THE BROOKINGS INSTITUTION

WEBINAR

# A CONVERSATION ABOUT CLIMATE CHANGE MITIGATION AND RESILIENCE

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PARTICIPANTS:

**Opening Speaker:**

TRACY WOLSTENCROFT
Trustee
The Brookings Institution

**Panel:**

SAMANTHA GROSS, Moderator
Fellow and Director, Energy Security and Climate Initiative
The Brookings Institution

JOSEPH W. KANE
Senior Research Associate and Associate Fellow
Metropolitan Policy Program
The Brookings Institution

SANJAY PATNAIK
Fellow and Director, Center on Regulation and Markets
Bernard L. Schwartz Chair in Economic Policy
Development, Economic Studies
The Brookings Institution

SHALINI VAJJHALA
Founder and Chief Executive Officer, re:focus partners
Nonresident Senior Fellow, Metropolitan Policy Program
The Brookings Institution

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P R O C E E D I N G S

MR. WOLSTENCROFT: Good morning and welcome to Brookings. My name is Tracy Wolstencroft. As a Brookings trustee I am delighted to join you today for the sixth and final event of the Brookings Blueprints for American Renewal and Prosperity. Launched this past December, the Brookings Blueprints is a series of innovative and implementable federal policy ideas to inform a new presidency and congress amid an array of challenges facing our society.

Today's topic, climate change mitigation and resilience, is arguably the most challenging issue of our time. Accelerating climate change and the associated risks affect every aspect of our economic, social, and physical well-being. Look no further than two weeks ago when a polar vortex brought arctic air to Texas and literally froze the electric grids and energy supply systems for millions. Indeed, we could go around the country or the world and describe similar events occurring with increasing frequency during the past decade. To be certain, the climate challenge is formidable. But there are solutions. And for that reason, I remain optimistic. For my own vantage point, having had a range of professional experiences with Goldman Sachs, working in the global financial markets, with Heidrick and Struggles, advising leadership teams around the world, and with National Geographic, which I think of as the eyes on our planet, I am encouraged by the momentum and alignment around the net zero emissions goal prompted by the Paris Agreement.

We all recognize there is no silver bullet to accomplish that net zero goal by the year 2050. It is but one generation away. It will require aggressive and extensive collaboration across three dimensions, policy, technology, and markets. Policy begins with many of you participating in this morning's conversation and the leadership you provide on a daily basis. Technology is the science, innovation, and engineering required to transform our existing and largely hydrocarbon economy. Markets provide sources of capital and in concert with policy and technology stimulate scalable solutions to achieve a decarbonized world. None of this will be easy, but the reward will be an opportunity as remarkable as it is compelling. A stronger, healthier, more just, more equal, and thriving global society.

With that, let's turn to our panel of expert scholars to be moderated by Samantha Gross. In the spirit of Brookings, this is a panel focused on solutions that certainly have application across America, but they are solutions equally global in their scope and relevance. Samantha is the director of

the Energy Security and Climate Initiative in the Foreign Policy Program at Brookings. She has over 20 years of experience in energy and environmental affairs, including having served in the Department of Energy directing the Office of International Climate and Clean Energy. Thank you all for you time this morning. Samantha, over to you.

MS. GROSS: Tracy, thank you very much for your kind and inspiring introduction.

I am really excited to see this group of papers released upon the world. I'd also like to say thank you to all the authors, all the reviewers, and everyone, both inside and outside of Brookings, that made this project possible. And I am particularly happy to have some of those authors here with us today to discuss their work and other topics. I'll start by introducing the folks who are with me here today. First we have Shalini Vajjhala. She is a nonresident senior fellow in the Metropolitan Studies Program. She is also the founder and CEO of re:focus partners. We also have Joe Kane. He is a senior research associate and associate fellow in the Metropolitan Studies Program. And, finally, we have Sanjay Patnaik. He is the director on the Center of Regulation and Markets, and a fellow in our Economic Studies Program. So thanks to all of you for coming in and having a conversation with me today.

For all of you in the audience, you can join in the conversation and ask us questions. You can tweet questions #BrookingsBlueprints and also you can email us at events@brookings.edu. So, Sanjay, let's start the conversation with you. What policy tools and economic incentives can the United States use to decarbonize our economy and also to make it more resilient to the changes that we expect to see due to climate change?

MR. PATNAIK: Of course. Thank you so much for having me today, Samantha. It's a pleasure to be here. So the good news is that we have a lot of policy tools at our fingertips that we could use if we were willing to deploy them. And economic incentives can play a very large role in them. The most important of all, which most economists agree on is we would need a system of carbon pricing. That means putting a price on these carbon emissions to internalize the negative externality of greenhouse gas emissions, and incentivize companies to reduce their emissions going forward.

We have seen in the United States in a carbon pricing scheme at the federal level has been very challenging to try to implement, and so there are different other incentives that we can at least work on while we wait maybe for the future carbon pricing to come. One of them is to try to kind of like

use financial market regulation and really elevate the issue of climate change as a risk issue. And I think this is something that is often neglected in the public debate about climate change, which has become very ideologic in the U.S., which is that climate change is a serious economic and risk management issue. Just to give an example, right, if I'm a company and I start building a factory in an area that's being hit by a hurricane every two years, this is a lot of investment at risk and I should probably as a manger think about maybe relocating or having redundancies in there. And so regulations to increase that risk resilience are really important. And then we have investor pressure that we also see already increasing with companies and investors like Black Rock trying to put pressure on firms to increase their climate risk resilience and to acknowledge those risks, which a lot of firms don't. And then, finally, in our article that we put out now together, is to actually use the COVID stimulus and recovery funds to shore up or climate resilience in the future. If you think about it, it is a terrible crisis that we are currently witnessing with COVID, but we are pumping unprecedented sums of money into the economy. And other economies, such as Canada and many European Union countries have used that money to also improve climate resilience. And we are arguing we should do the same in the United States through a variety of different measures by tying COVID economic stimulus and recovery fund to corporations to specific climate provisions.

