



## Taking Stock of the Paris Agreement's First Stocktake

**T**he Paris Agreement on climate change requires parties to carry out a global “stocktake” every five years to evaluate collective progress toward achieving long-term goals and purposes. The Environmental Law Institute invited an expert group to form our inaugural Firestone Policy Forum panel, held on the afternoon of the annual Award Dinner in October, to discuss how much progress has been made nationally and globally in meeting greenhouse gas reduction targets.

The stocktake constitutes a critical moment to evaluate global progress in achieving greenhouse gas reductions and for parties to the climate convention to determine if, when, and how acceleration is needed to realize the Paris Agreement’s overarching goals.

The stocktake process has three phases: first, information collection and preparation; second, a technical assessment of informa-

tion; and third, a consideration of outputs. The third phase, which the Firestone discussion previewed, included a presentation of the findings at COP28, the 2023 United Nations Climate Change Conference in Dubai, held in December.

The first global stocktake took place over several months, and the Firestone panel’s conversation summarized some of the lessons already learned from the assessment, including suggestions for strategies needed to stay on track to meet the agreement’s temperature goals.

What progress has the United States made toward its Nationally Determined Contribution to reduce net greenhouse gas emissions by 50-52 percent below 2005 levels by 2030? Where does broad international progress toward the Paris Agreement goals stand? What impact will the stocktake have on global climate policy?



**Scott Fulton**  
International Envoy  
Environmental Law Institute

*“While the Inflation Reduction Act will help push us toward our own goal, it can’t get the job done alone”*



**Susan Biniaz**  
Deputy Special Envoy for Climate  
Department of State

*“This first stocktake sets the precedent for what these global assessments are going to look like”*



**Marshall Shepherd**  
Georgia Athletic Association  
Distinguished Professor  
University of Georgia

*“Communities of color, elderly communities, and communities living in poverty will disproportionately bear the brunt”*



**Angela Barranco**  
Executive Director  
for North America  
Climate Group

*“Paris changed the paradigm not only around subnational but also around private-sector engagement”*



**Charles Di Leva**  
Partner  
Sustainability Frameworks, LLP

*“The multilateral development banks have an increasingly important role in tackling the climate crisis”*



**Jennifer Huang**  
International Program  
Center for Climate and Energy  
Solutions

*“The stocktake can be a moment to inspire us. It can be an opportunity to course correct and to direct us into a better future”*

**Scott Fulton, moderator:** Climate change has been billed as a “whole of society” challenge. Our approach will be to examine the question of progress through a number of key societal lenses—governmental/intergovernmental, the private sector, the finance sector, and civil society writ large.

Leading off will be Susan Biniaz, one of the State Department’s senior-most diplomats working on climate change. Sue is the right hand of Special Envoy for Climate John Kerry and has for more than 25 years served as the lead climate lawyer for the United States. In that capacity, she has played a central role in all major international climate negotiations, including the Paris Agreement.

**Susan Biniaz:** I thought I would take you back to 2015, when we were concluding the Paris Agreement, to give you background on how we ended up with the so-called global stocktake.

There were several countries on the road to Paris that called themselves the “High Ambition Coalition.” The United States joined them toward the end. They were seeking to make sure that the agreement was long-term and that it had an “ambition cycle”—so there would be some kind of collective review of how the parties were doing. That review would inform the next set of Nationally Determined Contributions and so on until the goals of the agreement were met.

The temperature goal of the Paris Agreement is to limit warming to well below 2 degrees Celsius and pursue efforts to limit it to 1.5 degrees. But the NDCs that were on the table just before the Paris meeting—there were about 185 of them—they added up to something closer to 2.7 degrees. That’s what put the global stocktake over the edge, where people realized it was untenable to have an agreement with that set of initial NDCs without structuring it with a long-term design.

So what does the global stocktake look like? Well, it was written to be a collective review, which is really important. The global stocktake doesn’t

look at how each individual country is doing. That’s more of the transparency regime under the Paris Agreement, where you have to report and be reviewed individually.

