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Practical Climate Change Policy

A sensible middle-of-the-road alternative exists between the defective Kyoto Protocol and do-nothing policy.

Global climate change policy has reached a stalemate. Europe, Canada, and Japan have ratified the Kyoto Protocol, but it now appears that Russia probably will not, and the Bush administration has ruled out U.S. participation. The treaty puts no obligations on developing countries to curb their rapidly growing emissions. Even if Russia joins and the Kyoto Protocol takes effect, the absence of the world's largest greenhouse gas (GHG) emitters--the United States and China--means that Kyoto will have little impact on future climate change. If the European Union (EU) and other countries proceed with a rump version of the Kyoto regime, it will accomplish even less. Although bills in the Senate and action by the states continue to inch along, the impact of local policies on a global problem is doubtful. Neither of the polar options typically posed for U.S. policy--join Europe in the Kyoto Protocol or stay out and do nothing--is satisfactory.

It's time for a new, more pragmatic approach. Smart climate policy does not have to choose between extremes. A pragmatic climate policy would balance benefits and costs, heed warnings without being panicked, recognize uncertainty without being paralyzed, employ economic incentives to accomplish results cost-effectively, and learn from experience with regulatory design. It would engage key countries in a new regime parallel to the Kyoto Protocol (or an adaptation of Kyoto led by the EU) that would allow us to test and evaluate international climate regulation over time instead of making an all-or-nothing choice today.

The United Nations Framework Convention on Climate Change, which provided for international cooperation on climate policy, was adopted in 1992, including by the United States. Its Kyoto Protocol, which adopted binding requirements for net GHG emissions reductions by industrialized countries, was signed in 1997. But the Clinton administration never submitted it to the Senate for ratification, and the Senate voted 95 to 0 to reject any climate treaty that failed to include meaningful participation by major developing countries or to achieve a reasonable balance of costs and benefits. At the follow-on treaty negotiations at The Hague in late 2000, the Clinton administration's efforts to ensure full scope for international GHG emissions trading and the use of sinks to sequester carbon were blocked by the EU. Then, in early 2001, President Bush openly repudiated the Kyoto Protocol. Many observers expected the Kyoto process to fall apart. Yet in late 2001 at Bonn and Marrakech, the other countries of the world agreed on the details for implementing the regime, and the treaty will take effect if and when Russia ratifies it.

We propose a path that is independent of what happens with the Kyoto Protocol. The United States should engage China, India, and other major developing country emitters, as well as Australia and any other industrialized countries that stay out of the Kyoto Protocol, in one or more new plurilateral arrangements that could cure the defects of Kyoto and gain experience with alternative approaches, rather than being locked into a single monolithic regime that requires agreement among scores of nations before any changes can be made.

Our proposed regime would have the following elements. It would use market-based incentives in the form of an international cap-and-trade system for net GHG emissions that would include both developing and industrialized countries. Because GHGs mix globally, their effects on global climate are unrelated to where emission reductions occur. A cap would be placed on net emissions by all participating countries and their sources. Emissions trading would allow those countries and companies that face high emissions reduction costs to finance emissions reductions in other countries, especially developing countries that enjoy lower costs, benefiting all parties financially and environmentally. Further, it would enlist the resources and ingenuity of the private sector, giving companies powerful incentives to develop emissions-reducing technologies and ways of doing business. The new regime would also include a comprehensive regulatory system covering all GHGs, sinks (such as forests), and economic sectors rather than being limited to a subset of the problem, such as fossil fuel CO₂ combustion. Finally, we would set sensible emissions limitations pathways that maximize net benefits to society.

Such a regime would be attractive to the United States, China, and even Europe. It also could yield an unexpected benefit: The Kyoto regime (or an EU-led successor) and the parallel regime could eventually merge, bringing the United

States and major developing countries into a global climate policy that is superior to Kyoto. The United States and China will not join a serious climate regime without each other. Joint accession by the United States, China, and other developing countries would provide leverage to persuade Europe to fix the flaws in Kyoto as well as establishing greater price stability in the allowance trading market.

