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MITIGATING CLIMATE RISK THROUGH LOCALIZED DATA

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PANEL 1:

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> Senior Fellow, Brookings Metro, The Brookings Institution
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> DARYL FAIRWEATHER
> Chief Economist, Redfin
>
> SAM KHATER
> Chief Economist, Freddie Mac

PANEL 2:

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Jenny Schuetz: Hello, everyone. Thanks for joining us. Hello to our in-person audience and to our webcast audience. Thank you all for tuning in today. My name is Jenny Schuetz, I'm a senior fellow at Brookings Metro. I work primarily on housing, and I work together with some of my colleagues who are here today on the Resilient Regions team. You will hear later today from my colleague Adie Tomer, our colleague Joe Kane, Caroline George and Julia Gill are also here. So we are the, the team of people in Metro that are thinking about the built environment and climate intersections. So thanks for joining us. We are here today to talk about something that is, on the one hand, extremely wonky and nerdy and on the other hand extremely important, which is sort of the Brookings sweet spot.

We know that all communities across the U.S. are already facing stresses from climate events, everything from intense storms and wildfire, fires, to more chronic stresses like lack of water, drought, extreme heat. While individual people and communities can't change the direction of a hurricane, there are things that people in households and communities can do to protect themselves, their property, their financial well-being. But in order for people to make smart decisions about protecting themselves and their families, they need to have the right information. Some of you may be aware that there is a rapidly growing field of climate analytics that takes some of the more sophisticated modern modeling of climate events from literally the stratospheric level and puts it on top of maps so that we can map it down to the neighborhood level, sometimes even to the street and the parcel level, and have a sense of what kinds of climate events are likely to be risky in particular locations.

That's then, that's already being incorporated by a lot of private sector companies, things like insurance companies, the rating agencies, the commercial real estate industry to help them think about what to build where both in terms of real estate, commercial and residential, and as my colleague Adie will talk about with infrastructure, all of the built environment is going to be affected by this. So having the right kinds of data to know what the risks are, where they are can help make help people make better decisions. Unfortunately, two of the groups who really need that information, households and local governments, are only just starting to get access to some of this information. So there are a number of providers that have been working to make this more available and accessible.

But we want to talk today about some of the uses of this. Why is it important to have this kind of locally specific climate risk data? What kinds of decisions can people make once they have that?

How do we, what do we know so far about how people are processing that data when it becomes available to them? How can we make them better aware and guide these decisions? So we're going to have two panels today. I'm going to start by moderating a discussion with Sam Khater of Freddie Mac and Daryl Fairweather of Redfin, talking specifically about the residential real estate side. If we provide this information to households, what kind of housing decisions can they make based on this?

And then Adie will moderate a conversation with Vicki Arroyo from EPA and Andrew Wishnia from DOT, thinking about on the community side, how can they use this to make better infrastructure decisions. After each of them, so we'll have conversations to begin with, and then we will take audience Q&A after each of the two panels. Those of you in the audience with us today in person are welcome to join in, we'll have some microphones circulating, you can ask questions. Those of you who are watching on the webcast can also join in. You can send us an email to events at Brookings dot edu, or you can join in on social media using the hashtag climate risk data.

So with that, I'm going to ask Sam and Daryl to come join me upfront and we'll start our first panel. Just to give you a brief introduction to who our guests are, Sam Khater is the vice president, chief economist and head of Freddie Mac's Economic and Housing Research Department. Previously, he worked at CoreLogic, Fannie Mae and the National Association of Realtors. Daryl Fairweather is the chief economist of Redfin. Her insights have been featured on 60 Minutes, CBS Evening News, as well as in The New York Times and The Washington Post. Prior to joining Redfin, Daryl was a senior economist at Amazon and previously worked at the Boston Fed. Thanks to both of you for joining us.

Daryl, let's start with you. You and your team at Redfin ran an experiment recently providing some climate risk scores to prospective homebuyers who were on the Redfin site. Can you tell us a little bit about why you did the study and what some of the key findings were?

Daryl Fairweather: Sure, sure. So this was back in 2020, fall of 2020. We were considering adding climate change information to the Redfin listing pages. We already had lots of information about things like school quality, walkability, transit score. And we had a feeling, or at least one of our product managers had a feeling that people would find climate change information useful when buying a home. We weren't entirely sure. So we decided to run an extended experiment that lasted three months, which as an economist, it just felt like a great opportunity to do some research. We did an A/B test where half of our users saw flood factor scores right on the listing detail pages you click on and you see a score from 1 to 10. You click in again, you can see the percent likelihood that a

flood will, that a home will be flooded. And then after the experiment ran, we went to look at how this impacted the way that people search for homes and what homes they buy.

We found that people who were exposed to the flood factor scores ended up buying homes at the end of the experiment with around 20% less risk. So if they were generally looking at a home with a ten score, they went on to search for homes with eight. And then we also found that when it came to the homes that people actually made offers on which we could track for customers of Redfin, that people who were looking at extremely risky homes went on to buy homes with more average risk than if they didn't see the flood factor information. We also noticed that people were clicking in on the information and using it, you know, as much as they were the other information that we had on the site. So we were convicted that it was something that we wanted to include.

And since then, we have added even more climate change information to the Redfin site. We now have scores from flood, from first street foundation, as well as climate check on things like flood, fire, heat, storm, drought risk. It's a bit of a challenge because, you know, we're not the arbiters of truth on what the climate risk is, and there are different opinions about what those risks are. But because people find it useful, we are committed to continuing to supply it and at least get the conversation started so people can be informed about what risks they're taking on when buying a home.

Jenny Schuetz: Great. And Sam, I know that you and your team have done a fair amount of work on the perceptions of climate risk. So can you tell us a little bit about what you've learned? How sensitive are people to this information? How do they process it? What are they, what are they using it for? And how are they incorporating that into their housing choices?

Sam Khater: Sure. So good afternoon, everyone. I'm delighted to be with you here today. I would like to thank Jenny for the invite, and our research really supports Daryl and Redfin's research and conclusions. We've done two large scale studies on flood risk. One in Florida, along the coastlines and the other in Houston. For the Florida analysis, we looked at 35 coastal counties, the entire coastline of Florida. And we pulled the public records data on home sales and home prices. And then we restricted it to a quarter mile of the coastline in sort of Euclidean space, sort of off the rooftops. And then we merged other data sets along with it, including the assessor data, which tells you characteristics of the property, we also pulled in data on amenities, you know, golf views, water views, things like that. And we pulled in two indicators of flood risk, one is the FEMA flood maps,

which gives you an indication of current or a little bit dated on flood risk and the sea level rise estimates from NOAA, which provides sort of a forward-looking view.

And the research concluded that when, when in terms of the capitalization of prices, in terms of the flood risk in areas where they were notified or they knew that they were purchasing in a FEMA flood risk area and a sea level area, so these are sort of the areas that are, where they're most certain that there is potential future risk, the properties were discounted by 4%. So in terms of the transaction, there was about a 4% discount versus outside the, the floodplain. What's interesting is we also then looked at areas that had, were under the sea level rise classification, meaning future near future risk is substantial, but they were not in the FEMA flood map areas. Those homes sold at a premium relative to the ones outside the floodplain by about 7% or so.