MS. GROSS: Thanks so much.

Shalini, let's move next to you. How can the federal government address infrastructure and the built environment, especially for the communities that are most likely to be impacted by the effects of climate change?

MS. VAJJHALA: Thank you, Samantha. I'm so glad to be here with you all. And I think my remarks are going to be entirely complementary to Sanjay's, because one of the things about climate resilience and adaptation is that climate change will touch everything and we have to enter the solutions for the problem through multiple doorways. And so I think the federal government itself has an enormous set of levers here that are being underutilized to improve our risk management and resilience across the board. And so what's not often talked about in the debates about how do address climate risk is that we are losing enormous amounts of money today because of climate impacts. This is not some grand future problem. And so when you think about programs like federal crop insurance, with increasing heat and

rain fall, or federal facilities that are — think large naval bases located on coasts that are subject to storms and sea level rise. These are risks that are here now and they're visible on federal budgets. And so there are programs that are experiencing escalating costs — think like the National Flood Insurance Program, there are programs that are struggling to cover need — crop insurance is a good example, and there are others that have widespread social impacts — think about all of the climate impacts that add up to decreased air quality and poor health in the most vulnerable communities.

So in our blueprint, which I was pleased to collaborate with Joe, who is going to talk about a separate blueprint as well — and Jenny Schuetz and Adie Tomer — we proposed creating a new governance structure to tackle these built environment challenges, and most importantly, to start now, not to wait for federal legislation or something that even if it comes into place in two years will take many, many more years to fully take effect.

So by focusing on these federal systems at risk, federal programs at risk, and the opportunities to capture cost savings within federal budgets and create value and more impactful investment across the built environment, we recommend creating a new unit, a climate planning unit within the Office of Management and Budget, to start looking really at the nuts and bolts of where the federal government is losing money, where there are going to be known and predictable solvency problems, and then finding solutions by bringing in experts through a model that looks similar to what we've done on the IT side of the federal government with innovations in the U.S. digital service and a program called 18F. And so we think there is enormous opportunity here to start now to deal with this problem.

MS. GROSS: Thanks so much. And I think that theme of risk and how we manage it will be a unifying theme throughout our conversation today.

Joe, I'd like to turn to you. When we think about the future that we all face, we need to think about having the right kind of people in place, not just in terms of workers to fulfill new jobs, although that is very important, but also in general. How do we educate the public to be open to the kind of transition that we need to see occur?

MR. KANE: Yeah, thanks, Samantha.

And, you know, following Shalini and Sanjay, I have a feeling we will be complementing

each other quite a bit today. But, right, I mean it's not just the technical solutions, but it's also the people. So how do we empower more people in places, not simply complete more infrastructure projects to address some of these climate challenges. And so along with my co-author, Christina Kwauk, we asked ourselves: how do our underlying behaviors and actions, and in particular our existing systems of economic and environment inequality limit our climate solutions?

And so in addition to that technical gap, the emissions and so on, we found, you know, there's an education gap, a lack of knowledge and awareness around climate issues and solutions, a training gap, a lack of consistent talent pipeline to prepare workers for green careers, which leads to this inequality gap, disinvestment and marginalization in many communities.

And so we propose a national strategy around climate education and workforce development centered not only on climate action, but also on climate justice and environmental justice. You know, why? We know that climate education can help decrease GHG emissions as much as new technologies alone. We also know that many people, especially lower income households and communities of color, as Shalini is describing, are absorbing some of the biggest climate costs and have traditionally been underrepresented or excluded from the types of careers and positions that can address our climate crisis.

And this is line with the Biden executive order on climate policy that came out a few weeks ago, looking at a government wide approach to the climate crisis, both in foreign and domestic policy. So empowering workers and people of all ages is central to that. So that means boosting climate literacy, green skills, advancing more economic equity in the transition to a cleaner more resilient economy. We must overcome our current decentralized uncoordinated education and workforce development systems. And then clearly define the types of knowledge needed and careers available in this space. And fortunately we do have a program right now, the U.S. Global Change Research Program that's been around for 30 years, that coordinates some of these inter-agency activities, but it doesn't have this clear mandate around education and training. And so that's really where our proposal has focused. And I think, again, we can't lose sight of the people, right here and as much as the projects that we have to do here in years to come.

MS. GROSS: I like the focus of that a lot. And I like particularly the focus on preparing

the workers and the population for the kind of world that we want to have in the future. I think I'd like to stick with this idea of justice and a fair transition for a moment and talk about how it works in our other areas of focus as well. I think that's something that I personally am excited to see so much focus on that in the Biden administration's policies. And I feel like it's something that's been missed in the past, not just that climate is dangerous for people, but the opportunities that this creates are also there for you, even in disadvantaged communities.

Shalini, would you like to come back for a moment and talk a bit about how this plays out in disadvantaged communities and how we can use this in a way that's positive for these communities? Kind of the opposite of what's happened in the past, of them bearing an extra burden from pollution and climate change.