Kyoto's flaws

Although it did well to adopt a comprehensive approach and international emissions trading, the Kyoto system still restricts their use. For example, it puts numerical limits on the amount of sinks countries can claim to meet their targets, and it gives credit only to new forests while denying credit for conserving existing forests, which harbor greater biodiversity. And it limits emissions trading by excluding developing countries from the main trading system, relegating them to a second and more cumbersome system called the "clean development mechanism" (CDM). The CDM authorizes industrialized countries to earn emissions reduction credits for investments in projects to reduce net GHG emissions in developing countries. The CDM, which has been slow to be implemented, could bring some investment in lower-emitting technologies to developing countries. But the CDM requires no caps on national emissions, so each CDM project may just shift emissions from one place to another with little effect on overall emissions, and it could even increase them. And if CDM credits sell at a price near what developing countries could expect to earn from formal emissions trading, the CDM will hinder rather than foster developing-country accession to a full cap-and-trade regime.

Second, Bonn/Marrakech failed to solve another basic flaw in Kyoto: the omission of developing-country participation in emissions limitations. Developing-country participation in a global limitations effort is essential on both environmental and economic grounds. Developing countries will soon emit more GHGs than do industrialized countries. Moreover, restricting emissions only in some countries will induce emitting activities to shift to unrestricted countries, thereby accelerating the growth in the latter's emissions and offsetting or even reversing the gains in restricted countries. Over time, such leakage would also make recipient countries even more reluctant to join the climate regime, as their economies become more dependent on emitting activities. In the near term, the mere fear of such leakage inhibits participation by countries contemplating emissions limitations. Omitting developing-country participation from international emissions trading also implies that global emissions abatement must be achieved at a much higher cost while denying developing countries a valuable flow of resources and technology that would help them grow more cleanly while overcoming poverty and disease.

Third, the Kyoto regime set arbitrary and costly emissions limitation targets and timetables not based on reasoned analysis. Kyoto did not address the level or rate of climate change that should be prevented, nor the appropriate limit on concentrations of GHGs in the atmosphere needed to avoid such climate change, nor the best way to limit net emissions to achieve such concentrations. Instead, it set targets as arbitrary percentage reductions below 1990 emissions. Further, Kyoto would require the United States to bear an enormous proportion of the global reductions from projected levels--about 50 to 80 percent of all industrialized country abatement.

We doubt that prompt ratification of Kyoto by the United States would lead to fundamental reform from within that would remedy these basic flaws. The United States would give up much leverage by joining without achieving reforms in exchange. A parallel joint regime with China and other countries and the demonstration that this regime works in practice would offer far greater leverage for persuading Europe to fix the flaws in Kyoto.

[Box: The United States should engage China and others in new arrangements that could cure Kyoto's defects.]

The case for action now

The extensive literature on climate science and policy shows that climate change is a serious risk that warrants sensible global regulatory action despite its many uncertainties. Indeed, some uncertainties, such as the risk of abrupt climate shifts, favor more, not less, action. But climate change calls for prudent preventive approaches, not costly crash measures.

Under the international law of treaty adoption by consent, a climate policy regime must yield net benefits not only to the world as a whole, but also to each country that participates. Because the damages from climate change and the costs and benefits of climate protection will vary significantly across countries, designing a regime to attract participation by all major emitters will be quite a feat.

Several studies suggest that the Kyoto Protocol, as currently structured, would probably yield expected benefits less than its expected costs, particularly for the United States. Perhaps for this reason, the Bush administration has rejected the protocol and proposed voluntary measures aimed at reducing U.S. GHG emissions intensity (emissions per unit of economic output), but not necessarily reducing total emissions.

Limiting the growth of GHG emissions can, however, be prudent insurance against the risks of climate change if appropriate regulatory policies are followed. A National Academy of Sciences report requested by the White House in 2001

concluded that rising GHG emissions from human activities are already causing Earth's atmosphere to warm and that the rate and extent of warming will increase significantly during this century. Recent studies indicate that some initial warming and carbon fertilization may help agriculture in some areas, including Russia, China, and member countries of the Organization for Economic Cooperation and Development (OECD), but will likely have adverse effects in poorer areas. These studies also show that the impact of greater or more rapid warming will worsen worldwide over time, including losses of 1 to 2 percent of gross domestic product (GDP) in the United States and other OECD countries and 4 to 9 percent in Russia and most developing countries, except China, which is forecast to gain about 2 percent of GDP. These estimates do not include the possibility of abrupt changes in ocean currents or other earth systems.