The other thing to know about it is it addresses all three of the long-term goals of the Paris Agreement. The first one is of course the temperature goal. The second one is to enhance adaptation and resilience. And the third is related to finance—to align financial flows in the world with those other two objectives.

One other thing to know about how the global stocktake is structured is that it is to inform the next round of NDCs. The next targets are due in 2025 and they are to address the 2035 time period.

This first stocktake is important for a few reasons. First, it sets the precedent for what these global assessments are going to look like. It also sends the signal to the world, to the marketplace, of how the parties think they’re doing, along with what needs to happen next. And it shows whether the parties to the agreement are up to the task of reviewing themselves.

For each topic under the stocktake, we think there should be backward-looking and forward-looking pieces. So it should look at the positive progress that’s been made since 2015, then at what still needs to be done. Before the Paris Agreement, scientists said the world was on track to something like 4 degrees Celsius of warming. Now, depending on which metric you use, we’re much closer to 2 degrees. Some will say, if everything were implemented that has been committed to, we’d be on track to 1.7 degrees. So clearly we’re in much better shape than we would have been without the Paris Agreement. Two hundred countries have put in NDCs. Way over 100 have updated them already. Over 100 countries have put in long-term strategies. You can’t open the newspaper these days without seeing some reference to a Paris-aligned target or a net-zero goal. Other international fora that we work

in have also tried to align themselves with the Paris temperature goal; if you go to the International Civil Aviation Organization, they’ve now taken on a net-zero goal and adopted measures to try to get there. This past summer the International Maritime Organization did the same thing. So there’s been a lot of progress.

But if you look at IPCC reports—especially the latest assessment—and reports of the International Energy Agency, we are not yet on track to keep a 1.5 degree limit within reach. Then the question is what to do about this gap. You have to decarbonize the energy sector. That has a renewable energy component. It has a fossil fuel phaseout component. Deforestation has to stop by 2030. And in terms of the next set of NDCs, in our view they need to include all greenhouse gases. Some of the major economies have only included CO<sub>2</sub> so far; to keep on a 1.5 degree trajectory, they need to broaden the scope of their NDCs.

In terms of challenges surrounding the global stocktake, one is that it’s a consensus process. Even if you agree on the gaps, there will be disagreement about the responses and who’s responsible for those responses. Another is that there are some countries that have experienced buyer’s remorse. They signed on to the agreement, but they don’t really love the design. Paris moved beyond the developed/developing dichotomy that was in the Kyoto Protocol. It took many years to create a new paradigm. Unfortunately, there are some large countries using the global stocktake as a back door-way of trying to renegotiate the Paris Agreement. Another challenge is that, of course, it will take money to implement the kind of responses that we’re talking about.

Finally, there is the issue of “loss and damage.” At the Glasgow COP, which was two years ago, there was a push by some of the more vulnerable countries to have funding to address loss and damage. That was a completely new issue. That had not

been included in the Paris Agreement and it was controversial. Fast forward another year, at the COP last year in Sharm el-Sheikh, the push went beyond that. And this past year there has been a smallish group, about 24 countries, looking into establishing a new fund. The issues include where the fund should sit, as well as who the beneficiaries should be. The Sharm el-Sheikh COP agreed that the beneficiaries of the fund would be the particularly vulnerable countries, but questions have arisen whether that includes all developing countries, whether it's just the small islands and the least-developed countries, or whether you leave it to the board of the new fund to decide.

Then you have the issue of “from whom,” i.e., who is asked to contribute. Is it just developed countries? Our view would be absolutely not. We're in completely uncharted waters when it comes to loss and damage. There is no donor group and everybody should be invited. But some big developing countries want to make sure that they're not invited to contribute.

One thing that's important, just for an American audience, is loss and damage funding is not about liability and compensation. And that's written into the mandate because that was a sensitive issue for the United States in the Paris Agreement. When we agreed to this loss and damage article, even though it wasn't about funding, it was very important to stipulate that—because the chances of getting funding pitched as compensation or reparations would be slim.

**Scott Fulton:** Let's remind ourselves what the United States' current Nationally Determined Contribution under the Paris Agreement is. That is to reach by 2030 a 50 percent to 52 percent reduction of greenhouse gas emissions below 2005 levels. This in turn is calibrated to a goal that the Biden administration has set of achieving net-zero emissions no later than 2050.