What's interesting is we looked at Hurricane Irma when Hurricane Irma swept through, I believe this was in 2017, the discount got wider from 4% to about 5%. So not much, but it grew a little bit. The real area of interest is, is where they were not in the FEMA flood map zone, but they were within the sea level rise zone. The premium flipped to a discount of about four, so about a ten-percentage point switch. So clearly, when they know that there is risk, they account for it in their decision making. But if they're unaware of it, then they don't.

We did a very similar analysis in Houston and very briefly, L.A. This was around Hurricane Harvey, which was a hurricane that dumped about 50 inches of rain in 2017, and the discount pre-storm was about two and a half percent post storm, I think it was about five and a half percent, so it's it doubled. Our research is very similar to, there has been a fair amount of research on the discounts, and it sits pretty much within the sweet spot of other research that's been done out there.

Jenny Schuetz: Yeah. And this you know, one of the fascinating things reading the academic papers on this is that climate plays into people's housing decisions in a bunch of different ways. People like to live on beachfront property in Florida, apparently for the amenity value. But the exact same thing that is an amenity is also potentially a risk. So there are these sort of interesting tradeoffs and decisions people are making. I'm curious whether either of you saw in your research, since there's sort of there's an amenity factor, but there's also concern about risk, do you find that different kinds of households are more sensitive to climate risk, either seem to be more deterred by it? You know, potentially maybe people who are at the lower end of the price tier are looking for discounts

and might be more willing to buy someplace because they can get more house. But do you see any differences in the kinds of households who process this data and use it differently?

Daryl Fairweather: In the context of the experiment, we weren't able to look at that because we don't have demographic information on our users. But we have done surveys and we have found that younger people report considering climate change more as one of the factors in deciding where to live and whether to buy versus rent. And also more liberal people tend to consider that more. It's interesting because Florida is something that I'm fascinated by, and it's experienced a lot of in-migration recently.

Actually, we did a study where we found that people are leaving climate safe areas from a climate risk area, one of them being Florida, but a lot of retirees are going to Florida and maybe they just have a different risk horizon than a younger person who's thinking about owning the home for decades and decades as opposed to, you know, the short term.

Jenny Schuetz: And Sam, you've looked quite a bit at the migration data. Is that sort of the general trend or are people moving towards or away from climate risk?

Sam Khater: They are clearly moving towards areas with climate risk. To kind of step back for a second and answer your initial question, we have looked at that discount that I talked about before for home buyers versus investors and the premium that I mentioned earlier that people are paying for in the high sea level risk areas where they are seemingly unaware of the fact that they're in a flood prone area, that premium goes completely away for investors. So clearly, investors are more sophisticated, not a, not a surprise. In terms of the migration research we've done actually quite a bit.

So we use our internal purchase applications data, and we know where people are moving to and from at the parcel level. And we've done it for every metro in the U.S. over the last 20 years. And there's a very clear pattern of people, homebuyers leaving unaffordable coastal metro areas. It's been this way the last two decades. That outflow increased a lot, and they are moving to more affordable areas. So, for example, New Yorkers, some of them might be moving to Miami, but they're mostly moving to Philadelphia in our research. And for the top 20 markets where they're moving to and from there saving about $600 a month, which tells you something about the savings.

However, there is a cost, and that is they are moving to areas that have a lot more risk, environmental risks. So we've mapped, we've merged the migration patterns with FEMA's National Risk Index, which has a typology of about 18 different risks. And the areas they are clearly moving to

over consistently over the last 20 years, what's interesting about sort of the pandemic, it didn't really create many new trends in housing. It just accelerated a lot of like completely turbocharged them. And so with many homebuyers, they are moving towards areas that have a lot more wildfire and drought risk.

On a 3 to 4 to 5 to 1 ratio in terms of the movement, there's a lot of folks moving to Florida, but there are a lot more folks moving to Arizona and Texas and Idaho, which has the one of the biggest wildfire indices, Central Valley of California. Riverside has been the number one inbound market, they're all leaving L.A. Worcester is another big inbound market, they're all leaving Boston. But for many of these areas, it's really the drought and wildfire risk. And so that's really raised alarm bells for me. And I've raised that internally and I've got some personal experience with that, which I may come back to if we have time.

Jenny Schuetz: Great. So one of the interesting questions when we think about when people make housing decisions, sort of when, when should we be providing people with this climate risk data that they can actually take advantage of and use it? Right. And in your study, you're looking at prospective home buyers at the stage where they are actively searching for something to buy, which seems like kind of an optimal window so that you can tell them this neighborhood is higher risk and this one is not, and they can change it.

But they were already thinking about making a change. Should we be trying to provide some of this data to people who already own homes? And if so, what could they do with that information? Or is this really just you know, you've got one shot when people are moving and that's the best opportunity to give them that information?

Daryl Fairweather: Sure, sure. So we, we service both home buyers and sellers at Redfin. We're a full-service brokerage. And we were actually a little bit worried when we put up the flood factor information initially that we would get a lot of pushback from homeowners confused about what this new score is that may be deterring people from buying their home. We actually didn't get any, we get, we get more pushback on the Redfin estimate than we do on the flood factor.

But I think it is good information for people to know because there are things that can be done. If you're in a high flood risk area, you can do landscaping to divert water away from the home. If you're in a high fire risk area, you can have a metal roof. There are improvements that could improve the value of the home. And ironically, that's something that is a bit concerning too, is that as people

improve their homes are going to become more valuable and less affordable. So we may have a situation where you can protect yourself against climate change, but it comes with a higher price tag.

Jenny Schuetz: And I'm curious whether you've seen anything on kind of the refinancing data. I mean, is that another window when we could give people some information, they might be able to make a decision about some sort of improvements or insurance purchases?

Sam Khater: Great question. We have actually not looked into that, but we can, that's something we can put on the research list and agenda, but not something that's come up.

Jenny Schuetz: Excellent. So, you know, you're both familiar with some of the economics research in this field and one of the sort of big glaring holes that jumps out to me is we're primarily looking at the behavior of home buyers and homeowners. We have a lot more information for mortgages. We have information from people browsing. Is climate risk data relevant for people who are renters and plan on staying renters. What could they do with that information? And are there ways that we can provide this to renters as well? Do we, and you know, if you have any thoughts on are renters likely to behave differently than homeowners if we provide them with climate risk data?

Daryl Fairweather: So Redfin does have rentals now, I'll put that plug in there. So if you go on Redfin, you can see the flood risk maps. And if you're looking for a rental, you'll see that information too. I think that renters, they think about it a little bit differently. It might be a decision that you would make to rent instead of buy if you're worried about taking on that risk yourself. If you rent and the landlord takes on that risk. But it also might encourage people to have renters' insurance or to think about a plan if there is a flood event like what they would do. So I think it is important for renters to be aware, but it might not be so much a decision of whether they rent in that particular location, but more how they can prepare.

Sam Khater: So I think one issue is the lack of data, and I think many economists are going to where the data is, and there's a lot, lot more data on the for-sale market than the rental market. You know, one of the ideas we've been thinking about is on, do the home price discounts or the capitalization of risks in the home price base, does that filter down into rentals? My, it should in theory, because rents are just the present value of the prices. But I'm not sure if that's happening or not. So something worth thinking about. But I think the main reason why you just don't see enough research on it is just the lack of data, which is a shame.

