



THE DEBATE

How Can the U.S. Lead in Paris to Achieve a Climate Agreement We Can Live With?

In a few weeks, the 21st Conference of the Parties of the UN Framework Convention on Climate Change will convene in Paris to hammer out for the first time an accord that will have binding targets for nearly all nations, industrialized and developing alike.

The United States is a party to the climate convention, but it famously flamed out on the Kyoto Protocol, an enforceable mandate for rich nations alone, which Al Gore signed but the Senate failed to approve under those grounds. Even the signatory status was withdrawn by the Bush II administration, leaving the United

States, then the biggest emitter, with no commitments.

Now, the United States has a chance to lead again. Many of its concerns have already been resolved in the negotiating framework, particularly the commitment of developing countries.

We polled some of the leading thinkers and activists involved in the climate change negotiations, asking them what the United States needs to do to realize an agreement that we can live with — one that protects the environment and also wins favor in the Senate and among the American public.



Joseph E. Aldy
Associate Professor
HARVARD KENNEDY SCHOOL



John D. Graham
Dean
INDIANA SCHOOL OF PUBLIC AND
ENVIRONMENTAL AFFAIRS



Gary S. Guzy
Senior of Counsel
COVINGTON & BURLING LLP



Bob Inglis
Director
REPUBLICEN.ORG



Jennifer Morgan
Global Director, Climate Program
WORLD RESOURCES INSTITUTE



Jake Schmidt
Director, International Program
NATURAL RESOURCES DEFENSE
COUNCIL



Durwood Zaelke
President
INSTITUTE FOR GOVERNANCE AND
SUSTAINABLE DEVELOPMENT

Need Transparency and Review Mechanisms

JOSEPH E. ALDY

At the 2009 climate talks, the leaders of every major economy and nation representing each of the UN blocs personally negotiated the text of the Copenhagen Accord. This three-page political agreement established several important precedents. The accord set a long-term goal to limit warming to no more than 2°Celsius; included nationally determined mitigation pledges from developed and developing countries representing more than 85 percent of global greenhouse gas emissions; quantified international climate finance goals; and promoted the transparency of nations' climate change programs. Building on the foundation laid in Copenhagen — in the Paris climate talks and beyond — can drive the global effort necessary to combat the risks posed by climate change.

A defining policy innovation in the 2009 agreement is the focus on pledge and review of emission mitigation commitments. Each country pledges a specific set of emission mitigation goals, actions, and/or policies, which is subject to review by other countries. The current climate talks have carried the pledging concept forward with so-called Intended Nationally Determined Contributions. Through about 100 INDCs pledged to date, many developed and developing countries have signaled the seriousness with which they have considered, evaluated, and designed their domestic climate programs. This pledging approach could deliver on the leaders' goal to limit warming to 2°C, however, only if there is a robust transparency and review mechanism.

Transparency and publicity of a country's pledge can signal a na-

tion's seriousness and enhance the credibility of its commitment. The review of ex post outcomes can demonstrate whether a country undertook a good-faith effort to deliver on its pledged commitment and build trust among those participating in an agreement. Designing the institutional capacity to collect, analyze, and disseminate information about countries' pledges can facilitate positive reciprocal pledging in subsequent negotiations. Political leaders who push for their nations to take on more ambitious climate change risk-reduction policies would benefit from this transparency: it would highlight their leadership on the issue. Such policy surveillance also increases the costs to political leaders of failing to deliver on commitments, opening them up to domestic stakeholder pressure and peer pressure from other leaders.

On the road to Paris, political leaders are pledging to take a step forward in combating climate change; the review of these pledges will allow them to look among their peers to see if they are all stepping forward together. A well-designed transparency regime can provide the confidence that they are moving forward in tandem, which can enable coordination on more ambitious future efforts to tackle climate change.

Transparency, however, has clearly been inadequate under the UN climate treaty. By the time of the Copenhagen conference, the most recent emission inventory that China had submitted to the UN was for fifteen years before — and neither its reported emissions nor the description of its emission mitigation programs were subject to any review. In an effort to improve the transparency of mitigation efforts, enable analysis of these efforts, and promote understanding by peers, developed and developing countries agreed to submit reports on their emission mitigation programs every two years starting in 2014. While every developed country (except

Turkey) has submitted its first report, only 10 developing countries met their 2014 deadline, and neither China nor India have submitted a report as of September 2015.