Our country's positioning relative to this objective was dramatically

improved by last year's passage of the Inflation Reduction Act—generally viewed as the United States' most important national climate legislation to date. It is expected to drive major new investment toward renewable energy.

That said, analyses of that law's reach indicate that, while the IRA will help push us toward our own NDC goal, it can't get the job done alone. The IRA, along with complementary electrification initiatives, sets us instead on a path to roughly 40 percent below 2005 levels by 2030 as opposed to the 50 percent to 52 percent reduction envisioned by the NDC.

So, how to make up the difference? Some had hoped that regulatory action by EPA might close the gap. But the Supreme Court recently took a big bite out of what had been seen as EPA's primary tool for regulating greenhouse gases, the Clean Air Act, in its decision in *West Virginia v. EPA*. The justices are saying if Congress wants to equip an agency like EPA to transform the energy system of the country, legislators need to say it more clearly. Of course, the current Congress is not in a position to say anything clearly or not. But a key question is whether state and big city governments can pick up the slack and help close this gap between the country's climate ambitions and its actual performance.

There's no one better able to help us think through that than our next speaker, Angela Barranco. Angela is executive director for the Climate Group in North America. Angela has two decades of political and policy leadership experience, most recently as undersecretary of the California Natural Resources Agency.

**Angela Barranco:** Climate Group is a global nonprofit. We are the secretariat of Under2, which is the subnational governments' group. We have over 173 individual states, regions, provinces, and other subnational governments that are part of a global coalition—including many here in the United States. The co-chairs who guide the direction of that action are

very actively involved in every COP. It is an interesting, very action-oriented group that has been coming together since the Paris Agreement defined this whole new world called “subnational action.” Paris changed the paradigm not only around subnational but also around private-sector engagement and bringing a lot of those folks to the table as equal actors in mitigation and resilience.

In addition to our subnational initiatives, Climate Group also runs several mitigation strategies in different industries with our corporate partners. We break down the silos and work in industry, transportation, built environment, food, and energy.

The traditional barriers between public and private sector are tumbling down. With Paris, it was about putting concrete thoughts and ideas about this global stocktake and the other actors that must come to the table. Everyone has to collaborate and move together. So this is where state governments especially become a really interesting and important driver of ambition and action.

There has been a paradigm shift in who is at the table. The Inflation Reduction Act changed so much of that framework. It's now embracing critical pathways for economic development and critical pathways for work forces. It has become the bread-and-butter economic underpinning of these governments.

Whether they are city leaders, governors, county leaders, or other entities, they are all focused on how they make this a just transition. Bringing them to the table is going to ensure that this incredible transition is really rooted in these communities. The ideal we are working toward is that climate isn't just a mitigation strategy, it's a whole new way of looking at the world in a way that benefits everyone.

In the United States in particular there's a very interesting moment involving Justice40 and some of the work that has been done in the Inflation Reduction Act, the Bipartisan Infrastructure Law, and the Infrastruc-

ture Investment and Jobs Act. All this climate work has also prioritized investments in impacted communities.

Our economic development is a model for others across the world and within our governors coalition we're seeing a lot of interest in policy mechanisms to ensure that these transitions are fruitful for all.

In addition, methane and other greenhouse gases have to be addressed. One, the scale of the problem is growing, and we need to address it a lot faster. And two, things like agriculture and waste diversion are handled at the local level. So, a city like New York can make a decision about organic waste that has broad impact on methane in the atmosphere. If a lot of cities come together and make some big choices, it can have a real impact. The same goes with agriculture. The same goes with deforestation.

Another piece of this is resilience and adaptation. Again, big governments can set big policies and sometimes have big dollars. But those resilience and adaptation projects are going to be done at that local level. So it is critical to have governors and city officials at the table being ambitious in terms of how they want those communities integrated into the climate response.