Jenny Schuetz: So we've been talking, a lot of the studies are focused particularly on things like flooding from storms, there's some work also on wildfires. I feel like we talk less about sort of the more subtle chronic stressors. So drought, water stress, extreme temperatures. Do we know how people react to that kind of information? Is that as salient to them in making decisions and should it be?

Daryl Fairweather: I have a personal story about that. So I was living in Seattle up until 2020 during the pandemic. When the pandemic hit and Redfin announced that we were going remote, I was kind of considering whether I should stay in Seattle or not. But the thing that pushed me and my family over the edge to, like, get in our car and drive to Wisconsin was the smoke was coming in. I've lived in Seattle for four summers and three out of four summers there were smoke events so bad that you couldn't go outside and breathe the air. And I had young children, a newborn and a two-year-old at the time, and we were just kind of fed up.

So we decided to drive to avoid the smoke to my husband's family in Wisconsin. And then once we got there, we never left. So for me, it was like the thing that tipped me over was just that because I hate the smoke, it's just so brutal. It really wears on you, and I just couldn't do it anymore.

Jenny Schuetz: And that's one of the, it's related to wildfires, but it's a much broader area, right. So you don't have to be worried that your house is going to catch on fire if there's a fire, you know, 200, 300 miles away and you're smelling the smoke, that still affects your quality of life.

Daryl Fairweather: Absolutely.

Sam Khater: So I am extremely concerned about the chronic risk, especially drought. If you look at the total amount of damages in dollars over the last 20 years in terms of climate risk, about 1.8 trillion, 1 trillion of that is due to hurricanes, second biggest, wildfires and floods are about 300 billion and they don't get nearly the amount of attention, there's a new research article in a journal, nature, in a nature journal that claims that the drought in the South, particularly concentrate in the Southwest, is the worst in the last 1200 years.

I've got a little bit of a personal story. I got family down in eastern New Mexico, pretty rural area, about an hour and a half west of El Paso. This is by far the number one story in that area. But this will never make it on the national news because this is like small town America, right, kind of, you know, rural, rural America. But when you go down there, I've crossed the Rio Grande there, which is

kind of the big river down there. It ain't a Rio and it ain't so grand. It's dry. People go four wheeling on and there's, it's, it's bone dry.

And so we've raised this internally. We've started to do initial, some initial work. We actually got a working paper that's already standing up, it's not yet ready for primetime where we take a look at our purchase applications data, and we take a look at the fires. You know, there were several fires, five of the worst of fires in the history of California have occurred in the last five years. And the non-renewal notices for fire insurance have increased by 40% after these fires and they've remained elevated. And so we decided to do an event study where we look at when these non-renewals occur, do people move out of these areas? And the short answer is yes. For every increase, one percentage point increase in non-renewals for fire insurance, the move out rate increases by 3%.

So early-stage work related to fires, I've raised the flag on, on, on you know, on drought. The biggest issue I'm worried about is the water supply. Colorado feeds about 40 million people. Lake Mead and Lake Powell, two biggest lakes are fairly low. You have all these kind of downstream effects. So you have a third of hydro or renewable energy is from hydro. And these two lakes are close to not being able to support renewable hydro energy anymore. And so this is a major concern. It has no precedent I can think of in the housing front, and I have a hard time thinking about it and it feels like it's one of these very low probability, but it's increasing but very high severity, right? You just suddenly just you shut off, right? And so this is a major issue.

Jenny Schuetz: But also, it's a couple steps removed. So people are aware that there are hurricanes, that there might be wildfires. The idea that your water supply, your town's water supply might not be there, or you might have restrictions. I think most people don't think that far ahead and don't process what that means for their choices.

Sam Khater: Yeah, I mean, I think that the visuals of the hurricane, I get it. And the drought is sort of it's kind of a slow motion, sort of like a glacier, right or wrong climate metaphor. But you kind of get the get, get the picture. I'm sorry. Daryl.

Daryl Fairweather: Oh, no and you mentioned earlier that people are moving to places where they're paying about $600 less in their housing costs. But I don't think people are able to foresee how their water bill might change. And that could be a very high expense in a place that is losing water.

Sam Khater: And our behavior is making it worse because these are the fastest growing areas, A, B, investors are paying attention. So some private equity and some foreign investors, they're

going out there and they're buying land have access to water, they're buying up water utilities. So this is sort of an intersection and confluence of a multitude of sort of factors that could make this worse.

Jenny Schuetz: So I'm going to ask you one more question, then throw it open to our audience so those of you in person start thinking about your questions and you'll be able to raise your hand, a microphone will come to you. Our online audience, if you want to email us at events at Brookings dot edu or you can tweet at us that's at Brookings Metro using the hashtag climate risk data.

So nice big open research question for you guys to think about. What are the gaps in our knowledge that are most important to fill? That can be either we're missing data on renters or there's something we don't know about how people use this data that would be really critical for knowing how to provide it. What are the questions that keep you awake at night that you think researchers ought to be focusing on that we really need to answer these critical policy questions.

Daryl Fairweather: The thing that I think is going to be the biggest challenge is the political economy of how one municipality negotiates with another municipality to mitigate these risks, because it's not just any localities problem. We saw this during the hurricane in New Jersey, that, you know, people were displaced, and they had to go to the next neighboring town and there wasn't housing for them there. They had housing was too expensive.

And if one if, say, if San Francisco doesn't up zone, the people have to leave for these forest fire areas. So there's a lot of externalities, a lot of stuff that needs to be kind of, I think, governed at a higher level than just the local government, because we know that local governments don't always act in the public's interest when it comes to their housing policies. And I'm sure the climate policy might be the same.

Jenny Schuetz: That is very diplomatically put.

Sam Khater: It's a collective action problem and economists have tools for that. But I'm not optimistic. I mean, think about, I think the way we phrased it Daryl is really nice. I think about the lack of supply and housing. And one of the metaphors I've been using is that if D.C. doesn't build enough, then these people are going to move into Arlington and that's going to displace some people out of Arlington into Fairfax and from Fairfax into [inaudible]. So it's like pollution.

Yet the no governments I'm aware of have sort of tackled this issue in a concerted way. And given that the housing supply issue, I mean, if you go, this has been an issue for decades and has not

been solved. So I'm not optimistic. But if you look at COVID, that's also a collective action problem as well. So it feels like we're facing more of these issues where we need to act in concert. And I feel like unless there are sticks or carrots imposed, it's not going to change.

Jenny Schuetz: That sounds about right. Luckily, our second panel is going to tackle the challenge of how governments can change their behavior, so they'll have all the solutions for that. Excellent. So ready to turn it over to audience questions now. So those of you who have questions, raise your hand. I see someone in the back if we can.

Audience Member: Hi, I am Karen Florine with Climate Central. Recently, we did an analysis of tax parcel property records that showed that 68, 648,000 properties are going to be at least partly below state title boundary levels which has significant potential implications for property taxes because people may not be all that interested in paying property, continuing to pay property taxes on, on land that is now no longer officially there is because it's below state boundary lines. Have, have either of you taken any, done any research or looked at the question of what happens in terms of eventual property tax receipts and how that could impact the same communities we're talking about facing these physical risks.

Sam Khater: The short answer is we've talked about buyouts quite a bit and not using the, the, you know, the data to identify particularly from a, invest, you know, big investors point of view, looking at if there are buyouts happening in areas where we own properties and that so that tells us something that municipalities see risk in areas where we might have exposure and we might be completely unaware of it. So I've been thinking about it that way, but less from a tax receipts perspective. I have to think about that some more. But that's the one angle that we've been thinking about it.