While developing countries participate in more intensive reviews under the International Monetary Fund and the World Trade Organization, many have been resistant to calls for improving the robustness of climate policy transparency and review. The United States can work with its developed and developing country allies to make the case for meaningful review of ex ante pledges and ex post outcomes in the Paris framework. Given the interest in climate finance by many developing countries, the United States and other donors could condition financial transfers on developing country participation in the transparency mechanism. To leverage developing country peer pressure, international climate finance could also be conditioned on a minimum overall participation rate, which would encourage the good actors to pressure laggards to participate in the reviews.

Building robust transparency and review institutions in the Paris framework can drive a positive dynamic in which serious mitigation efforts today will lead to more ambitious mitigation efforts tomorrow among all countries of the world. In doing so, transparency can serve as a catalyst for the policy actions, the investment in innovative technologies, and the changes in behavior necessary to address the risks posed by global climate change.

Joseph E. Aldy is an associate professor of public policy at the Harvard Kennedy School and a former special assistant to the president for energy and the environment in the Obama administration.

Avoid Falling Into Another Kyoto Trap

JOHN D. GRAHAM

President Obama and the United States enter the Paris Conference of the Parties in a strong position. The Obama administration has already used executive power to regulate greenhouse gas emissions from the two sectors of the economy that account for a majority of U.S. emissions: electricity generation and transportation. Coal will decline as a source of electricity in the United States unless it is coupled with carbon capture and storage. At the same time, cars and trucks are steadily becoming more fuel efficient due to regulations adopted by the federal government and the state of California.

The Obama administration has also encouraged unconventional gas development as a means of replacing coal with cleaner gas in the electric power sector. Methane emissions from the extraction, transport, and storage of natural gas have been targeted for regulatory control, which will better ensure that the “natural gas revolution” is climate friendly. As a result, natural gas will likely serve as a useful partner for the increasing use of intermittent sources of electricity (e.g., wind and solar) in many states. Without an affordable partner, the growth of renewable sources of electricity in the United States will be impaired.

The administration has acted unilaterally on climate change, without any assurance that other countries will follow our lead. The Obama approach is certainly vulnerable to the criticism that the president’s policies will impose higher energy costs on U.S. businesses and consumers, without any meaningful impact on global climate change. The U.S. manufacturing sector, for

example, is energy intensive and will be placed at a competitive disadvantage if other countries choose not to control greenhouse gases.

Thus, a major objective for the United States in Paris is to obtain assurances from leaders of other countries — especially China, India, Brazil, and Russia — that they will control emissions as well. Given what the United States has already done, President Obama should refuse to sign an international agreement that does not contain meaningful assurances from the rest of the world. President Obama should urge the European Union to take a similar stance. Since an international agreement without U.S. and EU support will be highly unattractive to most countries, a credible U.S. and EU threat not to sign an agreement will be the most effective strategy for bringing others to the table with significant commitments.

In Paris, President Obama will be under enormous pressure to make commitments that go beyond the significant executive policies that he has put in place. If President Obama makes any further commitments, it is quite possible — indeed likely — that the U.S. political system will not deliver on those commitments. Public opinion polls show that climate change does not rank highly compared to other key issues on the minds of the American people (e.g., the economy, immigration, health care, and education).

Even among environmental issues, Americans are more concerned about conventional air and water pollution than they are about greenhouse gas emissions. And there is certainly little support in the United States for a new budgetary program that would fund greenhouse gas control in the developing world. If President Obama makes commitments that go beyond what the United States can support, much of the work he has done to improve American credibility on the climate issue will ultimately be lost, and

our reputation for action on climate change will be damaged.

Stated differently, it is also crucial for President Obama to avoid making the same mistakes that the United States made in the 1990s with the failed Kyoto agreement. President Obama should not make pledges of new regulatory or budgetary programs that are unlikely to find majority support among the American people and in the U.S. Congress. Nor should President Obama support an agreement that calls for significant actions from developed countries, without any significant commitments from the developing world.