The adoption of a lot of this forward action at the state and local level is resilient in many ways to those large political challenges. That is true not just in the United States but across the globe. We have 16 governors in Mexico that are a part of our coalition. What we hear time and again is the federal government in Mexico has not prioritized climate as much as some of those governors would hope. But those governors are taking on a lot of this work, whether it be building up the work force of the future so that they can build and transition and do all that great work—or just adapt. Whether it's heat island effects or other things, they're making those investments in their communities at that level regardless of what the

federal government is doing. It's an incredible place of opportunity.

But we are not moving fast enough. Our governors and our mayors are just getting organized, just getting to the table, so there's a lot more work we can do there. The partnership has to be public-private. IRA will have an impact of like 40 percent. We still need the rest. That's all going to come from a whole lot of places, including public-private funding, and we must start moving in synch together. Breaking down those barriers is something that I'm sure we are all working on in one respect or another.

**Scott Fulton:** You talk about breaking down the barriers between the public and private sectors. Do you think, based on your work with the states and what's happening with the renewable energy trend lines, there is potential to break down barriers a bit between red and blue states?

**Angela Barranco:** Absolutely. Indiana is one of the leading renewable energy producers in the country. They love wind energy and they believe in all sorts of other incredible opportunities, but just don't say the word "climate." They're more than happy to talk about the benefits of renewables and how the investment in Indiana is achieving great progress and producing great Indiana jobs. So, let's use whatever language we need to use. But when it comes down to jobs and people's work and their pocketbook issues, people will be on the right side of things.

**Scott Fulton:** If you look back over the last decade or 15 years, it feels like government performance on climate change has been sort of a stutter step. It's been very difficult to maintain continuity in the face of political change and shifting priorities at the national level. We've seen that here at home. But it's equally true in countries all around the world.

The fact of the matter is that it's been hard for all governments, democracies and autocracies alike, to maintain the course when it comes to climate change, and to increase ambi-

tion. This has led to increased focus on the contribution of so-called non-state actors, some of which Angela has just been talking about, and in particular the business community. The belief and hope is that businesses aggressively decarbonizing their own operations and supply and value chains can be a key ingredient in reaching our climate goals and compensating to some degree for government unevenness in this area.

To focus some light on what's happening in the private sector is Jennifer Huang, who is associate director of the international program at the Center for Climate and Energy Solutions. C2ES is of course a leader on climate change and is at the vanguard of work with companies to inform and educate business leaders, strengthen corporate climate action, and mobilize business support for effective climate policies. Jennifer facilitates dialogue among international policymakers and manages C2ES's own global stocktake project. She also tracks and researches international climate policy focusing on the key issues in the UNFCCC.

**Jennifer Huang:** At C2ES, our international work focuses on the UNFCCC negotiations. I've been managing our project on the global stocktake. We also work with a number of stakeholders, particularly on the domestic side, including businesses and cities.

I will speak to C2ES's theory of change for the global stocktake and our hopes and expectations for that outcome at COP28. And I'll touch on the non-party stakeholder engagement in the global stocktake as well in this kind of moment for accountability that we find ourselves in. It's going to be at the end of a two-year process that will inform new Nationally Determined Contributions. But another important aspect is that it's meant to enhance international cooperation, which is a theme that I'll touch on.

Global stocktake is actually still a negotiated outcome. The conclusion of this process is happening during an evolving political landscape. Par-

ties had a really difficult meeting in June and were unable to address the substance of what this stocktake decision will look like. They don't have a lot of time to work on this at COP28. So some more progress was made at a recent negotiator meeting in Abu Dhabi, but we still don't have a text and there's very little time left to do this.

What Sue had mentioned as their ideal global stocktake is really not that far away from what we see as well. What we really don't want is what some parties may think of as the global stocktake: just being a Paris "report card," just telling us what we already know, just telling us we maybe have a failing grade at meeting our goals. But it can be a moment to inspire us. It can be an opportunity to course correct and to direct us into a better future.

So to add real value, we think that COP28 and the global stocktake outcome should identify a limited number of very specific operational transformative signals. They should be across mitigation, adaptation, loss and damage, and means of implementation. But it should also speak to all stakeholders—national governments, local authorities, civil society, the private sector, national-level practitioners, multilateral organizations, UN agencies, among others.