Daryl Fairweather: Just on that general topic, one of the reasons it's important to get this information out in front of people now as opposed to waiting for people to figure out on their own, is that the hope is that the, the risk gets capitalized into the into the price of the home. Because you don't want a situation like during the last housing crisis where home values really suddenly drop, and we know from that that when home values drop and people are underwater on their mortgages, they stop paying their mortgages or they're more likely to, possibly property tax as well. So hopefully, if the value of the home goes or reflects the risk, then we will see people continuing to pay their mortgages and property taxes as opposed to if the value drops suddenly, then they might stop.

Sam Khater: I'll add one other piece we have been talking about looking at it from a different angle, which is sort of municipal rates, sort of we're looking for a, or I've been interested in sort of market indicators of risks. So looking at sort of municipal finance, financing spreads. And there have been some work that shows in areas over the last ten years that have exposure to sea level rise, their spreads rise by about ten percentage points. So we've been thinking about trying to look into that. And because it's a complete, given that property taxes are the majority of incomes for municipalities, at least to my knowledge, there's a relationship between the two.

Jenny Schuetz: We might have to circle back at some point and do a whole other conversation about property taxes and the impacts on local revenues and what they're going to do with services.

Audience Member: Hi, thanks for doing this. I'm Tom Frank with E&E news. I have a question about flood disclosure. The Federal Emergency Management Agency has indicated that it's considering requiring municipalities or states to have flood disclosure policies during real estate sales, and they'd probably do this as a condition of NFIP membership. My question is, do you think that FEMA should require states and municipalities, communities to have flood disclosure policies during real estate sales, some states have, but a lot like Florida don't.

Daryl Fairweather: I would personally love that. One of the challenges that we have is that this kind of information is not captured in the listing remarks, like there's no obligation to reveal flood risk or climate risks. And because of that, we don't have good data on it. If we, if that data was required, then we could present it and we could summarize it for our Redfin users in a much more usable way. But right now we're just kind of at a loss because sometimes it's disclosed, sometimes it's not. If it was more uniform, that would be great.

Sam Khater: So I can't make specific comments about policy proposals given the entity I work for. However, I will say many of these areas are under-insured and I think consumers would benefit from having that information. I don't think anyone would sort of argue with that.

Jenny Schuetz: And I'm going to throw out there that we shouldn't just require this to be disclosed to potential homebuyers who are purchasing that there should be an equivalent form for renters, so before you sign a lease on an apartment, you ought to know the climate risk of the apartment you're moving into.

Sam Khater: I'll make one other just comment and one thing we should think about if we do mandate any of these items to think about the affordability, right. And so because they get capitalized into and the prices. So that is an angle we should all, you know, kind of the equity angle is something we should be thinking about.

Audience Member: Yeah. Hi, thank you. It picks up on the question you asked earlier about financing incentives. And so, Sam, I'm wondering, I'm Anne Para with Public Citizen. I'm wondering about the extent to which the climate risk data you're describing here today informs decision by the government sponsored enterprises by Fannie and Freddie to purchase mortgages. As you know, it provides incentives for banks obviously, if you're sending a signal one way or the other. Thanks.

Sam Khater: Sure. So, you know, right now we, so every Freddie Mac funded loan in a flood zone is mandated to get the policy and we check annually. And if they do not, then we ask the bank to buy it back. So it's in kind of everyone's incentive. So that's sort of one layer of risk protection, we've got of 50% of our book, the LTV is only 50%. So there's a lot of cushion for homebuyers.

The, we are the kind of research and policy setting framework stage internally. We have a charter, one of the benefits of being a big GSE is we have the benefits of a charter, but we have a responsibility to be in all markets all the time, including in a counter-cyclical fashion. So when events happen, negative event, events happen and the private market steps out, you have the GSEs there willing to take on the risk. And so there's a little bit of tension between the, the two. And I think we're kind of in the stage of trying to understand the risk and eventual downstream policy kind of framework that we provide in conjunction with working with our, our regulators and banks.

Jenny Schuetz: And I think we have a question from our online audience.

Karen Slachetka: We do, we have a Twitter question from Stuart Adams. He asks, how can the lending and appraisal process better recognize and reward climate informed hazard resistant construction?

Jenny Schuetz: That's a great question.

Daryl Fairweather: I much, I don't think that we're there yet until we have good data because it's hard to reward, to reward anything if you don't know the full information. I know that like in California, new construction is required to be more climate friendly, like with the solar panels and the fire resistance. And that may be factoring into the loans that, you know, you might get for construction

like that. But I honestly don't know enough about exactly how we price those mortgages to, you know, if it's being used. But, you know, as climate change gets worse, it might be more of a factor.

Sam Khater: Yeah, I'll jump in. New homes sell for about 25% more than existing homes. So I worry about, I think it makes sense, but I worry about the price implications. I'm more concerned about where construction activity is occurring. A lot of the builders are just reacting to where people are moving to. And Daryl's right, there's been a strong increase in the flow of migration into Florida, the Carolinas, especially South Carolina, South Carolina's red hot in terms of migration. So I worry about where we're building.

In addition to that, the issue that you bring up, I only bring up the price issue because if you look at first time homebuyers, half of our business is first time homebuyers, when you look at when you break it up for new homes, it's much lower. So there are clear affordability issues in new homes. And so, yes, it does make sense. But I think about, I worry about the affordability issues.

Daryl Fairweather: I'm just going to add one more thing on that. I think it's good to be really humble about how much we know, too. I mean, we don't want to incentivize people to say move to Wisconsin where I live because we think Wisconsin is safe. But then, you know, climate patterns change. Maybe there are some risks there that we don't know about and we're incentivizing something that we don't want to be incentivizing.

So that's why I'm a little bit cautious to really go gung-ho on, you know, encouraging people to build in certain areas unless we, we feel really confident that a place is risky. I think maybe more sticks than carrots would work at this point because we don't really know where the carrots should be.

Jenny Schuetz: Yeah, and picking up on Sam's point about the age of the housing, I mean, we know that newer homes are built to current building codes. You know, for instance, like new, new homes in California all have to be up to current seismic codes. So in general, new homes are safer as well as more energy efficient. But the vast majority of people don't live in new homes, right. And this is particularly an issue that older homes are cheaper, low-income people, low-income communities are likely to have older, less safe homes, and many of them are in some of the most climate vulnerable communities.

And one of the things that keeps me up at night is that we don't have a plan to climate harden older homes in vulnerable places, nor do we have a plan to move people out of those places to safer locations and safer homes. And that's something that we probably can't do with regulation, there's

going to have to be actual money. And I don't, I don't feel a lot of optimism that Congress is going to pay to relocate people to safer places any time soon.

Sam Khater: It sounds like the next symposium.

Jenny Schuetz: Did we have more?

Karen Slachetka: If we can ask and answer this quickly, I'll allow one more.

Audience Member: Quick. Okay. I like what you said about what are we doing about people living in, you know, homes right now? I spent, what, two months every ten years buying a house? So what am I going to do for the rest of the nine and a half years. I lived in Seattle during the smoke, by the way, I don't believe people moving from Boston to Worcester. My son's in Worcester, no one's living there. But what research is going on about what to do for hardening, fixing existing homes?

