric ozone, and industrial gases such as chlorofluorocarbons (CFCS) and hydrofluorocarbons (HFCS), which are used as coolants in refrigerators. Nearly all these pollutants have life spans of just a few weeks to a decade—much shorter than that of carbon dioxide. But although their tenure is brief, they are potent warmers. Emitting just one ton of black carbon, for example, has the same immediate effect on warming as emitting 500-2,000 tons of carbon dioxide. Because the impacts of these short-lived pollutants on the climate are severe and swift, limiting them could curb warming quickly, allowing more time for serious efforts to reduce carbon dioxide.

ALIGNING INTERESTS

LUCKILY, REDUCING short-lived pollutants poses fewer political hurdles than cutting carbon dioxide, for two reasons. First, existing technologies and policies, if properly applied, readily allow for deep cuts in these pollutants. Second, unlike reducing carbon dioxide, the main benefits of which arrive only after decades of costly efforts, controlling these pollutants would actually serve the immediate interests of developing countries, where pollutants such as soot and ozone damage vital crops and cause respiratory and heart diseases. A few hundred million tons of crops are lost to ozone smog every year; in India, air pollutants have decreased the production of rice by about ten million tons per year, compared with annual output in the 1980s. Globally, the inhalation of soot produced by cooking indoors already kills about two million people each year, mostly women and children living in extreme poverty. And because soot is dark, it traps heat from sunlight and thus speeds melting when it settles on mountain glaciers—a direct threat to drinking-water supplies and agricultural lands that depend on glacier-fed river systems in China and India, such as the Ganges, the Indus, and the Yangtze. Owing to these near-term economic and public health risks, even countries that have been skittish about costly long-term efforts to regulate carbon dioxide are already proving more willing to confront short-lived pollutants.

A plan to reduce short-lived pollutants would align the self-interests of the three largest polluting nations: China, India, and the United States, all of which have conspicuously failed to do much about climate change. It would also engage Europe, which has long been committed to the Kyoto Protocol but has struggled to find willing partners. The United States and a few other countries are in the early stages of building a coalition to address short-lived pollutants; China and India must find constructive ways to join. Limiting these pollutants could cut the pace of climate change in half over the next few decades. Visible success in fighting them would also restore credibility to climate-change diplomacy, which is essential for progress on the more daunting task of limiting carbon dioxide. And taken together, immediate action on short-lived pollutants and serious efforts to control carbon dioxide could achieve the goal of stopping warming at two degrees—just barely.

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Still, even those combined efforts cannot reverse the warming that will inevitably occur. Thus, all countries will need to adapt to some of the effects of climate change, especially poorer countries whose economies depend heavily on agriculture and other industries that are especially sensitive to the climate. International cooperation can help these places adapt, but not principally through targets set by diplomats in New York and Geneva, or through the kinds of large-scale, expensive projects directed by wealthy countries and international organizations that have been the mainstay of climate diplomacy to date. Instead, effective adaptation will require bottom-up institution building at the local level to engage people on the frontlines of climate change, such as city planners responding to the risk of rising seas and agricultural ministries helping farmers anticipate how a changing climate will affect their crops. The next era of climate diplomacy should revolve around connecting international experts to those local officials, so that information about best practices can spread more readily.

BEYOND CARBON DIOXIDE

As CLIMATE science matured in the late 1970s, all eyes were focused on carbon dioxide. Other gases were known to affect the climate, but human activities emit more carbon dioxide than any other greenhouse gas. Because carbon dioxide came mainly from fossil fuels, which governments tracked closely, its emissions were easy to quantify; other pollutants, by contrast, were much harder to pin down. When policymakers first began to pay attention to global warming, they, too, concentrated on carbon dioxide. The UN Framework Convention on Climate Change and the Kyoto Protocol recognized that other gases also cause warming, and the Kyoto Protocol created a scheme through which countries could meet their emissions-reduction obligations by substituting other gases for carbon dioxide at UN-established exchange rates. But the diplomats set the exchange rates in ways that emphasized long-term climate change, creating incentives to cut carbon dioxide and other long-lived warming gases and effectively penalizing attempts to reduce short-lived pollutants. Some of these, notably soot particles, were omitted from these treaties altogether, because, at the time, their precise warming effects were difficult to quantify.