The greatest momentum we see right now is behind this potential target to triple global renewable energy capacity by 2030. It's part of the COP presidency's vision. It's also part of the recent outcome of the G20 meeting. But we think, if you call for an increasing share of renewable energy and electricity generation to reach about two-thirds of the energy supply by 2030 with the aim of full decarbonization by 2050, it could be a really useful way to nuance that signal. But it also should be matched with a commitment by parties, multilateral development banks and international financial institutions, and non-party stakeholders to at least triple that proportion of finance and investments

in renewable energy by 2030 as well. Together this could be a useful package that directs parties and civil society in their actions over the next few years and enhances international cooperation.

But it's still far from certain that we would get this kind of energy target. So we need to build momentum around this ahead of COP28, including by activating existing relevant coalitions and initiatives around them, in particular the work of the High-Level Climate Champions. But even if this target is agreed at COP28, it's not going to be useful or operational unless there's some sort of follow through to implement it.

We hope that COP28 sets out a clear plan for what will happen next so that all parties and non-party stakeholders are clear as to what's expected of them in an effective response year and to implement that renewable energy target. So you could do something like a series of ministerial and technical meetings in 2024 to follow up. Then COP28 should require that COP and global stocktake outcomes are clearly linked to this process of submitting new NDCs due in 2025.

I want to focus a little bit more on the engagement and accountability of non-party stakeholders. Even in the UNFCCC space, the stocktake is unique for allowing a fairly open engagement of non-party stakeholders. They were able to sit at the same tables with climate negotiators and speak freely during the technical dialogues. Their input and contributions are part of that historical record for the global stocktake and were taken up in the synthesis report that came out recently.

But there is interest in tracking nongovernment actors' public commitments, despite the global stocktake being largely about collective progress of parties toward the goals of the Paris Agreement. There is still interest in tracking the progress of nongovernment actors toward the commitment that they have publicly made. The global stocktake sits in this wider

moment of desiring greater accountability by those who have put forward commitments to address and act on climate change.

Angela did a great job of speaking to this incredible evolution and engagement of non-state actors from just before the Paris Agreement until now. We have countless net-zero pledges, large coalitions of actors who've joined campaigns like the Race to Zero, an explosion of initiatives that are also dedicated to deforestation, nature-based solutions, and other efforts to address climate change. But these pledges have also been accompanied by a proliferation of criteria, and benchmarks, and narratives with varying levels of robustness. It gets confusing. It can generate a lot of confusion for consumers, investors, and regulators.

So I'll speak to two separate but related initiatives that are building momentum right now and generating a lot of interest in that non-party stakeholder space. The first is the UN High-Level Expert Group on Net-Zero Emissions Commitments of Non-State Entities. The secretary-general established HLEG to develop clearer, more rigorous standards for net-zero pledges by non-state actors, and to speed up their implementation. This group of experts delivered on their mandate in a report titled "Integrity Matters: Net-Zero Commitments by Businesses, Financial Institutions, Cities and Regions" at COP27.

The report is meant to serve as a guide. It provides 10 recommendations on how to set credible, accountable net-zero pledges and considerations. Then the secretary-general also called on these entities to put forward credible and transparent transition plans and to submit them before the end of the year. The secretary-general asked the UNFCCC to present a plan to address the lack of universally recognized credible third-party authorities that can conduct verification and accountability processes.

At COP27 parties responded to that request by inviting the secretariat

of the UNFCCC to ensure greater accountability of the voluntary initiatives that come through this portal called the Global Climate Action Platform. Last June the UNFCCC launched consultations on something called a “recognition and accountability” framework and draft implementation plan. They propose to apply those principles from the HLEG to individual non-party stakeholder and net-zero pledges that are registered in that Global Climate Action Portal.

These consultations are co-chaired by Sarah Bloom Raskin, the former deputy secretary of the U.S. Treasury, and Bing Leng, a member of the International Sustainable Standards Boards. Through this framework, the UNFCCC can strengthen this accountability framework for voluntary initiatives to have more ambitious and credible climate action that’s supported by international cooperation.