Even before the Kyoto agreement was concluded, the U.S. Senate voted 95-0 against considering the agreement for ratification; President Obama should work hard to avoid a similar outcome with the Paris agreement since it would damage the international credibility of the United States and undercut the global momentum for meaningful action to curb climate change.

Professor **John D. Graham** is currently dean of the Indiana University School of Public and Environmental Affairs and formerly director of the Office of Information and Regulatory Affairs in the George W. Bush administration.

A Balanced, International Approach

GARY S. GUZY

The president and his climate negotiating team seem most like the high-wire artist Philippe Petit, who improbably strung a wire between the towers of the World Trade Center and mustered reserves of guts and grace — leavened by intense focus, preparation, and a mild amount of lunacy — to walk between the twin towers.

In order for there to be a successful Paris climate outcome, the administration must likewise achieve a magnificent balance. It must demonstrate aggressive U.S. leadership and commitments to inspire other nations to join suit, so that there will be a truly global solution to this global problem. Yet it cannot be so tough that it deters other nations from similarly following suit.

The United States must promote a bottom-up system that flexibly accommodates the circumstances of individual countries, yet it cannot allow so much flexibility that there is no realistic hope of actually bettering the climate situation. It must accomplish an agreement that is legally binding to be meaningful, yet not prove to be so rigid that it falls of its own weight.

Our negotiators must commit to a robust and comprehensive international program addressing emissions mitigation, adaptation to the already locked-in effects of climate change, and assistance for climate-impacted poor nations, yet not do something that is seen domestically as foolhardy by taking on too great a comparative burden, given the level of growing emissions in countries such as China and India and the degree to which that approach doomed the Kyoto Protocol. It must seek a solution now, even if the trajectory may need

to grow more stringent over time.

And it perhaps may try to do all of this within the confines of existing legal authority, so as to avoid the need for implementing legislation that could doom participation by the United States — and the prospect for a meaningful global agreement — if there were a ratification fight before an impossibly divided Congress.

There are three tests by which I suggest we evaluate the success of any agreement:

First, does it prove to be enduring? Can the administration build enough momentum globally, domestically, and with private-sector companies, who see cost-effective compliance options and new clean energy business opportunities, so that its continuance remains inevitable and that it is just too damaging for a new administration to back away from?

Second, does it embrace a common global vision — the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system — and give a directional sense to the emissions goal. This all needs to be bounded by meaningful science, and a process for updating individual national commitments, with sufficient transparency around individual country goals and their implementation that there is a realistic hope that these goals can be met over time and the worst climatic impacts avoided.

This process of continuous refinement is akin to the Clean Air Act's long-standing process for continuously updating the fundamental National Ambient Air Quality Standards and is a structure with which U.S. lawmakers and regulated industries should be very comfortable. It is more like what John Dingell once referred to — on the domestic front — as a “glorious mess” than would be the top-down, more predictable, streamlined, rigid, and compulsory approach of the ultimately unsustainable Kyoto Protocol.

Third, is it truly international, with shared commitments that seem equitable given the world's growing energy demands?

Few could have foreseen, just months ago, the enormous progress that U.S. negotiators have made in the ramp up to the Paris Conference of the Parties. The enrollment of national goals by the major emitting nations already demonstrates that there can be a global response to this challenge. The idea that China will implement a cap-and-trade program, that it has committed to a green energy dispatch approach, and that it has committed to the growth of renewables equivalent to the entire existing electricity market in the United States is breathtaking.

Likewise, U.S. negotiators come armed with an ambitious and finalized utility-sector Clean Power Plan, aggressive vehicle fuel efficiency standards, and much progress in reducing building-sector emissions — thereby demonstrating the depth of the U.S. commitment to progress across all of our major sources of greenhouse gas emissions.

All of this is not to say — just as Philippe Petit had to contend with the initial challenge of how to string the wire — that this magnificent balance will be achieved with ease or grace. Senate Foreign Relations Committee Chair Bob Corker recently questioned the State Department's approach to Senate consultation over any Paris agreement. And the overall enterprise seems to be coming up short on commitments. Success should not be judged alone by what happens in Paris, but by the degree to which that balancing act inspires even further and enduring efforts.