MS. VAJJHALA: Absolutely, Samantha. I think this is an opportunity for a grand reset. And Sanjay sort of brought this up, which is it would be a failure of imagination post-COVID to return to normal. And so I think there are many, many ways that we can improve equity, that we can reach the most vulnerable who have historically the hardest and most costly to reach for a lot of structural reasons. We don't talk a lot about the fact that our infrastructure in many places was built to divide on purpose. It was an investment in inequality. And so I think the fact that we have to do so much to rework our basic infrastructure systems gives us a real opportunity to flip the entire equity question on its head and not frame it as looking for extra money to reach the most vulnerable, but frame it as an opportunity to do something that creates value across the entire society, an entire system.

And so I'll give two quick examples. Katharine Hayhoe, who is a climate scientist out of Texas, gives absolutely one of my favorite descriptions of our options. And she says we have three choices: we can mitigate, we can adapt, or we can suffer. And the suffering at the end of that line is what we are trying to prevent by action on mitigation and adaptation. And what this looks like I think when you approach really basic investments in our federal programs and system — I'll talk about urban transit and heat.

If you think about transit systems in high heat, right, who suffers? It's older people, it's low income people, it's minority and marginalized communities who are transit dependent for jobs. And they end up sitting out in high heat days longer because transit authorities will often run fewer trains and

run them more slowly. So if you think about how you deal with this problem, you don't go charge the low-income folks extra for their trains and their buses, what you do is you look at where a transit authority investment, federal, state, and local can help make the system better off and serve the people who would suffer most. And what that looks like is improving tracks, improving trains, making sure bus ways are protected from high heat and floods. And in doing that you have an opportunity to dramatically relieve suffering. So I actually think approaching this through an equity lens can open up solutions that just haven't been on the radar screen from folks who are coming from a more technocratic perspective on climate fixes.

MS. GROSS: Thanks so much.

And, Sanjay, would you like to come in on this issue of equity and risk and how do we reduce the risk for those who tend to be the most vulnerable?

MR. PATNAIK: I think this is a critical issue, right, because if we look at risk, what climate change does it's a risk multiplier. And a lot of experts have looked at it, including a report by some of the major companies in the world, that current risks that we already face, like for instance diseases that are coming up in tropical areas and that are moving further north or, for instance, inequality, right, the economic suffering. Climate change will exacerbate those. And as you both pointed out, the poor communities are really the ones that are going to be hit hardest. And not only within the United States, but even outside of the United States when we look at the global level, right.

When I was at the Paris Climate Conference, we heard voices from a prime minister of Barbados who said 10 years of development can be wiped out with one hurricane in two hours, right. And so these are really fundamental issues and they can exacerbate a lot of the existing problems. And so we really have to look at everything we do going forward though climate risk perspective. That means we have make sure that companies address, recognize, and disclose their climate risk and make investments accordingly. We have to revamp the federal system, the federal insurance system, and the federal government so that, for instance, there are no new infrastructure buildings put in places that will be probably hit by floods or hurricanes much more frequently so that our money is not at risk. We have to make sure that if there is a lot of extreme weather events, that we don't continue building new zoning areas in those areas, building new buildings in that area.

So there are a lot of different things that we can do. And when we look at the economic stimulus now, we really focused on the corporate aspect in our article. And we said, look, this is a lot of money that is given to corporations and if we look at the last two packages from the spring 2020 and from December there was actually almost no strings attached to that amount. Then, obviously, initially that was understandable because it was a crisis that was unprecedented and we had to move quickly, but now we are entering our third stimulus and recovery package and it would be a really missed opportunity not to use some of that money to incentivize firms to address some of the climate risk.

And we have specific recommendations. Among those are giving —- kind of like a stick and carrot approach —- giving a carrot to companies that implement an internal price for carbon. There are already 400 companies worldwide that do that, 900 major companies are planning to do it. So we are saying, “If you are implementing an internal price for carbon within your company then you get better loan conditions for some of the money.” That is one.

Another very important policy recommendation we have is that we have to look at different sectors, especially sectors that are very carbon intensive, like the fossil fuel industry, and not provide any subsidies to that industry. A lot of those industries, like the fossil fuel industry, was already suffering before the crisis. They have very high levels of debt. And in terms of looking at climate resilience, it does not make sense to prop the market up artificially with additional subsidies or financial aid.

And then the third one, which is really important, is information. We need information on emissions and carbon footprints by companies. And so what we are proposing is if a new stimulus packages —- which seems likely —- is implemented, it should force companies that receive COVID funds or COVID recovery funds, to disclose their indirect and direct emissions. This can be done through the EPA, for instance, to really get a picture. This is the first step. To be able to regulate emissions carefully we need to know what the emissions are. And there are many companies nowadays where we don't have an idea of their emissions as of yet given the lack of a federal carbon pricing scheme in the U.S.

MS. GROSS: I'm hearing in Sanjay's answer a lot of talk about how we cannot just protect people, but how we can also protect the financial system from systemic risk.

And would anyone else like to jump in on that topic?

MR. KANE: You know, I'll actually jump in. I mean as much as I talk about people, people obviously care about money and how it affects their bottom line. And partially also to respond to your previous question too, Samantha, it can't be — as Shalini is describing — it can't just be about mitigation, it's adaptation. We're living with this right now and these aren't just acute shocks. So as much as there was the Texas situation a few weeks ago, you know, it's the chronic challenges too that we are living with, the daily flooding, the daily heat waves. So the reality that these costs, right, are hitting us more frequently, more extremely, not just from those acute events, but just every day. That's the reality that's hitting different people and different places unevenly.