But there is ongoing debate—this is a very sensitive topic right now—about how much of a role the UNFCCC should and can have in transparency and accountability of voluntary initiatives. There’s a strong concern that, if you take a very prescriptive approach, you can stifle the ambition and the willingness to do more.

**Scott Fulton:** One of the hopes is that the finance sector can play an important role in leveraging, incentivizing, and enabling transformation of energy and other carbon-intensive sectors. And in much of the world that leverage is expressed through development banks—like the World Bank—that can condition access to capital on climate-safe behavior.

We have with us an expert on climate finance and the development bank sphere, Charles Di Leva. Now an independent sustainability advisor, Charles was for many years the World Bank’s principal presence on all matters environment through his roles as chief counsel for environmental law and chief officer for environmental and social safeguards. He represented the bank in international treaty nego-

tiations, including with respect to climate. He also played a key role in the development and implementation of the bank’s environmental, social, and climate policies.

**Charles Di Leva:** I’m going to start by speaking to the issue of carbon markets. One proposal to set up a market for carbon offsets is to include carbon dioxide removal as an activity that would be financed—and then the financier of those activities that remove carbon from the atmosphere gets credit for that offset. There is a controversy whether these removals can meet the integrity that Jennifer was talking about in terms of demonstrating permanence of the removed carbon and what test is put in place over the life of that carbon to ensure it stays out of the atmosphere.

Because if you remove or store carbon but it leaks 10 years from now or 50 years from now, you may defeat the very purpose of that offset. So under the Paris Agreement there is a supervisory body that has a working paper on whether removals can be included in what’s called Article 6.4 carbon market activities.

The multilateral development banks have an increasingly important role in tackling the climate crisis. The global stocktake has highlighted the role of MDBs as have recent G20 communiqués. In fact, if you go back to the UNFCCC, it’s always been understood that international organizations have a role, and the World Bank has certainly been a part.

Under the new World Bank president, Ajay Banga, there is a deep commitment to collaborate with the other multilateral development banks. Collaboration among the banks to tackle the urgent climate crisis has now been agreed upon. Almost everybody understands the urgency to act sooner. Indeed, starting this year the World Bank has committed that all of the public-sector financing of the bank, 100 percent, would be Paris-aligned. For the private-sector part of the World Bank, the International Finance Corporation and the Multilateral Investment Guar-

antee Agency, they will do so by the beginning of 2025.

But you need private-sector capital multifold beyond what’s capable of being generated through the public sector. And we’re talking on the scale of an estimated eight times more. President Biden wants to ask Congress to appropriate an extra billion dollars for callable capital into the World Bank because it’s recognized that multilateral development banks can stretch public finance to enhance bringing in the necessary private money that the global stocktake says is essential.

The World Bank is trying to put in place measures to do that. The new president has spoken about the essential element of de-risking private capital’s entry into the field of climate finance. If private capital is going to address the fact that today 63 percent of greenhouse gas emissions are coming from emerging markets and developing economies, you need to help deal with the various risk factors that private capital faces when they go into unstable markets. There is political risk, currency risk, extreme weather risk. All these risks can benefit from tools and instruments that the multilateral development banks are setting up through their different arms to try to address.

We have a historical set of crises that development institutions are being called upon to address. There’s still the need to deal with high unemployment with the recent pandemic. Many of the regions in the world are dealing with food insecurity. We have a biodiversity crisis that has not generated the kind of finance that’s coming out in the climate world.

Some powerful voices are coming from the Global South to point out the challenge of generating capital to deal with the climate crisis when so many of these countries are under staggering debt. That’s not just low-income countries. It’s often middle-income countries as well. The debt inhibits the renewable energy investment that the IPCC is saying is necessary to get to 1.5 degrees. So the wealthy countries,

including China, need to find a way to work on debt relief to free capital. There have been some good examples. Recently, China's willingness to work with the multilateral community in Zambia is seen as one good step in the right direction.

Fatih Birol, the head of the International Energy Agency, has said very clearly that we should be reaching peak oil by 2025. At the same time, there is interesting coverage in the last couple of weeks that you can see in the *Financial Times* about Exxon purchasing Pioneer Shale for \$60 billion. Then even more recently Chevron purchasing Hess for a similar amount. In each case, it is investment in increased extraction. Hess has a high degree of ownership on the Guyana Basin, which is seen as one of the largest untapped oil reserves in the world. So if these are to be developed, then the concept of peak oil is challenged.