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In the background, however, climatologists started to pay attention to a longer list of greenhouse gases. In the 1970s, CFCs became the first to attract scrutiny. Adding one molecule of these hyperwarmers to the atmosphere has the same climate effect as the addition of more than 10,000 molecules of carbon dioxide. Policymakers, however, were more concerned about the role that CFCs played in depleting the ozone layer, which caused skin cancers, damaged crops, and threatened natural ecosystems. Those risks inspired the Montreal Protocol, a **1987** treaty that banned CFCs and many other ozone depleters. Because the Montreal Protocol focused on pollutants that had little effect on national economic competitiveness, it has been the most successful environmental treaty in history. It set the stage for the ozone layer to heal, and because CFCs are also warming gases, it had the helpful side effect of slowing climate change. In fact, studies have shown that the reduction of CFC emissions since the late 1980s has done more to reduce global warming than all the climate treaties focused on carbon dioxide to date. Unfortunately, HFCs and some of the other gases that have been used to replace CFCs are also strong warming agents; adding them to the list of pollutants covered by the Montreal Protocol, a policy now under consideration, could help phase them out speedily.

As climate science has progressed, researchers have become aware of more warming agents. For the most part, emissions of these pollutants result from primitive energy technologies, mostly in emerging economies. Most black carbon, for example, is emitted by old-fashioned cookstoves, improperly maintained and poorly regulated diesel engines, and outdated power plants. Emissions from all three of these sources could be reduced with available technologies, market-based incentives, and low-cost government regulation. Between 1989 and 2007, California cut its black carbon emissions from diesel engines nearly in half by mandating the use of better fuels and filters.

Similar steps would have an even greater impact in the developing world, where pollution controls are much more primitive. In 2008, a group of scientists working for the United Nations Environment Program (UNEP) estimated that roughly **60** percent of India's soot emissions could be eliminated by replacing traditional stoves that burn unprocessed firewood and dung with cleaner stoves that burn more efficiently by using pellet forms of those fuels. India and other



South Asian countries could lower their soot levels even further by switching from the primitive kilns used to manufacture bricks to more efficient modern varieties. Similarly, eliminating the burning of solid coal for heating homes in China could reduce black carbon emissions there by more than **50** percent. Developing countries could achieve further soot reductions by installing better insulation in homes (to reduce the need for heating) and by using alternative fuels for heat, such as natural gas, which yields essentially no soot when burned. Making these changes would require governments to subsidize the initial costs of the new technologies. But those expenses would be offset relatively quickly by gains in public health and agricultural productivity.

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The strategy for reducing soot from power plants also involves shifting to more efficient technologies, along with switching to natural gas and installing pollution-control equipment, such as scrubbers and filters, in coal-burning plants. In most places, market-friendly reforms could spur these changes. In India, deregulation and the restructuring of state-owned companies led to increased competition among technology suppliers and power plant operators; as a result, the country's newest coal plants are dramatically more efficient.

During the last 15 years, dozens of research teams have documented effective, low-cost methods of reducing levels of soot and the three other short-lived warming pollutants. Last year, the UNEP summarized their work, highlighting the potential benefits of installing new cookstoves, building more efficient power plants, and plugging the leaks that occur when natural gas is extracted from wells. The UNEP concluded that such steps would make it possible to cut 40 percent of global man-made methane emissions and almost 75 percent of global black carbon emissions by 2030. Those reductions could ultimately prevent as many as five million deaths every year and safeguard as many as 140 million tons of corn, rice, and soybeans every year—the equivalent of four percent of annual global production. These measures would also halve the global warming expected to occur between now and 2050 and sharply raise the odds that total warming could be limited to two degrees.

These aims are ambitious but not unrealistic. Driven by short-term national interests unrelated to climate change, China and India are already trying to cut the air pollution that sullies their cities and undermines their agricultural productivity. China has put in place an elaborate program to document the national economic costs of local pollution and has made energy efficiency a centerpiece of its most recent five-year plans. In India, courts are forcing the national government to take stronger action to control air pollution.

In February, the United States announced that it would lead a group of countries including Bangladesh, Canada, and Sweden in a new strategy to reduce short-lived pollutants. Working with the UNEP, this initiative aims to help countries make the deepest cuts possible by leveraging a form of peer pressure and by sharing information on best practices. For years, major polluters have criticized UN climate talks as too rigid; this initiative could represent a practical complement. But for it to succeed, China and India must find a way to become involved.

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Both countries have been wary of diplomatic initiatives that could lead to binding emissions controls, and they have been suspicious that efforts to control short-lived pollutants represent a way for the industrialized nations to avoid taking responsibility for decades of carbon dioxide emissions. Chinese and Indian policymakers need to realize that, in fact, a new focus on short-lived pollutants would allow them to shift climate negotiations to their own terms. It would reduce global warming while letting China and India focus on the pollutants that they are most inclined and able to control.

Success on short-lived pollutants could also help recharge climate diplomacy more generally. Most of the world's governments and big industrial firms—players whose policies and investments are crucial to solving the climate problem—are growing weary of climate talks that have dragged on for decades yet produced few tangible results. A relatively quick and easy victory over short-lived pollutants could help reverse those sentiments and reinvigorate efforts to manage the much harder task of coordinating cuts in carbon dioxide emissions.