And so it's I think — another piece that Shalini and I did actually on legacy infrastructure that we talk quite a bit about is there's just a new way of talking about our needs, talking about costs and benefits in different ways. That's a conversation starter that I think needs to happen in Washington and is already happening across the country in many ways. But then also rethinking how we measure our costs and benefits, which are ultimately going to inform, as Sanjay is describing, some of the market tools, the market instruments that can hopefully address these issues, and a Tracy was describing too to open up.

So we have to have clearer ways of talking about these issues, but we also need to measure them more precisely in ways that are people based, place based, not just project based. But I think that's key moving forward as we think of not just spending more, right, but targeting that investment in the places that need it the most.

MS. VAJJHALA: Joe, I think there's something so important in this measurement piece that also goes unrecognized a lot. And it's when we're successful at adapting to climate change and protecting the most vulnerable, success is something that doesn't happen, right. The storm hit but the community wasn't flooded. And this is the stuff the federal government is the absolute worst at because you have to constantly defend why you're investing in something. And so the defense community knows this incredibly well, right. It's the event avoided. And I think there's an enormous opportunity for collaboration among nontraditional partners in getting this right, specifically because of that. It's how do you invest in the counter factual, the avoided loss and maintain that investment so it's not just a one off. We avoided on ice storm but not the next six, or one flood and not the next two.

And so I do there is something here to the measurement piece of this that's actually

fundamental, but we can't wait to do all the measuring and the data collection to act. And so I think going back to that starting point on this discussion was really all these different doorways. We have to walk through them at once to be able to tackle this problem.

So we need to start measuring from the ground all the way up to the global financial system indicators that you're talking about, Sanjay, but at the same time we need to be able to act on what we know now, which is really where are we losing money, how can we create those savings and how can we defend those investments over time.

MR. PATNAIK: And I think one important aspect that I'd like to add here is that the losses that we're already seeing, as you pointed out and that we are expecting, will be so large that even for a wealthy country like the United States, it will be unsustainable if we don't try to prevent them or find some ways or mechanism of mitigating those risks. Because these losses are huge.

SPEAKER: Exactly.

MR. PATNAIK: And they're expected to be larger every year with the increasing incidents of extreme weather events. And we see that with the wildfires in California, we see that with hurricanes that are much stronger than they used to be in the past. And even a country like the U.S. will struggle to be able to really absorb a lot of these costs.

MS. VAJJHALA: Yeah. And the costs of events like, you know — Joe, you mentioned Texas two weeks ago, it's still Texas now, right. The snow and ice have melted, but a lot of the costs of climate impacts have very long tails, right. And the suffering has a very long tail. There are many communities that have gotten hit by the next hurricane before they've recovered from the current one. And the Caribbean is a perfect example of that. 2017 was horrific and there are people still displaced and suffering from that.

So I think we are — this would be an opportunity lost if we don't throw everything we have at this.

MR. KANE: And a challenge, too, Shalini, is that they're not always visible, right.

MS. VAJJHALA: Exactly.

MR. KANE: I mean Texas, you know, wasn't just an energy issue, it was a water issue too.

MS. VAJJHALA: Right, mm-hmm.

MR. KANE: And what some people don't realize, right, even with the wildfires in California a couple of years ago, that cause water contamination.

MS. VAJJHALA: Exactly.

MR. KANE: So we talk about a lot of destruction that's very visible, there is a lot of invisible destruction and suffering, quite frankly, that a lot of people are dealing with. And so how we begin to find that, you know, and measure that, is important too.

MS. VAJJHALA: Yeah. And I think where we see it in the system —- sorry, Samantha, one more (laughing) —- I think, Joe, the wildfire example, the annual smoke inhalation, the health impacts of that aren't going to show up for a decade.

MR. KANE: Right, right.

MS. GROSS: Yeah. And when you look at some of the preventative measures that might have been done here, it's particularly obvious in the Texas case, so I'll pick on that. The cost of winterizing the Texas power grid suddenly doesn't look so high anymore. If you look at not just the lost economic output from that time when people didn't have power, but the incredible damage that happened to water systems, to people's homes from burst pipes. The economic losses there are huge. And I think that is a bit of a microcosm of the climate problem. You know, dealing with it might look expensive until you look at what might actually happen, the kinds of risks that we are —- the risks that we're making more likely.

And all of this, I mean from where I sit you listen to the conversation that we're having now amongst ourselves, and this sounds like an absolute political no brainer for action. And you certainly see the Biden administration really focused on this. He was elected with the strongest climate platform that we've ever seen and has really appointed a lot of people with tremendous experience across different parts of the government, throughout the executive branch.

However, we're still facing challenges in congress and we're still dealing with a reluctance to deal with the climate problem. And so I'd like to spend at least a couple of minutes talking about the politics, which maybe takes us to more negative territory, but I think is a place where what we say can really make a difference. How can we link climate to COVID relief in a way that doesn't turn off the

doubters? What are programs that the Biden administration can put in place now that are palatable to the Republican Congress? How can we move forward in the political and economic situation that we're in?

Not an easy question, but would someone like to jump first?

MR. PATNAIK: I can try to jump in. I think one that was represented in our article is, as I said, we're trying to do a mix of a carrot and a stick approach. And one is a carrot approach where you say, okay, we're not forcing you to do anything if you get COVID money in one aspect, but we're saying if, for instance, you implement an internal carbon price, you get more favorable loan terms and you get more money. And I think this is something that anyone can get behind.