Gary S. Guzy, senior of counsel at Covington & Burling LLP, previously served as the deputy director and general counsel of the White House Council on Environmental Quality in the Obama administration and as the general counsel of the Environmental Protection Agency during the Clinton administration.

A New Language for Diplomacy in Paris (and U.S.)

BOB INGLIS

The language of climate change needs to be about more energy, more mobility, and more freedom. It need not be about doing with less, walking and eating bugs or feeling guilty about living in the suburbs. Conservatives in America will join the conversation when the talk is conducted in the language of abundance.

Since its inception, the climate conversation has been cast in the milieu of death — death of the planet, death of a suburban lifestyle, death of significant growth in GDP. The catchphrases in the conversation carry a significant dose of guilt (yes, we humans are to blame), a touch of hypocrisy (the most shrill alarms being sounded at high carbon-footprint, fly-in conferences in exotic locations) and a set of prescriptive solutions that involve the growth of the nanny state (cap-and-trade and the Clean Power Plan, for example). It's no wonder, then, that conservatives have found it difficult to enter the conversation.

It doesn't have to be this way. At republicEn.org we imagine a different conversation. We dream of free enterprise bringing distributed energy systems to villages in India that are currently dark at night. We see those villages leapfrogging our electrical grid with better solar cells and better batteries. What free enterprise did for them in making cell phones available and affordable, it will do for them in energy. A conversation in this language of abundance would pick up on Pope Francis's implicit blessing of the "spirit of enterprise" in his speech to Congress.

Capitalists are right to assert that breakthroughs in things like solar cells and batteries will almost cer-

tainly come from labs and capital in the developed world, not the undeveloped world. Humans turn their attention to environmental protection after they've met their basic needs. So we needn't feel guilty for living in a wealthy country. We just need to accept the admonition that "to whom much is given, much will be required." Developing and commercializing the fuels of the future could be the defining achievement of another Greatest Generation, lessening a cause of war, increasing world GDP and making lives more enjoyable.

Defenders of fossil fuels are wrong, however, to say that the developing world is better off sticking with tried and true fossil fuels. As prices rise due to scarcity or higher extraction costs, the developing world will find itself unable to remain at the auction for those fuels. If we really care about people in dark places, we won't offer them the false hope of a future built on fossil fuels; we'll get to work inventing the future fuels. The spirit of enterprise will deliver innovations that light up the world, create wealth, and serve willing customers at home and abroad. Clearly, there's an opportunity here to do well by doing good.

How then will future fuels come to be? Some would rely on fickle tax incentives, clumsy government mandates or expensive regulations. At republicEn.org we aim to rely on the liberty of enlightened self-interest and the blessings that flow from accountability. If all of the costs of all of the fuels were transparently applied to the fuels such that there were no hidden costs (no unrecognized negative externalities), consumers would drive innovation because the price signal would make it in their self-interest to innovate. As in all areas of life, accountability would bring blessings.

Accountability, abundance, fair competition, wealth creation, care for the poor that's expressed as opportunity rather than a guarantee —

these are words of a language that open the climate change conversation to conservatives. The harder part of the conversation comes when we start talking about how to impose that accountability via a price signal. Many conservatives are willing to concede that emitters should pay for the health costs occasioned by their soot. Those costs are immediate and readily quantifiable. But some fear that it's too speculative to calculate the climate change costs of greenhouse gas emissions, as those costs appear over a much longer time horizon.

At republicEn.org we'd be excited about getting to that quantification debate and getting beyond the disputation of the science. For most conservatives, the guiding principle would be setting a price on greenhouse gas emissions that best approximates the marginal harm caused by the next ton of CO₂ emitted.

We're aware, though, that the economics profession can provide only part of the answer here. Just as a jury has to decide whether to award a successful plaintiff with non-economic damages on top of economic damages, we as a society have to decide if we have an ethical obligation to future generations that may exceed the value we place upon their lives by cold present value calculations. Thankfully, in a constitutional republic we the people get to answer these value questions at the ballot box and through our elected representatives. Those representatives are waiting for our instructions. They really are. They just need them in a language that they and their activists can understand.