EMBRACING ADAPTATION

BUT EVEN an effective international effort on short-lived pollutants cannot avoid the increase in the earth's temperature that will be the inevitable consequence of the emissions that are still accumulating in the atmosphere. Yet until just a few years ago, even discussing adaptation to climate change was taboo, because activists and policymakers alike wrongly believed that simply talking about preparing to cope with a warmer planet would make averting its arrival seem somehow less urgent. Most of them now realize that adaptation is essential; still missing, however, is a strategy to guide international diplomacy around the issue.

Poor countries are the most vulnerable to the changing climate, and it would be unconscionable for the international community not to help them deal with it. Historically, discussions of foreign aid for dealing with climate change have focused on large-scale projects or on helping government officials from poor countries attend international meetings. Ultimately, those approaches will fail, because adaptation is an intrinsically local activity. Aid must play a role, but countries will have to take control of their own fates. And even in the poorest countries, internationally funded projects—for example, building seawalls in places threatened by

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rising oceans—will play only marginal roles, at best. What international organizations can do, however, is fund networks to connect local authorities all over the world to one another, which would allow them to share information about best practices. Such networks could also connect local authorities to international experts who can help them assess and respond to climate vulnerabilities in their areas.

Until recently, most climate-risk assessments were done at the global level; very few countries or localities were willing to invest in translating abstract global dangers into practical local actions. But the best adaptation plans draw on the more detailed kind of information about conditions on the ground that is available only to locals. For example, in 2006, California conducted a thorough assessment of its vulnerability to a range of climate-change effects, including more frequent or severe wildfires and a possible 90 percent decline by the end of the century in snow cover in the northern Sierra Nevada mountain range, which would threaten all the state's major rivers. In turn, local officials used those studies to guide their planning. Similar assessments are being performed across the United States—for example, in states along the Gulf of Mexico, where officials and firms that operate the region's infrastructure are now preparing for the higher sea levels and stronger storms that are likely in a warmer world.

Many governments in the developing world are also doing serious assessments, including those in Brazil, China, and India. But locally directed assessments are not occurring in the most vulnerable, poorest places, such as rural Africa, where climate-sensitive agriculture is the dominant economic activity, and low-lying Pacific island nations, where rising sea levels and stronger storms will redraw coastlines. Places such as these would benefit the most from the establishment of collaborative networks of government officials, private-sector firms, and nongovernmental organizations that can share information and expertise, thereby cutting the cost and speeding the implementation of adaptations.

Such connections are already making a difference. For example, in 2004, a team of 300 scientists that included representatives from all eight countries with territory in the Arctic published the *Arctic Climate Impact Assessment*, which synthesized international and local research on the likely effects of global warming on the region. The report is part of a larger, collective effort by the Arctic countries to prepare for those effects and minimize them through controls on pollutants such as soot.

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With its combination of international funding and local expertise, the Arctic assessment project should serve as a model for how to connect high-level climate diplomacy with ground-level policymaking.

AFTER DURBAN

As WITH most global challenges, climate change requires policymakers and activists to align international goals with national interests. The Durban conference witnessed some progress on that front. Delegates there agreed to the so-called Durban Platform, which offers a framework for new climate talks that could reduce the divisions between wealthy and poor countries that have frequently impeded progress. In the past, poor countries have refused to agree to emissions controls and demanded that rich countries alone make all the effort. For their part, rich countries have worried that reducing their own emissions would limit their ability to compete with emerging economic powerhouses such as China. Unlike earlier frameworks that put all the burden for emissions controls on rich countries, the Durban Platform requires all the major emitters to make a serious effort.

That is a good first step, but the practical details that will define any new talks remain unsettled. The largest emitters of short-lived warming gases—China, India, the United States, and the countries of the EU—should demonstrate leadership by putting those pollutants at the center of the next round of diplomacy. In Durban, diplomats also agreed to devote a significant amount (probably several billion dollars a year) to projects relating to adaptation. They should use those funds to build networks to connect people who are developing practical, location-specific ways to adapt.

For the last 20 years, any proposal that de-emphasized the long-term mitigation of carbon dioxide or advocated adapting to irreversible warming was considered a dangerous distraction from the goal of permanently solving the climate problem. But an unrealistic focus on permanence has proved counterproductive, obscuring practical steps that are already attainable and politically attractive to the countries that matter most. The best way to restore faith in climate diplomacy is to make tangible progress on those measures. After all, only once countries revive climate diplomacy can they take on the much harder challenge of taming carbon dioxide emissions. 🌍