And it's actually quite interesting if you think about it, because if you look at the history, the origin and the idea of cap and trade was implemented by a Republican president in the 1990s for acid rain. And so the idea of carbon pricing, or pricing that externality, has had bipartisan support in the past.

And so I think if you try to break through that gridlock you can really focus on that incentive part, right. And you'll say, okay, if you take those steps or, for instance, if you report your emissions voluntarily, then you get better loan terms, you get more money. And of course it has to be paired to some degree with a stick, which might be politically more difficult to come through, but I think given the amounts of money we're giving to corporations, there has to be some kind of condition to attach to it. But I think you can work with both. And I think there are ways in a bipartisan way that you can get through that. Another one is if you look at the carbon pricing, right, which has been very contentious, if you try to devise a system where that carbon tax, for instance, if we go for a carbon tax, might be revenue neutral, right. And when you give back some of the money to disadvantaged communities I think there is some bipartisan support for that. I've seen ideas on both sides of the aisle.

And so I think —– what I'd like to say is to really cut through the partisanship issue, which shouldn't be in the case of climate change, is think about it as economic issue, right, again. Think about it as a risk issue. Because anyone understands risk, anyone understands if your home is at risk of being flooded and your insurance premiums are going to go up so high that you can't afford it. And that doesn't matter on which side of the aisle you are, when you think about it and frame it in that risk aspect, I think you can connect to a much broader community of people and make it clear to them how important that is.

MR. KANE: I'll hop in next. I mean I think, Sanjay, you're totally right. The fact that there

— the multiple risks, but also multiple benefits in how we think of the economic benefits here.

And, Samantha, you know, the one word of jobs, right, is usually when we talk about infrastructure, climate, the Biden administration has put that front and center. We are not only in a pandemic, we are in a deep recession. And people look towards infrastructure investment as a stimulating effect, right. That it's going to create a bunch of — not just jobs, but good paying jobs. And infrastructure certainly fits that bill and infrastructure policy is climate policy in many cases. Our transportation systems, or water systems, our energy systems, our broadband systems, and so on.

And so there is a definite jobs opportunity here, especially when we think of many of the skilled trades workers who for so long have really not gotten a lot of — we talk about investment, have not gotten a lot of investment nationally. You know, there's the opportunity to replace — not just grow jobs, but replace jobs for many workers who are retiring in these sectors nationally.

But we have to keep an eye on the generational timeline to this, the generational investments that how can we use this current moment, this political moment, where I think, you know, Democrats and Republicans both agree there's consensus, right, on that, infrastructure makes sense, let's do this. Obviously it's hard to do. There's a reason it hasn't gotten done in terms of the money and everything else, but there's a real opportunity here, a generational opportunity in terms of helping people and our economy at the same time.

And so how jobs can figure into this is very important. It's not a separate conversation from how we talk about our climate investments, but how do we invest in the two together. That's the big question moving forward. It's something that my colleagues, Adie Tomer and Caroline George, and I looked at even just last week, fossil fuel dependent communities as being tremendous sites for renewable energy potential, right. So if you think about just transitions to cleaner energy, to renewable energy, jobs certain figure into that. And how we can look at the economic benefits is crucial.

MR. GROSS: Yeah, that's a really interesting paper. I would recommend that to people who are listening.

MS. VAJJHALA: Yes, Samantha, just to fully second that. I think Joe you're — you brought up the term "transitions", which is something we haven't talked about. And it's something that we're historically bad at in politics, right. It's easy to focus on the money and the ribbon cuttings, but not

necessarily what doesn't need to be there, or how you slowly move from one thing to the next to not leave communities behind.

I think there are a couple of things in the politics here that have been done badly in past decades, right. We spent a lot of time trying to educate people about the problem of climate change and very little about the daily day to day impacts on them and the benefits of the solutions. And I think that bent still exists in a lot of our political communication of let's talk about climate change.

I don't want to talk about climate change, I want to talk about the impacts of deferred maintenance on infrastructure in Mobile, Alabama. And let me tell you what that is, that's adaptation. Because the water mains breaking, that's going to happen more often. And it's going to happen more often the more you delay investment in infrastructure. So I think there's a lot of unsexy investments that don't need to be a conversation about climate change. We have an enormous backlog of infrastructure maintenance that is increasing our risk across the board. Dams, high ways, bridges. And we always get those dramatic new stories every year, and depending on the cycle, whatever season we're in.

And so I think there's something incredibly important to recognizing what doesn't need to be said in the politics and what the talking points need to be that are close enough to the ground. And I think it took a long time, but they got there in healthcare. You know, you are now on your parents insurance, would you like to discuss healthcare politics, you know, for a 26-year-old.

And so I don't think we've made that switch in climate change and we can, because the impacts of COVID are so clear and present and people's needs and daily ways of being have changed so much. And I think — again, I remain — hope springs eternal, right — so I remain an optimist about being able to get this right.

MR. PATNAIK: I'd like to second that. I think we really have like missed the opportunity to talk more about the benefits and potential opportunity in there, right. And something that is really important to keep in mind is that most of the countries around the world are already moving full steam ahead. That means they are creating new industries, they are creating new companies and new jobs. And if we don't move in the United States as well, we're going to be left behind. And I don't think anyone wants this, regardless of which side of the aisle you are on right.