Look at all these thousands of homes right here, right. Not talking about the ones that are being built out there in Arlington. We're talking about the homes here that people are living in every day. What research is being done to make them more resilient to climate risk, to make localized data down to the street level so that people can decide whether they need to change their HVAC systems, need to put in outside dampers, need to put in AC. What sort of research is being done, not at the policy level for, you know, events that happen every ten years in someone's life. But the events that are happening this week, next week, and are going to be covering me for the next nine years.

Jenny Schuetz: I'll say from economists, the answer is not very much. Unfortunately, there hasn't been a lot of focus on the existing stock. There's more work on the architecture side, civil engineering, thinking about that, but getting the information to people. What are the risks for your house? What are the most effective and cost-effective things that you can do to your existing house? There is a giant gap in our, in our public knowledge and certainly in our public communications. So that's a great point. Those were fantastic questions. Thank you all for, for joining in. Let's have a round of applause for our first panel and then we'll switch over.

Adie Tomer: All right. Good afternoon, everyone. First of all, I want to thank the last panel for showing so much interest in Florida, not mentioning bath salts or Florida man. So as a Floridian, I really appreciate your genuine interest in my home state. My name is Adie Tomer, I lead a bunch of our infrastructure work here at the Brookings Metro program. So thank you all for spending time with us talking about this really, really important topic. In just a second, I'm going to introduce two of our esteemed and already known federal friends who are doing just incredible work here. And as Jenny

alluded to, I think you're going to hear a little bit of a different focus on the topic from the infrastructure perspective. And there was a bunch of ways we could go with this, but I kind of want to set a really quick the context for the conversation today.

The, our infrastructure in general in the United States, we know that it's under threat and that we have significant investment needs. So we're going to focus quite a bit today on our transportation and generally speaking, our water, physical water systems. Natural environmental solutions will be part of the conversation too. But those two physical asset systems, they're valued at north of $6 trillion. So there's a ton of physical stuff. It has real financial value. And therefore, it's not a surprise too as we see an increase in both extreme weather events, chronic risks, that those losses have gone up over time. I could spend considerable time here referencing some of them.

In one of the most recent or the most recent National Climate Assessment, which is the newest one, is almost done, so we'll get updated numbers here, by 2050, 1.2 to $1.4 billion in annual damages to bridges could come from just inland flooding. We have hundreds of billions of dollars in physical water system upgrades that are necessary and as important and you'll hear more about it as the IIJA was, that's and that's only over five years, but we have to continue that effort over time. So there's real investment needs here.

But at the same time, some ways, sometimes the numbers are so absurd. So the way I like to think about it is those visual lessons that I think resonate with many of us who probably work in this space. But I mean, kind of the, the people we share homes with, right, who are just watching the news. It's seen what happened in Jackson, Mississippi, Right, when people can't actually drink their water, right. And of course, we had it before in Flint. But in many ways, what Jackson's is related to climate in a different way. It's seeing what happened to the bridge that collapsed outside of Fort Myers, right. Again, just less than 50 miles basically from where I grew up. I mean, it's astonishing, right? People basically trapped on an island, you know, due to an extreme weather event. It's what's happened in California that which was parched for water. And, and there's reasons that happened, but seeing literally fresh water fall from the sky and it cannot be captured as it goes back out to the ocean, these are all infrastructure related upgrades we need to make.

Now, that's all negative. And here's the flip, right, is I actually think we can have a really affirmative conversation here over the next portion of the event because there is so much promising stuff happening, especially out of Washington. So when Jenny and I were thinking about how to do

this event, well, we kind of landed on, on top of the fact that our federal friends are right here down the street so it's easy for them to make it, is that in many ways, the infrastructure conversation is coming out of Washington these days. It really is a big difference from where we've been for the last few years.

So I want to take some time to, to meet with our friends and have you all hear from them on some of the promising interventions happening in the climate space and how data is actually informing what they're doing. So with that, I'm going to introduce our colleagues here. So Victoria, Vicki Arroyo is the associate administrator for the Office of Policy at the EPA. Her work covers a range of topics, including climate economics, adaptation issues and community revitalization. Prior to joining the administration, Vicki served for 12 years as the executive director of Georgetown University's Climate Center. This is all shorthand for saying she knows her stuff.

Andrew Wishnia's the deputy Assistant Secretary for Climate Policy at U.S. D.O.T., or U.S. Department of Transportation. Much like Vicki, his work allows Andrew and his colleagues to touch on the major environmental issues facing our nation's transportation networks and how those networks in turn, impact the environment. Prior to U.S. DOT, Andrew worked at the US Senate's Environment and Public Works Committee, a stint with within FHWA, CEQ, too. Again, this is all shorthand for Andrew knows his stuff. Okay. So we are very fortunate to have them here with us today.

So here's where I want to start is I want to kind of talk about framing our country's infrastructure issues through a climate lens. And in both your personal views, but as much as you can also convey what's kind of going on in administrations, what do you hope to achieve with the historic funding that's been made available here, and how do we make sure that we can build resilience on infrastructure in the communities and across the environment? Maybe, Vicki, we can start with you.

Vicki Arroyo: Thank you, Adie, for having me and thank you, Brookings. And thank you all for being here in the audience. And I want to start out on a different topic, but I'm also grateful to Brookings, especially with Valentine's Day being yesterday, I have to say I met my husband of many years now in this room at a Brookings-Pew Center event. So before I worked for the Georgetown Climate Center, I was at the Pew Center on Global Climate Change, and we did a joint event with Brookings. So for those of you who took the time to be here in person, it might be really worth it to you to stop and visit a little bit after the talk. Just saying this might be the only thing you remember from this panel, and that would be great if it works out as well.

Vicki Arroyo: That is I think the most lovely story that's ever been told at Brookings. That is awesome.

Vicki Arroyo: And last night on our romantic Valentine's Day, we were cleaning up a flood in our basement, not from sea level rise or anything like that—.

Adie Tomer: Not so romantic.

Vicki Arroyo: Not that romantic, but our water heater gave out. So I guess that is an infrastructure issue, right? But anyway, so, you know, years later, that's what you do. But I think I want to start with that question with where President Biden took this in the State of the Union, which is how sad it is that our country has fallen to, what, 13th in infrastructure when we used to be first. And you think about the roads crackling and the bridges falling and the rails, you know, bending, especially with the heat that's to come from climate change and the water systems that we're working to replace lead pipes all these years later. I started my career right out of grad school, working at EPA, working on lead in the air program, but worked very closely with the water program that was trying to get the lead out. And here we are still trying to get the lead out of our drinking water, which obviously has long term damage to our, to our children.

So, you know, obviously, first and foremost, you know, now that we have Bill, as I call it, the infrastructure law that we were waiting for, all those infrastructure weeks for many, many years, you know, we have an opportunity, especially an administration, that really prioritizes things like climate change work, both mitigation and adaptation and environmental justice and equity considerations, to really spend that money in a way that's really intentional and that really tries to embed those values and the work that we're doing on climate and EJ into the spending of that money. So really proud to be part of that. And it's really exciting. Having been with Transportation Research Board as a volunteer for many years and seeing all the years that, you know, there was really a lot of hope about getting some funding for infrastructure in this country and it just fell short. The fact that we've got the resources that we're talking about is just mind blowing.