Bob Inglis directs republicEn.org, a community committed to free enterprise action on climate change. He is a Republican who represented South Carolina's 4th District in the U.S. House of Representatives from 1993–99 and 2005–11.

Senate Should Favor Accord This Time

JENNIFER MORGAN

Much is at stake for the United States in final negotiations for a new international climate agreement this December. Having experienced eight extreme weather events in 2014 that cost society over \$1 billion each, the country is very vulnerable to climate change. From droughts in California and the Midwest to forest dieback from pine bark beetle infestation in the Rocky Mountain West to the rising seas along the East Coast, American citizens and businesses are feeling the impacts more quickly and more severely than might have seemed possible just five years ago.

But the United States is hardly alone. These impacts also threaten fragile states around the world, making climate change the final straw in places like Sudan and putting climate front and center in the Pentagon's assessment of security risks. The United States needs an agreement to protect its own national interests — one that limits the risks and keeps global average temperature rise below 2°C (3.6°F) from pre-industrial levels.

As a practical matter, this means we have to reduce carbon pollution and shift to clean, efficient energy as rapidly as possible, and work with countries around the world so that each does its fair share in this transition. The forthcoming Paris Agreement is an opportunity to do just that.

Each country is now in the process of presenting its own national climate plan to address the problem. China's climate plan, announced in June, committed to peak its emissions by 2030, if not earlier. China also sees a national interest in scaling back coal use to address its massive air pollution problems and avoid climate change impacts. The EU is continu-

ing its shift to a low-carbon economy, committing to increase renewable energy and efficiency and reduce emissions by 40 percent by 2030 below 1990 baselines.

The U.S. climate plan, offered in March, builds on President Obama's 2013 Climate Action Plan. For domestic reasons, and to have a chance of a successful international agreement, it was clear that the United States needed to forge a credible and effective plan. The U.S. climate commitment aims to reduce emissions by 26–28 percent below 2005 levels by 2025 through executive authority.

WRI has taken a close look at this plan and finds it ambitious but achievable. The Clean Power Plan, issued in August to address emissions from existing power plants, is at the heart of this commitment, but each sector needs to make the transition to a cleaner, more efficient pathway. This is one of the cornerstones of how the United States can credibly work with other countries to achieve a Paris outcome that is in its own national interests, one that includes all countries, especially the major economies. The Byrd-Hagel Resolution in 1997 put forward this condition, and the world is about to fulfill it.

National climate plans, however, are not enough. What happens after Paris? How will the United States know whether other countries are staying on this path? This is where the Paris Agreement itself comes in; it can set international rules and norms that should be in place for years to come. We need an agreement that sends clear short-term and long-term signals to American businesses so that investment can shift away from dirty technologies and into clean and efficient ones.

The Paris Agreement should thus include short-term cycles of improvement where each country strengthens its climate plans every five years. Each country would decide for itself what those improvements are, but the direction would be clear.

All this should be coupled with

a long-term goal that provides clarity and predictability about how the world will accelerate its transition to a low-carbon, climate-resilient economy. Achieving the above also demonstrates that governments are serious about reducing carbon pollution and shifting to clean energy. Such signals will support U.S. industry to produce the breakthrough technologies the world needs, whether affordable batteries for solar energy, the smart grid that supports a continued rapid shift to renewables, or zero-carbon materials.

This combination of short- and long-term signals will also assist the shift of capital needed for low carbon infrastructure in the United States and around the world. This signal will resonate in the halls of Congress and on Wall Street, showing that the United States is part of a global transformation, one where it can compete and provide clean goods and services to markets around the world, while keeping the 2°C goal within reach.

If these signals are critical for the United States, they are existentially crucial for parts of Africa, the small island states, and countries like Bangladesh, where the effects of a changing climate are expected to hit worst and first. So in addition to mitigation, the Paris Agreement must deliver on adaptation, building resiliency against the impacts that are to come. The United States needs to work closely with these countries to provide the financial and technical support they need.

The Paris Agreement can set the stage for a new form of international cooperation that will achieve more than any country can on their own. That's good for the global climate, and that's good for the United States.