And so, again, going back to Shalini's point, also talk about the immediate impact, right.

And the immediate impact you see across the country, in blue areas, in read areas, if you look at farmers and the impact that they face, for instance. So I think that this is, again, we don't — if we just talk about some of the economic effects, that would take away a lot of the noise around it. And if we show people it doesn't have to be a choice between the environment and the economy, you can combine both. Because we have seen that in the past. We have seen countries successfully and companies successfully using environmental friendly initiatives and technologies to actually also be economically successful. And I think that's something we really have to emphasize to get more people on board.

MS. GROSS: Yeah, I am listening to all of this. And I think I really saw a change in the way that this was dealt with politically during the last presidential campaign. I saw a lot more of an emphasis on jobs, on climate being an issue that affects people now, and on the transition being to something that's fundamentally better, something that people actually want to be a part of rather than seeing — you know, putting on Jimmy Carter's sweater — and pardon me for showing my age — and, you know, and this being a burden that we all have to bear. That we're transitioning to something good that brings economic growth and job growth with it. And I'm excited about that.

It has been nice to see — and I hope we continue following this pathway, and I hope this pathway leads us to some breakthroughs on the political front. And it's also definitely clear that we need more than infrastructure, we need infrastructure months. But that this really is — this is really the direction we need to go and this is U.S. climate policy.

Just a couple of words from where I'm at. I'm actually sitting in Berlin right now. I'm here looking at the implementation of the EU Green Deal. And it's very interesting to see what's happening here in the European view of the United States. With the Biden administration people here are very excited to see that we have a new attitude towards climate. But I think the political realities that we face are hard for people to understand, and that has been a challenge. And I have been telling a lot of people here to just take a deep breath and slow their roll, but we're coming along. But we will get there. I think we'll use a lot of a carrot oriented approach than perhaps Europe does. But it's been very interesting times.

But the most important thing that I think the U.S. can do right now to reestablish leadership on climate, to reengage with the world on this issue after we pulled back for the last four years,

it to really push hard on what we do at home. There is talk everywhere and constantly about net zero by mid-century, by 2050, which is just an incredibly lofty goal, to eliminate greenhouse gas emissions on a net basis by the middle of the century. But that's where the world is going and it's important that the U.S. follow. But in the meantime, the countries that are party to the Paris Agreement, pretty much all of the countries in the world, are putting out new nationally determined contribution, their own promises about emissions reductions at the end of the year in November at the conference of the parties meeting. So it's just a very interesting, very important year right now, that the U.S. rejoins ambitiously but credibly. And it's difficult to figure out where that ambitious and that credible overlap. So I'd be curious how my compatriots on this meeting, how do you feel about this idea of the U.S. being both ambitious and credible in what it's promising to the world? And how can we meet those things at once? What kind of government programs can we do to show our ambition to the world, but also actually get things done in the political environment that we're in?

MR. KANE: I'm happy to kick it off. I'm sure it will bleed a little bit into what Shalini and Sanjay will talk about as well. You know, look, Samantha, I think you're totally right in that there's questions over the U.S. global role, but I think there's also the question of the federal role within the U.S., right, in the sense that states and localities, at least on infrastructure investments, I mean they haven't stopped, right. They haven't had really the luxury to stop, quite frankly. I mean, you know, our essential services, as we've learned so much during this pandemic, we all depend on reliable energy, we depend on reliable and affordable water. These are central climate issues that just haven't stopped over the last four years. And so they know, in going back to our take on costs and benefits, they know how much it costs if they do not stay head proactively of some of these concerns.

And so I think there's an interesting moment now where there's the redefined potentially federal role in these — not just these infrastructure conversations, but also our workforce conversations, our financial market conversations, as Sanjay has described. And I think that's the alluring promise here, right, is what is possible versus what hasn't happened. So looking forward versus just looking back. At least in terms of workforce and education issues, which I've been focusing quite a bit on, you know, our K-12 system, our career and technical educational system, right, climate isn't really a central factor in that, right. And so, you know, that maybe takes a little money, right, in terms of incorporating climate as a

curriculum or a point of focus in those studies and in those course offerings. But it's really — right, it's more just integrating this into some of our existing systems. So kind of — not even just a culture change, right, but just a flip of a switch of like how can we work this into our existing systems to demonstrate short-term attainable changes in addition to those longer-term structural changes that we also know are needed.

Same for our workforce systems, right. I mean Department of Labor, they've tried to measure green jobs in the past. I worked there before when they were doing this. It's a very hard task to do, but we have to have an understanding of what are the occupations and industries even in this space. Some people would say it's just energy, some people would just say it's water related industries. But it's obviously more than that. So we need to have clear idea of what are the career pathways in this space in addition to making the crucial investments in work based learning and training that need to happen as well. So it's thinking of those short-term sort of attainable wins in addition to the long-term structural changes that are going to be needed to. But I know, Shalini, you've touched on so much of this stuff even in the other work that we've done.

MS. VAJJHALA: Yeah, I think that — Samantha, you hit the nail on the head, right, which is international credibility depends on domestic progress on climate action. And that's true for mitigation, that's true for adaptation. That's a consistent baseline.

I think, Joe, you're right that if we don't think about the U.S. as a monolith, which it is not, you can actually express the ambition from the state and local levels and establish the credibility at the federal level. What I worry about as a fundamental for credibility is consistency. And that's the one thing our political system is weighted against. And so a lot of what's embedded in the blueprint that Joe and I co-authored is really how do you create the institutional and governance models to enable that consistency around something that is bipartisan, like cost savings and good government, and good use of taxpayer dollars so that you don't just knock the teeth out of every program every four to eight years? And then have to reexplain yourself on the international stage.