Vicki Arroyo: Yeah, that's great. Same question for you, Andrew.

Andrew Wishnia: And it's a great question. And like Vicki, Adie, Brookings thanks so much for, for having us. I don't have nearly as creative an anecdote as Vicki does, to start us off. But I will say, like Vicki, you know, my sense is that adaptation and mitigation, you know, do go hand in hand. Our transportation system either will be or is already vulnerable to extreme weather events, you know,

very susceptible to erosion, to sea level rise, to extreme weather events. You know, that's sort of the problem statement. And the good news is that we do have solutions for the first time potentially in a generation plus through the bipartisan Infrastructure Law and Inflation Reduction Act investments.

You know, right now, I'd say, according— and Vicki would know this best— according to EPA statistics, in 2019, about 33% of emissions came from the transportation sector alone. But the extraordinary fact of that statistic is that statistic doesn't include all of the other emissions that are part of the transportation sector. It doesn't include the manufacturing of materials, the transportation of materials, the excavation of materials. If you include industrial emissions, some of which are part of the transportation sector and you don't just look at use emissions, the 33% actually expands even further.

So we have an extraordinary challenge, an extraordinary challenge. But we also have a once in a generation opportunity to make a difference. And that's what we're trying to do, you know, both at EPA, at DOT, and across the administration. The good news is that, you know, through the bipartisan Infrastructure and Inflation Reduction Act, we now have tools in the toolkit. And we did create an overlay within the past couple of months. You know, in addition to EPA's leadership, DOE's leadership and HUD's leadership, the four agencies created the first ever transportation decarbonization blueprint. So this actually codified a long-standing relationship between and amongst the four agencies.

But just in terms of that market signalization, it's extraordinarily important to know that there is coordination happening across those four agencies to decarbonize our transportation sector consistent with the president's directions of 50% reduction by 2030 and net zero emissions by 2050. We can do this, we have tools to create options for Americans to have more efficient trips, you know, have more convenient trips and have more clean options in general. And we've detailed this through this 89-page blueprint, which provides optionality for folks, doesn't force anyone to do anything that that they wouldn't want to do.

But it does create options where those options currently don't exist, particularly in disadvantaged communities. So we think with those kind of overlays and working with State Departments of Transportation, working with localities, that we can provide that sort of leadership to significantly reduce emissions in accordance with the, the requirements that are in law.

Adie Tomer: It's great. Thank you for help, helping to set the stage. Obviously, today, data is kind of a central part of the conversation, so I want to make sure we touch on that, even though in the end of the day.

Vicki Arroyo: It's the most romantic part of the conversation since we're going to stay with that theme—.

Adie Tomer: No wonder you love Brookings so much. Yes. You know, look, in the end of the day, I think most folks probably in the room and streaming know this, right. But, you know, the federal government doesn't build much infrastructure, especially if it's not, you know, quite little a U.S. Army, not even to be, you know, whether Army Corps, elsewhere else or otherwise. Right. But the at the end of the day, though, the data, data is just as important to you all as other actors, too.

So I kind of want to frame a question this way. You know, what are, what are each of your agencies doing to expand your use of climate data overall? We've already heard from the first panel of the importance of flood maps. Those come from different agencies not here, so you don't need to speak for them, right. But, but how much are EPA, U.S. DOT, respectively thinking about both bringing in climate data and then putting that data to use in the various products that you have? That's the same question for both of you. So feel free.

Vicki Arroyo: I'll start. So years ago, I was really impressed being on the outside of EPA, that EPA and I think it might have even been in a Republican administration was starting to talk about the climate impacts to the water system in the Office of Water. So I really think of our Office of Water as a real leader, and they created a climate ready waters, water utilities initiative or CRWU for short that provides drinking water and wastewater and stormwater systems, as well as state and local government, some resources and help, including tools to really map what the risks might be.

That includes climate change projections and data, create, it's called I'm having a look at my notes because of that incident that I told you about last night where I didn't sleep very much because of the flood, the climate resilience evaluation and awareness toolkit, or create and some projection maps to evaluate potential impacts that the utilities are going to have so they can keep our water safe, which is great. And they offer workshops and training and technical assistance as well. So this has been going on for a while. And now with the kind of resources that we're talking about today, we can really ramp that up.

So just a few recent examples to kind of bring it home. In Maryland, since that's nearby, this month, CRWU helped cities like Cambridge, Crisfield and Chesapeake Beach conduct climate change risk assessments to better understand adaptive measures that they could take to avoid future flooding impacts that would affect their water systems. And that information is being shared with utilities across the state. So you kind of learn by doing from others. We're not going to have the resources to work in every community, but you can kind of like share the protocols with others and use this tool, create, to map it. In Traverse City, Michigan, CRWU supported Traverse City Utility with evaluating the climate resilience of projects to improve the waterfront storm water capacity under different climate scenarios and informed them making a case for a $2.7 million clean water state revolving fund investment around the Boardman River. So it shows that, you know, they're taking data and they're infusing climate consideration and making it more actionable.

Another tool that we use a lot at EPA and our communities often use is EJ Screen, very proud of that tool. It allows us internally to think about where are we going to target our outreach to communities that are often overburdened by pollution and underserved. We also look at it for our enforcement purposes and engagement around voluntary programs and geographic initiatives permitting and more. And many state and local governments rely on this because they don't have the resources to do their own EJ screens. So we're really proud that we've also infused climate considerations with our partners, with both within the agency and our federal government partners as well in, with climate change considerations overlaid now.

So we've added layers to include anticipated climate impacts including wildfire risk, drought, coastal floods, 100-year floods, etc. with the help of FEMA, who we were talking about earlier with the flood plain data and NOAA, sea level rise and drought considerations, which we were talking about earlier. And we're doing some training on those indicators. I'll just mention a couple of other ones really briefly, and we could talk more if people are interested. And I've got some people who could tell you even more. How's My Waterway is a cool app that can be used to visualize where identified water quality issues are in your backyard. You can put in your zip code or your street and get monitoring data on water, and you can prioritize your restoration efforts accordingly.

And our Office of Water is once again working on infusing climate-focused data in that, with the help of USGS looking at things like water and weather conditions and also algal bloom considerations with the help of NASA. We've also played a role in some of the federal family efforts

around the climate mapping for resilience and adaptation tool and the CEJS, the climate and economic justice screening tool, which is going to be very important for doing the justice 40 investments that are pledged in the huge amounts of money that's flowing now to advance that initiative. So our work on EJ has really informed that we're very proud of that.

And finally, I'll just mention something, it's really not a data tool per se, but because our earlier panel talked about how resilience has to be considered regionally because you're not just impacted and it stops at the border, there's a EPA regional resilience toolkit that I would recommend that people check out because it helps people think about this more holistically and work with regional partners.

Adie Tomer: So you haven't been sitting on your hands is what the EPA's saying here.

Vicki Arroyo: No, we've been busy. We've been really busy.

Adie Tomer: Okay, Andrew.

Andrew Wishnia: No, and Vicki and I also know each other from prior lives, and Vicki hasn't been sitting on her hands in prior life as well. Well, you know, one of the conversations I think that we had in your prior capacity was just kind of zooming out, you know, what's the definitional approach of like, what is the right kind of data input and how do you standardize that input? So in the bipartisan infrastructure law, we now have the first ever definition of resilience, which isn't like front page news, but is something I think that's extraordinarily important for engineers and folks on the ground to have the same definitional approach when they're collecting the right kinds of data.