But the Kyoto Protocol would reduce global emissions only enough to avoid a fraction of these future losses, perhaps 10 percent, amounting to a benefit of 0.1 to 0.2 percent of GDP in the United States and other industrialized countries and 0.4 to 0.9 percent of GDP elsewhere. Several economic models put the cost of meeting the Kyoto targets through wholly domestic measures to reduce CO₂ emissions at 1 to 3 percent of GDP in the United States and other industrialized countries, clearly exceeding the benefits.

Smart regulatory design, however, can substantially reduce these costs. As detailed below, a comprehensive approach covering all GHGs and sinks and full international emissions trading could in concert reduce the costs by 90 percent or more, to 0.1 to 0.3 percent of GDP, about equal to the estimated benefits. Adding the risk of abrupt climate change and the ancillary benefits of reduction of other pollutants might make the benefits slightly greater than the costs for the United States and would make the benefits significantly greater than the costs globally.

Although staying out of Kyoto could give U.S. industry a competitive advantage over companies in other industrialized countries that are subject to Kyoto's regulatory burdens, U.S. nonparticipation in any climate regime would also deprive U.S. businesses of valuable commercial opportunities and impose significant business risks. If the United States joined a well-designed climate regime, many U.S. companies could become allowance sellers by achieving low-cost GHG emission reductions and enhancing sinks, and many U.S. firms in the financial, consulting, accounting, legal, and insurance industries could help run emissions trading markets. These opportunities for U.S. business are likely to be foreclosed or sharply restricted if the United States remains on the sidelines. London, not New York, will become the center of global emissions trading; indeed, this is already starting to happen. Ironically, the United States championed international emissions trading and the comprehensive approach for the past 12 years, but is now standing aside while others move first. Britain,

Denmark, and Norway are already launching their own domestic CO₂ emissions trading systems, and the EU is creating a Europe-wide trading system, also limited to CO₂ emissions. These European CO₂ emissions trading systems may become the models for the global trading system, restricting the coverage of other gases and sinks and leaving the United States at a disadvantage if it decides to join later.

If the United States stays out of international climate policy, U.S. businesses subject to eventual U.S. domestic emissions limitations, as well as those with operations abroad in industrialized countries that ratify Kyoto, will be unable to enjoy the compliance cost savings provided by international emissions trading. Worse, parties to the Kyoto Protocol, particularly in Europe, may attempt to impose countervailing duties against imports of U.S. goods to compensate for the lower cost of embedded GHG emissions in U.S. production; such "carbon trade wars" could seriously damage global prosperity.

Uncertainty in GHG regulatory policies may also inhibit investment by utilities and other businesses that are already subject to U.S. environmental regulations aimed at air pollutants from sources that also generate GHGs. Capital investments needed to comply with these regulations may be rendered obsolete by the subsequent adoption of GHG regulatory controls that will require additional and different investments to limit CO₂ or other GHG emissions from the same facilities. Unless GHGs are added to the regulatory mix sooner rather than later, these businesses will face a period of substantial uncertainty and regulatory risk. Many in industry might even prefer a single integrated regime covering many pollutants to a sequence of separate, fragmented, and potentially inconsistent partial regulations, especially if a comprehensive statute provided for interpollutant emissions trading. At the same time, the absence of credit for early abatement efforts may mean that U.S. firms are holding back on investments, including investments they would have made irrespective of climate policy but are deferring in order to be able to claim GHG emission reduction credits when those credits become available. This drag on investment may be adversely affecting U.S. economic growth.

In addition to the environmental benefits of forestalling climate change and the commercial benefits of participating in and helping to shape an international GHG emissions trading system, the United States would reap strategic benefits on other issues from its willingness to engage in multilateral climate policy. Especially after the September 11, 2001, terrorist attacks, the United States needs the cooperation of other countries to help achieve national security and global economic and political stability. Many other countries on whose cooperation the United States depends are also deeply concerned about climate change; they will bridle at U.S. indifference or intransigence regarding climate issues. On the other hand, if the United States successfully engages China and

other major developing countries and helps secure their participation in international GHG regulation, the United States will gain leadership on an important global issue and help strengthen multilateralism in ways that would provide benefits in other areas of international policy. Indeed, along with issues such as trade and terrorism, climate change may be a premier platform for a new U.S.-China strategic partnership. And the United States may benefit from a negotiating strategy that links sensible U.S. cooperation on climate policy to the cooperation of others on issues of greater interest to the United States. If, on the other hand, the United States remains the largest emitter and sits out a climate treaty, severe weather events around the world, such as last summer's heat wave in Europe, may be blamed, accurately or not, on the United States, and may become a new flashpoint for anti-Americanism.