Many in the environmental community are worried there is a sense among some participants in this global debate that it can be okay to "overshoot" 1.5 degrees. Because removal activity is going to somehow enable us to go beyond 1.5 and come back to that temperature by eventually taking the excess carbon out of the atmosphere. What types of technologies is the world willing to consider to be acceptable market approaches to be used to offset emissions?

Let me just step back to Sue's comment about the Kyoto Protocol. The United States was a tremendous force in designing the Kyoto Protocol's market mechanisms. The Clean Development Mechanism was created under the protocol to set up means for purchasing reduction offsets in the developing world. Well, today under the Paris Agreement there is the Article 6.4 mechanism. That's trying to build on the CDM and improve its credibility and integrity.

We need to do a better job of identifying market activity that is credible, that is permanent, that avoids leakage, and that is truly additional from what otherwise would happen. So the

carbon market discussion is a critical one to follow. It's one where the multilateral development banks are trying to bring the credibility of their operations into those types of activities because they operate from beginning of the operation and continue to monitor it through to the end.

So the role of the multilateral banks in looking at these emerging markets and developing countries that are critical, if we're going to start to reduce emissions as much as we want to, is to help these countries track and authorize emission reductions in a way that the market is going to feel confident.

That if they invest in this type of activities, they aren't going to be subject to greenwashing claims or, as we saw recently with Delta Airlines, brought into a class action lawsuit by passengers who felt that they were misled by the claim that they were flying on an airline that was carbon neutral. That case was followed by one against KLM not long after. So if we're going to have the private sector do this, we need to help set the rules and the credibility of the carbon market so they can really achieve that ambition.

There are two types of market structures under the Paris Agreement. One is set up for bilateral deals with developing countries. So, for example, Japan and Switzerland can support wind, solar, green hydrogen activities in those countries. Then they can claim under Article 6.2 they have offset emissions reductions and will claim credit under that as part of their NDCs.

One incentive the World Bank has been talking about is that, if an investment is really delivering environmental benefits, perhaps they can lower the interest rate that would normally be charged to the borrower for entering into that type of investment. So I think it's important not to let the fact that the marginal cost curve is coming down between the renewables and traditional fossil fuel investments discourage what would otherwise be an important renewable investment.

**Scott Fulton:** Perhaps the ultimate player in a whole of society pursuit is society itself—all of us. In response to this daunting problem of climate change, civil society is being asked to care more and at times make different choices than we might have made in the past. Collective clarity within civil society and a shared sense of purpose in dealing with this problem can enable improvement in all the systems that we have been talking about here. It can help clear out the political underbrush that impedes government action. It can help create consumer demand that accelerates the move to market of climate-sensitive products and services.

The challenge of arriving at a greater common accord on climate change is a function of public education and moving hearts and minds. Who better to help us think about how we can up our civil society game than our next speaker, who is someone already deeply involved in informing public understanding of climate change. And that's this year's ELI Environmental Achievement Awardee, J. Marshall Shepherd.

Originally a research meteorologist at NASA and later deputy project scientist for the Global Precipitation Measurement's space mission, Marshall is currently director of the Atmospheric Sciences Program and professor of Geography and Atmospheric Sciences at the University of Georgia. In November he becomes associate dean of research scholarship and partnerships in the Franklin College of Arts and Sciences at the university. Marshall is one of the world's leading thinkers, teachers, and advisers on weather and climate science. He is also a host of the Weather Channel's award-winning podcast *Weather Geeks*, a senior contributor to *Forbes* magazine, and a regular guest on CBS's *Face the Nation*, PBS's *Nova*, the NBC *Today* show, CNN, Fox News, and other media outlets.

**Marshall Shepherd:** As I look at it, science has done its job in marshaling public opinion and appropriate



responses. The climate is doing what our models said it would do. Now economic policy and law need to rightfully take front and center as we deal with this crisis. I think carefully about that because, as I thought about my remarks here and tonight, the Environmental Law Institute—many of you in this room—will need to lead, to charge forward.