So I do think that there is a need to split the messaging here so that it's not all ambition and credibility from the same level of government, bit also there's need to establish that kind of consistent governance to maintain both.

MR. PATNAIK: Now, I want to echo something here. I think it's really important to be realistic and to set realist expectations and goals. And this transition is going to take a long time. It's not going to happen overnight. That means we will also have fossil fuels for quite some time. And one very hopeful side I think, and I think the U.S. can really be a leader in that are, are two things, which is innovation and technology, and the second one is the private sector and capital markets. And I think we see very interesting and very important developments in the area where the U.S. can take a leadership role.

First, we see more and more investors. And that is globally happening, but also starting in the U.S., really thinking about climate as a risk, and putting the money and the investments into companies that are less risky from a climate perspective. And I think this has really a large potential to move the market. And the second one is technology and innovation. The U.S. has been incredibly innovative, is a leader in new technologies, and I think we can really harness that also towards the climate area. And we see some of that, right. I mean with Tesla and with some of the other companies that are really innovative, coming up with low carbon technologies. The U.S. can contribute that to the global debate. And I think these are more trends that are driven by market forces that are not so dependent on the political climate. And I think this is where we might get some of the consistency and stability going forward.

MS. VAJJHALA: Could I add one thing to that, Samantha?

I think, Sanjay, one of the things that I would love to see more on in the finance sector is really splitting out corporate finance from project finance. When we talk about infrastructure, investing in a company does not build a bridge, investing in the design and predevelopment does.

MR. PATNAIK: Mm-hmm.

MS. VAJJHALA: So when I think about wanting a road that can also act as a coastal storm barrier or buffer from hurricane surge, it can take years to design that well. And if you don't invest in the design, it's going to be tempting and almost inevitable to build back what you had, especially if the money is moving faster than the projects can be implemented. And so I think there tends to be a lot of villainizing of things like permitting, but that's not actually the barrier. It's the investment in the up-front so we focus on what we need, not just what we know how to do.

MR. PATNAIK: Mm-hmm.

MS. GROSS: Those are really important points.

And this idea of policy durability is such an important one. And also the idea of what's been happening at the subnational level in the United States. I know when I talked to other people abroad during the past four years, I've really stressed that there's not a perfectly United States shaped hole in international plan of action, that there has been a lot of efforts taking place at the state and local level, and also among business and corporate actors who see which way the wind is blowing, they work internationally, they're concerned about their reputation, they're concerned — as our banking systems changed, they're concerned about their financing. And so we have seen the United States take actions within its borders that have not been driven by the federal government.

But we had a question of how do we make sure that those are durable actions, how do they add up to something significant at the overall level of our country? And how do we make sure that they stick around? How do we turn this into something that we can then go to the world with and say look what we're doing? And that I think is one of the biggest challenges for us, because sitting here in the EU I see a lot of pressure at the European Union level and it being pushed down. And it works, but it's a very different structure than I see in the United States where we see a lot more bottom up, a lot more business oriented efforts and, you know, a lot more let 1,000 flowers bloom and see what works than the top down system we're seeing here in Europe. And so this is more of a statement than a question, but it's going to be very interesting to see how the U.S. reengages with this system that looks quite different than what I am seeing in other countries abroad.

MS. VAJJHALA: I think, Samantha, there's a set of really important things in there, right, because the way we think about ambition in the U.S. is very different philosophically than the way the EU thinks about setting a vision, setting a target, setting an ambition.

And from my former life at EPA, I had this back and forth all the time where they were like, why doesn't EPA just set an aspirational target. And I was like that's not how regulation works in the United States. And so I think the U.S. is often the subject of such scrutiny that you could end up with really smart folks from almost any country who know more about our individual senators and representatives than we would know about anything in their national government. And so I think there's a

great deal of sophistication around this, but it is a disconnect philosophically that we have to decide if it needs to be solved or if the credibility is going to come in the proof of having done things.

MR. KANE: Yeah, I'll just quickly add too — Sanjay, I love your point on market forces and — not that that's uniquely American, but it's certain distinct in that Americans respond to what's in their wallet, right, and where are the cost savings and I'm going to do what's convenient for me and hopefully for my community. And not to say that regulations and that top down perspective, Samantha that you're describing in Europe, wouldn't work, but we know that demonstrated cost savings, demonstrated benefits, economically and financially, that power American — well, American behavior and attitudes, but also ingenuity, right, and creation and potential here. And so that's I think where there's some hope with this, but, you know, it's not a bad thing that America can be different, right, in addressing some of these issues, as long as we're getting kind of to the same destination, right, of we're ultimately helping create a more resilient, cleaner built environment, right. That's what really matters.

MR. PATNAIK: And I think one way that that could lead to some of that resilience on long-term view is if we take some market trends that are really good in terms of climate and we reinforce them through regulation in a way that they might become irreversible, right.

To give an example, why is it that coal production companies are not doing very well? Why? Because natural gas is cheaper. Again, going back to Joe's point, right, it is cheaper for our power plants to actually get natural gas and switch over. And so it's the economic, the market forces. But we can implement regulations that might help along that trend, right. And so I think this is just one example, but there are many others. And if we look at alternative fuels and renewable energy, right, it's quite interesting when you look at where a lot of solar and wind is being deployed is in Republican states. And so, again, combining that opportunity with maybe some smart regulation that can reinforce market forces can really build to like a long-term situation that can't be reversed easily.