Economic incentives

Today the global atmosphere is being treated as an open-access resource and as a result is being overused in a classic "tragedy of the commons." Those who generate GHGs bear only a fraction of the climate risks they generate but would bear the full costs of their own abatement efforts. Accordingly, the atmosphere is overexploited and climate risks are greater than they would be if the full social costs of emissions were appropriately reflected in the decisions of those using the atmosphere for GHG disposal. This is a classic market failure, an "externality" that ordinary market operations and voluntary behavior will not correct. Rules backed by law are needed in order to prevent wasteful overuse of atmospheric resources.

[Box: Developing-country participation in a global effort to limit emissions is essential on both environmental and economic grounds.]

Such rules could take the form of centralized commands of conduct and technologies, government subsidies of emissions reductions, emissions taxes, or quantity caps on emissions, with or without tradable emissions allowances. The cap-and-trade approach amounts to parceling out limited property rights to use the atmosphere. It underlies the highly successful U.S. program for reducing acid rain through sulfur dioxide allowance trading, as well as the U.S. programs for removing lead from gasoline and chlorofluorocarbons from the atmosphere, and systems worldwide for protecting fisheries. The Bush administration and others should see the use of tradable property rights not as an intrusion on economic growth or sovereignty, but as akin to the familiar parceling out of property rights in land, oil, and other resources that enabled prosperity and stability to thrive in the United States. Thirty years of experience with environmental regulation makes clear that, if properly designed and implemented, incentive-based systems are generally far more efficient and effective than command regulations.

A cap-and-trade system allows flexibility to undertake more of the reductions at those sources that can reduce emissions at lower costs and sell unneeded emissions allowances to sources with higher costs. The U.S. sulfur dioxide emissions trading program has reduced emissions even more than expected and at roughly half the cost of the prior regulatory approach. Because of wide variations in abatement opportunities and costs across countries, numerous analyses find that international emissions trading involving all major emitters, including China, would reduce costs by about 75 percent as compared to wholly domestic CO₂ emissions limitations. Moreover, under a trading system, emitting sources bear a cost for each unit of emissions they generate. They thus have strong economic incentives to develop and adopt emissions-reducing technological innovations.

Many economists nonetheless favor emissions taxes over tradable permits for abating GHGs. A key reason is that meeting the quantity cap in a trading system could result in unexpectedly high costs (if the costs of abatement turn out to be greater than anticipated), whereas taxes would limit costs but could let emissions rise. But at the international level, taxes confront two serious problems. First, under the consent rule for the adoption of treaties, they fail to engage developing countries. China and India will not agree to impose taxes on themselves without compensation, but the compensation would likely vitiate the tax. Second, it would be easy for countries to render taxes ineffective by playing behind-the-scenes fiscal cushioning games in which they quietly change other domestic taxes and subsidies to offset the GHG tax. Because trading imposes a quantity cap on emissions (with compensation through extra headroom allowances), it can avoid both of these problems. Further, proposals to curb the costs of a cap-and-trade regime with a "safety valve" (a trigger price at which governments would sell extra allowances) need to be studied in a world of multiple governments who may compete to sell at lower trigger prices, thus letting emissions rise.

Regulation of emissions through a cap-and-trade system is, to be sure, only one tool among several in a sound climate policy. At least four complementary strategies are also warranted. First, public and private investment in low-GHG technology research needs to be accelerated. Second, government should identify and correct policies that blunt existing economic incentives to conserve energy and economize on net GHG emissions, such as perverse government subsidies that exacerbate fossil fuel use and forest clearing. Third, information-based strategies, including public reporting by firms of their net GHG emissions, may also be useful as a means of generating incentives, especially in the early years before a full-fledged regulatory system is implemented. Fourth, governments should invest in helping people adapt to a changing climate. This assistance is especially needed for poorer regions of the world, which lack affordable insurance or access to adaptive technologies.