You know, similarly, there's now an additional cost share incentive for resilience planning. You know, folks want to get the right kind of data. Now they have an incentive to do so. So rather than the traditional 80-20 split, now you can get a 90-10 split from the federal government if you do the right kind of resilience planning. You know, on your more specific question, DOT isn't necessarily like the progenitor of data, we don't develop a lot of our own data. We rely on, you know, the brilliant subject matter experts at EPA and NOAA and other federal agencies.

One specific, you know, illustrative example that comes to mind from your question, Adie, is the Atlas 14 precipitation data. And this is also a very sort of wonky, esoteric, but incredibly important. So Atlas 14 provides precipitation data across, across the country. As we move into what we want to move into, which is Atlas 15, we want to start monitoring precipitation data insofar as the climate change impacts of that precipitation. It so happens that the intensity of precipitation is creating circumstances where you have engineers that are building undersized structures as a result.

We need to fix those kinds of problems on the ground. So we're working with NOAA and other federal agencies to make sure that those kinds of datasets are updated so that we have the right kind of data to inform, you know, a rigorous evidence-based assessment of what kind of infrastructure needs to be built and where.

Adie Tomer: That's great. I want to ask you one, to stay on the data for a second, just because what I want to get to is Justice 40, just to give you a second for you both to think about it, not only is I think Justice 40 captured attention positive some negative depending on who you're talking to, right. But to speak it in an affirmative way from an analytical perspective, what's been so frankly, just again, as a researcher, I feel comfortable saying it's kind of like cool to see is like, thank you for putting out it, putting out that information in a mapping platform. Right.

So what have you all heard, what's been the reception to kind of demonstrating this kind of environmental justice approach, if you will, through a mapping platform? Obviously, E.J. screen does some similar stuff. In fact, some of the data, right, is completely congruent. But could you just riff a little bit on what's happening with, with Justice 40 in general and how has kind of been the data plus mapping side been impactful for your conversations across the country.

Andrew Wishnia: You know, Justice 40, for those in the room or online that they don't have the background and perhaps many of you do, this is an initiative spearheaded, you know, through the president's leadership, through executive order, one of the flagship climate executive orders in the first couple of weeks of the administration. And the, the provision on Justice 40 is that at least, at least 40% of benefits, you know, ought to go to disadvantaged, overburdened or underserved communities, you know, focus in on the word benefits. We're not necessarily talking about just funding per se, because it so happens that during the build out of the interstate system, a lot of disadvantaged communities were either bulldozed or had other intentional or, or unintentional marginalizations as a result.

So we are keenly focused on Justice 40 and making sure that, you know, as many programs are covered so that we're providing the right kinds of tools and infrastructure build out for those communities that have been left behind in the past. Currently, we have 39 covered Justice 40 programs within the Department of Transportation through the bipartisan infrastructure law. That number, you know, will obviously grow with the Inflation Reduction Act and with more learnings across all of our, our programs.

And then insofar as data is concerned, you know, it's enormously important to make sure that we have localized data to ensure that these investments are translating to those communities that have been left behind in the past. Just anecdotally, before coming here, I spoke a little bit this morning and our team has spoken over the course of the past 24 hours. At 5 a.m. this morning, the White House released the final standards for EV charging infrastructure. And you might not necessarily think that that's related, but it absolutely is, because now we have a glide path to have minimum standards for charging infrastructure.

We have a Buy America policy for charging infrastructure, and we have funding to actually install that charging infrastructure. You know, but a huge question is going to be where and in what circumstances will that charging infrastructure serve populations, particularly populations who so desperately need, you know, pollution reduction in their, in their neighborhoods. And that's where a lot of this, these data tools that Vicki, you know, has been talking about and that we're going to need to leverage going forward.

Adie Tomer: That's great. Thank you.

Vicki Arroyo: I'm glad that you gave that example, because one of the things that I did early before we knew about Bill and IRA was to ask, ask our Office of Community Revitalization to work with your folks and D.O.E. to make sure that the EV investments that were being made, which were small compared to what we are going to do now, were made with equity and environmental justice considerations in mind so that the people who have disproportionally been affected by pollution and will bear the burden of a lot of the climate impacts too like urban heat and worse air quality and things like that stand to benefit from the investment in electric school busses and transit busses and alternatives and multi-unit dwellings that have places to charge and that they also, importantly, for those of us who work on the other leg of the stool, the VMT side also are using that as a way to engage around their own priorities for what they want to see their transportation alternatives to be.

So we already got a head start on that, and we've announced some work that we're doing in my home state of Louisiana on that with communities and the clean cities coalitions from DOE to really engage them around their priorities in Gonzales, Louisiana and also a city in Minnesota. So that's just one little example. But a big thing that just got announced yesterday, I mean, this is what's so cool about these jobs now is like every day it's like my administrator just announced 27 billion with a B dollars yesterday, two competitions to distribute grant funding under the Greenhouse Gas

Reduction Fund, 20 billion for general and low income assistance, that competition will be one competition and the second will be a 7 billion zero emissions technology fund competition. And these will also have to be aligned with Justice 40.

So these tools that we're talking about that really try to make sure that these funds, at least 40%, are flowing for the benefit of not necessarily in the communities, but for the benefit of the communities that are disadvantaged, including those that are facing high, you know, burden of health impacts, often from redlining and the historic, you know, division of the cities by putting in infrastructure, like highways right through them. We can try to start addressing that.

And I'll just say to your question about Justice 40, you know, there was a lot of talk earlier about the limitations of not being able to use race per se. But, you know, a lot of the things that you can use in it are very much a proxy at the end of the day, you know, often because if you think about, you know, what redlining has done and where it's put people often in floodplains or in more polluted areas and things like that, you know, you see a mapping that looks frequently like our E.J. tool, which does include race and demographics and where they ended up with CEJS. And being from south Louisiana, I would just say that it's really important when you're looking at these tools to discern what to do about that investment and where the investment should go.

So for example, because a lot of areas that are going to be vulnerable to the kind of flooding that we heard from our partners earlier, does that mean that it makes sense to keep putting people back in the same place in the same way? I mean, as a person whose own family lost their homes in Katrina, I would say no. You know, so, so like, we should do it for the benefit of those communities.

But it might not be that that investment is going specifically in the same place, but it might be helping some of the communities who choose to do so, get some support to move to a higher, safer place inland, for example, which is already happening with some of the indigenous and indigenous tribes in south Louisiana. So that's just one caution, I would say, about mapping tools. I don't think people can like just use them and say this map means that the money is going to flow exactly there and put people back where they were in the same way. We really ought to use it smarter than that.

Adie Tomer: Yeah, that's, I think it's a great transition. I want to ask one more question, but I want to kind of prepare everyone in the room if you want to get a question, we'll, as much time as Karen will let us answer that. I will try to push forward. And for everyone online, again, a quick reminder, it's events that's plural at Brookings dot edu or using the hashtag climate risk data on

Twitter. We will monitor that as well, as you heard in the last for the last panel, we are, in fact, monitoring it.