Jennifer Morgan is the global director of the Climate Program at the World Resources Institute. In this capacity, she oversees the Institute's work on climate change issues and guides WRI strategy in helping countries, governments, and individuals take positive action toward achieving a zero-carbon future.

A New Tag Line: “It’s Global and It Will Work”

JAKE SCHMIDT

For more than twenty years, companies and politicians that resisted climate action have used the refrain, “It’s not global and it won’t work.” This was the tag line of the advertising campaign that ran throughout the United States by opponents of the Kyoto Protocol. Both for political and scientific reasons, the agreement in Paris must include commitments from all key countries to significantly cut their climate pollution. The agreement in Paris will address this concern as it will enshrine commitments to cut emissions from countries like China, India, Brazil, Mexico, Europe, and others. In fact, the Paris agreement is likely to codify concrete emission reduction commitments from countries that account for more than 80 percent of the world’s climate pollution.

U.S. leadership has been critical to helping secure these commitments, as evidenced by the U.S.-China agreement. This accord secured, for the first time, a commitment from China to a firm date for its emissions growth to end. Before this commitment, energy analysts were predicting that China’s emissions wouldn’t peak until after 2040 — not before 2030 as China agreed. Critical to achieving this commitment was a clear sign from the United States that it was acting aggressively at home. The announcement of the Climate Action Plan and the subsequent implementation of the Clean Power Plan showed that the United States was finally prepared to follow through with its promises of more climate action.

This dynamic — strong domestic action — highlights the other element that is critical to capture in

the Paris agreement. The agreement must include tools to hold countries accountable to follow through on their promised targets by including a strong monitoring, reporting, and verification system that requires countries to regularly report their actual emissions levels and progress toward their climate targets. It should also include international oversight through both technical reviews by independent experts and the international community.

These domestic actions by key countries will unleash huge opportunities in clean energy and other climate reduction strategies. The clean energy market has witnessed huge growth in the past few years and is poised for even greater growth as countries implement their commitments. To help drive this dynamic, the Paris agreement should include innovative financing tools. This financing won’t look like traditional aid. It will need to use targeted public investments to spur even larger financial investments from the private sector. This is how the new Green Climate Fund is being organized.

At the same time, the agreement in Paris will need to assist the most vulnerable countries in building more climate-resilient economies and addressing the climate damages that are already being felt. Most countries in the world have contributed very little to the problem but they are likely to face the brunt of the damages.

Even with all of these elements Paris can’t be the end destination. Before the Copenhagen Climate Summit we were headed for a 5⁰ Celsius world. With the commitments that countries have already pledged we are likely headed for a 3⁰C world, according to recent estimates. We are getting closer to the less than 2⁰C trajectory but the Paris agreement will have to help spur a virtual cycle of upward ambition by countries, mobilize additional actors, and spur even greater action in the real world. One way to do this is

to include a provision in the agreement requiring countries to update their targets every five years, since we can’t lock in this level of ambition for the next 15 years. Five years from now we are likely to find that countries have achieved even greater ambition than they were prepared to commit to in Paris. China is a prime example. Facing extreme air pollution, the Chinese government is likely to include a total coal consumption cap in its next national binding law — its Five-Year Plan — to run from 2016–20. Implementing this limit will likely result in its climate pollution peaking well before 2030. We need a way to capture this overachievement and use it as a springboard for even deeper commitments in subsequent years from all key countries.

Leaders in Paris will also need to capture and mobilize a groundswell of climate action by cities, states, provinces, companies, and financial institutions. Cities and companies are already joining this effort and showing that it is possible to achieve even more action in the real world than countries are prepared to commit to in 2015. The Paris meeting is poised to help take these efforts to the next level.

We need an agreement in Paris that spurs a new tag line: “It’s global and it will work.” Such an agreement will help spur the kind of actions that our children and grandchildren can live with. It won’t be the final destination, but it must be a critical turning point.

Jake Schmidt is director of the international program at the Natural Resources Defense Council.