Such measures, however, will not be enough to reduce emissions on the scale required to moderate the climate risks resulting from the common-pool character of the atmosphere. Reductions in emissions intensity due to general technological advances do not necessarily reduce total emissions. For example, the U.S. Energy Information Administration reports that although U.S. energy intensity declined at 2.3 percent per year from 1970 to 1986, and at 1.5 percent per year from 1987 to 2000, total CO₂ emissions in the United States have nonetheless increased more than 30 percent because of the increase in overall economic activity. Although new low-GHG energy technologies may be developed, they will not be adopted unless both producers and consumers have an incentive to demand them. Regulatory incentives can stimulate such demand.

A comprehensive approach

On both environmental and economic grounds, it is imperative that a comprehensive approach that includes all gases, sources, and sinks be adopted in strategies to limit GHG emissions. The comprehensive approach has been advocated by the United States since 1989 and is largely embodied in both the Framework Convention and the Kyoto Protocol. Under the comprehensive approach, emissions limitation targets are defined in terms of a common unit of measurement that includes all the GHGs. An index is used to weight the GHGs' relative contribution to climate change. A nation or source may choose the mix of limitations of different GHG emissions or sink enhancements that it prefers in order to achieve its net GHG emissions limitation target.

The comprehensive approach is environmentally superior to a CO₂-only approach because it would prevent shifts in emissions from regulated sectors and gases (such as CO₂ from burning coal) to unregulated ones (such as CH₄ from leaky natural gas systems). Because CH₄ and other GHGs are significantly more potent warming agents than CO₂, even small shifts could exacerbate climate change. The new European CO₂ trading directive may invite just this tradeoff. The comprehensive approach would also yield valuable side benefits in reduction of other pollutants, carbon fertilization of plant growth (an attribute that the non-CO₂ gases lack), and biodiversity conservation from the incentive to enhance sinks such as forests.

The comprehensive approach is economically superior because it allows flexibility for each country to choose its most cost-effective means to achieve its index-weighted GHG emissions target. Studies at the Massachusetts Institute of Technology, the World Bank, and the Department of Energy have shown that embracing all GHGs would reduce costs by about 60 to 75 percent (or even more if sinks are counted) as compared to regulating fossil fuel CO₂ alone. Assuming 60 percent savings from the comprehensive approach and the 75 percent savings from international emissions trading noted above, the combined cost

savings could be 90 percent as compared to a CO₂-only policy with national caps and no trading.

Criticisms of the comprehensive approach as too complex and difficult to implement are misplaced. Ignoring non-CO₂ gases does not make them go away. The environmental and economic gains of the comprehensive approach dwarf any administrative costs it may entail. Simplified default rules can be adopted to deal with cross-gas comparison indices and the uncertainties presented in measuring GHGs such as agricultural CH₄ and CO₂ sinks, and these rules can provide incentives to improve monitoring and measurement techniques over time.

Setting climate targets

With the improvements we have suggested so far, the Kyoto targets might achieve a close balance between benefits and costs. Our design for climate policy would go a step further, adjusting regulatory targets to maximize net benefits, both to the world and to the United States. We would set emissions limitation targets and pathways based on a benefit-cost calculus. Such a calculus takes into account the facts that the effects of climate change are a function of the total atmospheric concentration of GHGs, which changes quite slowly in response to changes in emissions; that the more serious effects of climate change would occur in the future but can be ameliorated by earlier emissions reductions; and that the costs of reducing emissions can be expected to decline with technological advances and the turnover of the capital stock. In contrast to both the arbitrary Kyoto emissions targets and a least-cost path to stabilize GHG concentrations at an arbitrary level, our approach would set targets that minimize the sum of climate damages and abatement costs over time.

[Box: Regulation of emissions through a cap-and-trade system is one tool among several in a sound climate policy.]

We believe that maximizing net benefits, including interim benefits, is conceptually preferable to the Kyoto approach, which sets arbitrary emissions targets based on an arbitrary base year, and to a least-cost path to stabilize at an arbitrarily chosen concentration level. With expert advice, countries could negotiate a schedule of future aggregate global emissions targets (with target periods set for, say, every 10 years over the next three or four decades), based on the principle of maximizing net benefits to society. This would require judgments by accountable political officials about the expected benefits and costs of abatement, informed by expert analysis of benefits, costs, uncertainties, and sensitivity analysis. Recent studies indicate that such an approach would be less stringent than the Kyoto targets but more stringent than the least-cost stabilization path.