But I'm going to take, you know, dealer's choice here and get in, ask the last question. We're, we're talking a lot about both what the ambitions are and what this moment provides to you all, the power of data to make better decisions, not just data for its own sake. Let's transition to, to me what I thought you kind of naturally transitioned us to Vicki is the capacity at a local level, because that's really in the end of the day, what whatever agency we're talking about right now in any sector, right, that's what we're doing, right? We're empowering localities and you can include states in that, too. Right. But, but federally that federalist ladder are really helping it go.

Can you speak a little bit to how this moment is helping you all prepare capacity at the local level, whether it's using data to make better decisions, whether you're helping them understand what data there is, maybe it's in competitive grant making, hey, can you put in better data so we can help you with your competitive grant applications? This was a big deal I remember back in 2009 and ten in the early stages of the Tiger Grant program, which is now known as RAISE, right, I'm having to think which one is which, you know, to track the name. Maybe if you could speak to how you're working with local partners to build their capacity with data and in conjunction to data.

Vicki Arroyo: Sure. So in my last job for 12 years, I worked largely with the state and local governments on resilience and also climate mitigation, and saw both their drive to do better and to get the help they need to do better, but they often just don't have the capacity and the resources themselves, right? The in-house expertise and all of that. So I think whatever we can do to really make these tools accessible to them in a way that doesn't overwhelm them because one of the things that we would often hear on our toolkits that we had in my old job at Georgetown, which still exists and are out there, you know, like an adaptation clearinghouse called that, or Ark X, which we have an adaptation clearinghouse at the federal level and EPA is we don't necessarily need another toolkit.

We need people to help us, you know, from our perspective, like walk through what are the steps that we need to take as a urban sustainability director person or a water utility or whatever. So I do think, you know, really trying to curate the data in a way that really can help the fact that these people are often, you know, doing three jobs. I mean, especially when COVID came on, we found that a lot of the same people working on hazard mitigation for climate purposes, also became the COVID, I mean, like the pandemic coordinator. So you knew where the climate stuff stood after that.

So we've been doing even pre-Bill and IRA, some technical assistance that helps kind of connect the dots with the different funding streams and how to help braid those together so that in South Carolina, for example, a $160 million HUD grant on voluntary buyouts includes equity considerations. So we have some limited staff that do that. But now we're really excited to announce in conjunction with D.O.T., that's been really a leader on this thriving community networks and a thriving community, technical assistance centers which are called tic tacs, which is easier to say.

And the idea is that people can come to these centers that people are actively competing for right now, so they haven't been announced yet. And then whether they're community groups or local governments that are strapped for resources, they can really help get walked through, these are the different programs, we can help you with our DOT colleagues to kind of braid some of these applications together and really, you know, leverage the resources that you have to try to get more federal money in the door. Because what we hear is that, you know, even just identifying the opportunities that you're eligible for and applying for them is kind of overwhelming at this point.

And I can get it because like our budget, we get, our budget is much less than this, but we now have $100 billion or more actually between Bill and IRA. And our normal budget is much lower than that. So we're all kind of trying to figure out how do we ramp up in a smart way, in an efficient way, and how do we help make sure that that local community and the community groups themselves are getting the support they need to really be a part of this and not feel so overwhelmed? So I think the tic tacs are one good example.

Andrew Wishnia: That's such a good example. Yeah. Maria Zimmerman on our team is sort of the leader of the thriving communities partnership and she's just a fantastic resource, so happy to make those connections as those folks see appropriate. You know, the only other thing I can think of is that the bipartisan infrastructure law, I think, changed sort of the equation with respect to the power centers of where the funding is going.

You know, historically, the vast majority of funding went to state departments of transportation, and that still is the case to, to, to a large extent, a lot of the funding does go to state DoTs. But the way that bill sort of augmented eligibility is that it created for the first time in many pots where those pots didn't exist, eligibility for localities, for tribes, for metropolitan planning organizations. And that's not a small thing, because when you're looking at pre-development, when you're looking at, you know, that we're kind of planning to get the right kinds of data to build projects, it's incredibly

important for localities to have eligibility for those kinds of data inputs so that they can actually then, you know, construct projects to improve their communities without those kinds of eligibilities, they're, they're stuck in this cycle of not being able to have the right kinds of data and resourcing to, to, to capitalize projects appropriately.

So again, the bipartisan infrastructure law just provides us enormous opportunity, and it just gives us another opportunity to underscore the importance of leveraging, you know, this infrastructure law in ways that can benefit communities across the country to make them safer, cleaner, you know, more resilient. And we have the opportunity to do that. It's going to take all of us, and that's where we're committed to do.

Adie Tomer: Okay. That was great. I'm trying to negotiate with Karen in real time and, and I'm getting one question. So, so would you both be able to stick around even for a minute? I know you got a call soon after this, but come, come rush the stage after, you can ask—.

Vicki Arroyo: This is on behalf of the webcast audience.

Adie Tomer: And then it's off the record, too, by the way.

Karen Slachetka: One of the email questions from Elizabeth—.

Adie Tomer: Oh, you have one. Let's go for it.

Karen Slachetka: Elizabeth Forbes Wallace asks, in the D.C. area, we talk about smart growth, that is a push to build near public transportation as one strategy. But what about climate risk on public transportation and an effect on housing choices and prices? Do your maps highlight that as well?

Vicki Arroyo: That's a great question. I think MTA's do, right? I mean, New York and New Jersey and some of these places that have really suffered from storms like Superstorm Sandy, I think have learned a lot about the risk. I think historically it's been hard to spend the money differently. And I think the D.O.T. in particular has done a good job of saying you can consider climate projections and spend a little bit more money to build the culverts wider, to carry more water through or to build your transit hire or whatever. So I'll let Andrew answer because he's got some good examples, I'm sure from transportation.

Andrew Wishnia: No. And just to that point, in all of our discretionary grants, where appropriate and applicable, you know, we are building in resilience and climate considerations across the board, and that includes climate considerations to ensure, for example, that, you know, sea level

rise isn't impacting projects. And, you know, toward that end, not just at DOT, but sort of across the interagency, we're having a conversation about the FFRMS, the federal flood risk management standards, and making sure that we're not, you know, that we're being good stewards of taxpayer dollars. And, you know, part of that equation is making sure that we're working with the entire interagency.

You know, it's extremely important as part of this new paradigm, this, you know, whole of government approach to be working with EPA and all of our friends across sort of the transport, the broader transportation ecosystem to be, you know, thinking about how these projects are, are being impacted by the, by the effects of climate change. That's something that we're endeavoring to do under this blueprint that we just released and something that we're, you know, going to be thinking about as part of, you know, regulations, orders and new policy going forward.

Adie Tomer: I'm going, to wrap us up I'm going to borrow a phrase you just used, Andrew. So, I mean, what I'm constantly impressed by hearing from all the administration folks, depending on what agency they're working on, that this whole of government is really coming through, both working across agencies in Washington, but critically trying to reach folks at a state and local level. Part of that is because Congress has given you so much money to work with. So, I mean, you kind of have to. Right.

But I think critically, the data conversation that we've had today shows that it is something to help that whole of government approach actually deliver what it's on promise to. So thank you for sharing so many original details that even for me to hear about of so much going on, hope you all get a little rest at some point here. There's a lot of work on your hands. On behalf of Jenny and our team, thank you for all four sets of, or all four total panelists, both sets. And thank you to everyone for joining us today.