MS. VAJJHALA: I think, Sanjay, everything that you just said is so important and also so connected to Joe's workforce points on just transitions. I grew up in Western Pennsylvania, right. Market forces drove out coal and steel, but it left a lot of people behind. And that goes back to our choices on mitigation, adaptation, or suffering. If we don't pay attention to the suffering and put in the floor of these policies, then I think we risk undermining our own efforts on mitigation and adaptation. The point is

people's well-being at the global level and at the individual level. And so I think there's a through line from everything that Joe said to everything that you said, from the beginning and the end of this conversation.

MS. GROSS: Shalini, you bring up a point that I think of a lot. And we can't think of climate changes even being an environmental issue. It's not about hugging trees, it's about making the world better and, frankly, habitable for people. And so we need to focus on policies and situations that bring everyone along, that include environmental justice and that make the world better for us. It's not about environmentalism in some abstract way, it's about making the world better for people.

This is just a really interesting conversation. We're coming up on the end of our time sadly. I think we could sit around and talk about this all day constructively. But I'm wondering if you all have any closing comments that you'd like to leave our audience with. And I think I'll particularly frame it as notes for policy makers. If you were talking to a committee in congress, a group of people, what do you want them to take away from what they heard today? What do you want to see the U.S. do in this really critical year, both as we rejoin the world in climate action, as we really think harder about what we want to do at home?

So what's your advice for policy makers?

Joe, I think I'll start with you.

MR. KANE: Yeah, I think you've hit the nail on the head, Samantha. I mean get started now, or sooner than later. Not that we haven't. There's obviously many conversations happening. I mean you can read the news every day, it seems like climate is hitting more of the headlines. I don't keep track of this, but it seems like it's hitting the headlines almost every day. So clearly there is interest, there's enthusiasm. Whether that leads to substantive action, you know, is another question, especially federally speaking. But that doesn't mean we can't — as Shalini was describing quite well, there are solutions already unfolding across the country, there are new technologies, there are new approaches that are helping people afford and enter, right, this transition to a cleaner economy right now. How do we scale those efforts? How do we build the capacity for places at the moment that are really struggling? I mean we are in a deep recession. There are tremendous fiscal restraints. This doesn't come without cost, but we can't lead with the costs, right. We have to look at the benefits and we have to look at how we can scale what we're already doing well and maybe try new things, right, to realize those benefits over

time. That is going to be key, is that scaling and replication across the country, not just one single solution from the federal level top down, but the scaling across the country that's going to lead to solutions.

MS. GROSS: Thanks.

Shalini, over to you.

MS. VAJJHALA: I think I would want policy makers, and especially folks on the legislative side, to not lose focus on the small stuff in favor of the big win. The big wins are going to be hard. They're important, but also look at place based opportunities, sector specific opportunities, and collect up these things that are the opportunities for the avoided losses and improved program solvency.

And so I would strongly advocate for every effort on a really large piece of legislation, do something small too, get something out of the gates faster.

MS. GROSS: Sanjay?

MR. PATNAIK: So I think the two main things I'd like them to take away is, one, again going back to an earlier point, it will be much cheaper to try to prevent some of those occurrences than to try to mop up after them. And I think we have seen it with COVID, right. What happens if we have a crisis or an event that we haven't prepared for well? The costs afterwards are astronomical. And it's the same with climate change. It might cost us a little bit to prepare now, but it will cost us much more if we don't mitigate and adapt to some of those really extreme events that will come down the line.

And then, second, look outside the United States, because the fact is that the world is moving along and very quickly, both on the government policy level —- if you look at the EU, if you look at congress in Asia, other areas of the world —- and in the market side, right. And we want to be part of that, we want to be part of that conversation and we want to get a share of those new industries, new companies, and new jobs. And I think that's something we owe to our population and to our workers.

MS. GROSS: Thanks to all of you.

I will add on at the end the thing that I wanted to add to this conversation here at the end is the idea of time. I don't think we have time to wait for perfect solutions. We're already seeing the impact of climate change now in weather patterns and other things, fires, and such. So we can't wait for the perfect solution. We need to implement the solutions that we have now while researching and doing

more work on solutions that we'll need in the future. We need to be able to walk and chew gum at the same time rather than waiting for the silver bullet that we will come up with eventually. We don't have time for that, we need to move now. This is a cumulative system. It's like pouring water in a glass. And so we need to poor slowly, lest the glass overfill on us.

I also agree with Sanjay completely in that we need to follow the world. The world is moving in this direction and we want to go with it. We want to be a leader, not a lagger in technology, in the energy transition. I think a lot about energy systems and we are currently a leader in the world's energy field today and we can stay that way as the world transitions. I think that's definitely a position that we would rather be in than the alternative. So I just want to say thank you to all of our speakers. This has just been a great conversation. I really enjoyed being with you all, at least virtually, today. I also want to say thank you so much to our audience. Thanks for joining us today. We look forward to a day that we can perhaps do this in person. But in the meantime you can go to the website and you can pull up all of the papers in this series, which are completely worth your time — not that I'm biased. But, again, thanks to everybody, to our speakers, to our guests, and we're glad you could join us today.

MR. PATNAIK: Thank you so much.

MR. KANE: Thanks, Sam.

MS. VAJJHALA: Thank you.

MS. GROSS: Of course.

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