Post-Paris Pivot to Fast Climate Change Mitigation

DURWOOD ZAEKE

It's a fantasy to think that holding warming to 2°C above pre-industrial levels will keep the world safe. We've warmed the world by about half that and climate impacts are already here, and the initial warming is feeding upon itself and causing still more warming. Already, disappearing Arctic sea ice is shrinking the protective white shield that reflects heat back to space, the permafrost line is moving north and releasing stored methane and carbon dioxide, forests are drying out and burning up and releasing the carbon dioxide stored in the biomass and soils, and ocean carbon dioxide storage is slowing down. Maybe James Hansen is right and warming of 1.5°C will keep us relatively safe, but even this looks optimistic today.

Whatever the outcome at COP-21 — a global agreement with ambitious national commitments, or a stalemate that keeps us dancing around the few remaining musical chairs left on high-ground after rising seas and pounding storms wash away the rest — we need to pivot after Paris to fast-mitigation strategies in all venues that can help cut climate pollution.

Solving a fast-moving problem like climate change requires fast-mitigation. The climate game could be lost before the anticipated UN agreement goes into effect in 2020. Fast-mitigation is essential for slowing impacts and facilitating adaptation, and needs to be pursued in all possible venues at the local, national, and international level.

The ultimate objective of the UN climate process is to prevent dangerous interference with the climate, and to do so “within a timeframe sufficient to allow ecosystems to

adapt naturally” and “to ensure the food production is not threatened.” Within the UN climate process, the parties recognize the need for fast, pre-2020 mitigation, and in 2011 set up a process to focus on pre-2020 ambition, including identifying robust mitigation strategies, especially those with co-benefits for adaptation, health, and sustainable development.

The fastest mitigation available at scale is to amend the Montreal Protocol — the world's best environmental treaty — to virtually eliminate one of the six main greenhouse gases by phasing down production and use of refrigerants known as hydrofluorocarbons, or HFCs, leaving accounting and reporting of HFC emissions in the UN climate process. This can cut the equivalent of 100 to 200 billion tonnes of carbon dioxide by 2050 and avoid up to 0.5°C of warming by the end of the century. Already, 95 parties have submitted formal proposals to phase down HFCs, and most other parties are supporting, including China, India, and Brazil. The few parties yet to join the consensus include Saudi Arabia, Kuwait, and Pakistan, although Pakistan may be moving in a positive direction.

Improvements in the energy efficiency of appliances that a phase-down of HFCs is expected to catalyze can provide the equivalent of another 100 billion tonnes of carbon dioxide avoided, according to a recent report from Lawrence Berkeley National Laboratory. These efficiency gains will save energy equal to doubling the current global fleet of power plants.

Other fast-mitigation strategies include using national and regional laws and institutions to cut black carbon and the air pollutants that produce ozone in smog, powerful warming pollutants that are not included in the UN climate discussions, but kill more than seven million people every year and destroy over one hundred million tons of

crops. California has shown the world the way, cutting its black carbon concentrations by 90 percent since 1966, without any noticeable disruption to the citizens of California, but with tremendous benefits to their health as well as to climate protection.

The Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants, which now has more than 48 countries and 60 international organizations and non-state partners including the World Bank and World Health Organization, is helping to fill the gap with actions to reduce black carbon, methane, and HFCs. Cutting these climate pollutants can cut the rate of global warming in half in the near-term through mid-century, and by two-thirds in the Arctic. This can avoid up to 0.6°C of warming by 2050, and up to 1.5°C by end of century. In contrast, aggressive carbon dioxide mitigation, while essential, can avoid only 0.1°C of warming by 2050 and 1.1°C by end of century. It's not possible to stay below the 2°C barrier, let alone the more appropriate 1.5°C limit, without aggressive cuts to both the short-lived climate pollutants and to carbon dioxide.

Reducing the rate of warming by half is essential for adaptation, as it's always better to prevent damage so that there is less damage to adapt to. Support from heads of state and government and a comprehensive plan of action for fast pre-2020 mitigation to complement the UN agreement can start to answer the legitimate demands of all citizens for their governments to avoid an irreversible climate crisis, and to do so fast enough to protect food production and allow ecosystems to adapt.

Durwood Zaelke is the president and founder of the Institute for Governance & Sustainable Development, and founder and co-director of a related program at University of California, Santa Barbara.