Setting such pathways will necessarily involve substantial social and political elements. Nonetheless, the judgments involved should be disciplined and made more transparent by the societal benefit-cost framework for decision and the facts and analysis generated in implementing it. And the pathways would be revised periodically in light of experience and new information. The pathways could be used to set targets for successive periods of, say, 10 years. The targets would then be divided into national allowance allocations for each period. Such allowances could then be subassigned by national governments to private firms and traded internationally. This approach would be similar in concept, though not stringency, to the schedule (with allowance trading and banking) successfully employed in the United States to phase out leaded gasoline in the 1980s.

The path forward

The Bush administration was right to question the flaws in Kyoto, but its critics are also right in saying that climate change needs an international approach. We propose a new, third option: The United States, China, and other major developing countries, as well as Australia and other like-minded industrialized countries (perhaps including Russia if it declines to ratify Kyoto) should create a parallel climate treaty that makes full use of the comprehensive approach and emissions trading, includes developing country participation, and sets sensible targets. This approach would be a useful source of experimentation and learning from alternatives to the Kyoto system or an EU-led successor regime. It would be much easier to develop such a regime than to renegotiate the entire Kyoto accord among all countries. And eventually it could merge with the Kyoto or successor regime.

Without the United States and China, the Kyoto regime will amount to little. Without Russia, it will amount to even less. Yet the United States will not act without China for fear of leakage and competitiveness losses and because without China the costs of abatement in the United States will seem too high. And China will not act without the United States both because of perceived unfairness if the United States does not adopt limitations and because China's major incentive to join a climate regime will be to sell allowances to U.S. companies. Joint action would satisfy both. And if China joins, other major developing-country emitters are likely to follow.

Ideally, the United States and China would reach a high-level accord that brings this system into operation. Another possible approach is for domestic GHG abatement legislation, such as the McCain-Lieberman GHG cap-and-trade bill recently debated in the Senate, or a multipollutant bill that includes GHGs along with sulfur, nitrogen, and mercury, to add provisions making their targets contingent on Chinese participation in a new joint regime and authorizing U.S.

companies to meet their targets with allowances purchased from China and other participating countries.

Engaging developing countries such as China and India would reduce global emissions more effectively and would also cut costs by reducing leakage and involving developing countries in emissions trading. But the developing countries have strong economic and equity reasons not to agree to emissions cuts that they fear could compromise their economic development for the sake of an environmental problem they believe was created primarily by and is of primary concern to wealthier countries. Moreover, China and Russia may see some global warming as benign. To attract their participation, the industrialized countries must help finance emissions limitations.

We argue that the most promising method is an international emissions trading system that assigns major developing countries allowances above their existing emissions. That would provide headroom--not hot air--for future growth and profitable allowance sales that attract investment while also reducing costs to industrialized countries. (This was precisely the approach used to attract Russia to participate in Kyoto; but when the major allowance buyer--the United States--withdrew, the value of Russia's surplus allowances declined sharply, and Russia now sees too little gain from participating, hence its own apparent withdrawal.) Other methods of side payment, such as direct government financial aid, would be less cost-effective and more politically unpopular than creating a new market in competitive business deals. Trade, not aid, will be the best way to engage developing countries in global climate cooperation.

We submit that Europe, Japan, and Russia would prefer our proposal in which the United States and China join simultaneously rather than individually. Allowance prices will rise sharply if the United States (a large net demander) joins alone, hurting Europe and Japan. And allowance prices will fall sharply if China (a large net supplier) joins alone, hurting Russia. In each case, the party likely to be hurt could seek to block accession. But simultaneous accession by the United States, China, and other countries-- or the merger of our proposed regime with the Kyoto regime or a successor--would help maintain price stability, enhancing the chances for agreement.

Pragmatism involves attention to benefits, costs, and incentives. It also emphasizes empiricism: learning from experience and revising policies in the light of new information. A pragmatic approach to climate policy would get us out of the straightjacket of the Kyoto monolith and test alternative approaches. Our proposal offers a serious opportunity to compare regimes and improve them over time. Together, the United States and China, with other willing partners, could test a superior alternative design for climate protection while forging a new partnership for global leadership.

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