Just this morning I was on the Hill. I'm part of the American Academy of Arts and Sciences commission that released a report, "Forging Climate Solutions." This report is a readable, actionable, approachable set of ideas put forth by a very ideologically diverse group of scholars, CEOs, and stakeholders. And so we were marching it around to the various policymakers.

This afternoon, I want to also talk about another report that I co-authored for the National Academy of Sciences back in 2016. Because the science has moved to a point where we can say that climate change is certainly happening, the extreme events that we face are becoming more extreme, and they have a particularly high impact on certain segments of our society. But nature is making the case for us and, as I told Congress when I testified before the House Science Committee in 2019, it's the extremes that people, our infrastructure, and our economy feel more than the average.

I want to circle back to vulnerable communities, the marginalized communities. I've done studies. We published a report in 2021 looking at what communities in the United States would be vulnerable to climate change by 2040. It's a publication that looks at various factors, both social vulnerability, economic vulnerability, policy levers, and the extreme events themselves. What we know is that communities of color, elderly communities, and certain communities living in poverty will disproportionately bear the brunt of the challenges that we face.

These days my job as a scientist

isn't enough. What I mean by that is, when I talk to my students or when I talk to stakeholders or when I talk to a senator or someone at the White House, I often talk about how our scholarly system from the science perspective is broken. We teach scientists to be scientists, but we're in an era where end-to-end science is needed.

As I think about the discussion today, this is end-to-end science. You have a scientist at the table. We have policymakers and policy advocates at the table. We have economists at the table. We have attorneys at the table. Our collective action is what will be needed. Because I can tell you this, Canton, Georgia, a rural community that I grew up in, or Cascade Road in southwest Atlanta, where my wife grew up, they're not thinking about anything that any of us are saying today. They just know that it's 107 degrees and their power is out and there's no access to a cooling station, or the variability in the production of pecans or peanuts or cotton in our state has been disrupted. They don't speak any of this language used here because at the end of the day they see things as a local issue. They might not even call it climate change for goodness' sake.

So when I think about the work that I have evolved to do—and I said I'm a card-carrying physical scientist because, if you go and look at my publication record and the things that have gotten me into the National Academies, they're very much science theory, models, development of new satellite techniques. But in the last ten years much of my work evolved to think about taking on this climate crisis as this wicked challenge that we face.

I'm thinking about it from the lens of vulnerable communities. Amid the destruction of New Orleans during Hurricane Katrina was the disruption of one of the most petrochemical-intense regions in the United States. Many people were vulnerable, but the people that we

stared at in our television screens at the Super Dome was the community that was highly impacted but likely had the least amount of impact on carbon emissions when we're thinking about the global stocktake.

Resolving this crisis, it will take local, regional, national, and international action. I think about some of the things that we've done in the state of Georgia when we were talking about needs for gap-filling activities here at the table. I've been involved in a funding that came from a private foundation called the Ray C. Anderson Foundation. Ray was a former CEO of Interface Carpets and he calls himself an "environmental industrialist."

We took the broader project drawdown framework that some of you may be familiar with. We looked at it because they talk about a hundred-plus solutions for reducing carbon emissions to get us to hit our targets. But what that effort did not do is what works in Georgia. So we quantified what it would take and we estimated that we can reduce carbon emissions in Georgia by 67 megatons by 2030 with 20 very focused solutions rather than a haphazard approach. We looked at what solutions make sense for Georgia given our landscape, and our transportation infrastructure, and our building infrastructure and so forth.

When I was just on the Hill talking to people, there are still basic misunderstandings about aspects of the science. I lived and worked here in the D.C. area for 12 years. Every time I come here I realize I don't talk D.C.-speak anymore. I've lost that art because I used to know it well. But yet, as I think about where we go going forward, we'll need to engage.

The good news is my daughter is in pre-law and she wants to go into environmental law. So hopefully she will help to engage in this. It's really ironic when I got this award because I said, I'm speaking to a bunch of environmental lawyers, so let me know if you need a reference. ❧