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Chair Castor, Ranking Member Graves, and members of the Select Committee, thank you for the opportunity to testify today on this important issue.

My name is Jisung Park, and I am a professor at the University of California Los Angeles. Given my training as a PhD economist, my job is mainly to describe economic data and its implications for our understanding of the issue, not to make political statements. Indeed, the bulk of my testimony will focus on what we can learn about the intersection of climate, environmental justice, and economic inequality by looking carefully at economic data.

Summary

The country has just seen two record heat waves in the West, with a third in progress now. We are just now beginning to learn the full extent of the costs of heat: in human lives, diminished livelihoods, and increased instability. What my research shows in particular is how the costs and burdens of heat fall unequally, in ways that have not been previously measured.

New work by my colleagues and me shows heat to be a much more serious problem than previously understood. Using data from over 11 million worker's compensation claims, we find that heat increases workplace injuries significantly, likely causing tens of thousands of workplace injuries per year in California alone.

Because many of these injuries are not officially tagged as being caused by heat, official statistics may significantly under-estimate the magnitude of heat's effects. We find that hotter temperature increases injuries even in many indoor environments, including manufacturing and warehousing, implying that many more workers might be exposed to climate risk than previously understood.

The effects of heat fall disproportionately on low-income workers, who are more likely to work in more dangerous industries and to live and work in already hotter places. Heat also reduces the rate of learning and human capital formation more for under-represented racial minorities and low income communities, which means climate change may exacerbate recent trends in economic inequality.

These and other often hidden impacts suggest that the distribution of heat burdens needs policy attention, alongside continued efforts to reduce greenhouse gas emissions and the ongoing rise of global temperatures. While many important data gaps remain, acting to reduce emissions now may have inequality reducing benefits previously unappreciated. However, even if we are successful at reducing emissions, there is likely an urgent need for more coordinated adaptation and resilience policy.

1. The Economic Costs of Climate Change

Numerous studies show that climate change could cost the US economy several trillions of dollars in damages within the next 2 to 3 decades, and possibly tens of trillions by the end of this century.[1] Given the interconnectedness of global supply chains and financial markets, climate shocks may already be affecting companies' profits and putting individual wealth at risk in ways that markets have not fully accounted for.[2]

My understanding is that the committee has heard from my economist colleague Professor Michael Greenstone in a previous hearing regarding the aggregate economic costs of climate inaction and the social cost of carbon. In my testimony, I'd like to focus on the aspects of climate impacts that may be less familiar or front of mind, and which may inform our understanding of the interactions between climate policy and environmental justice.

2. Extreme Heat: A Thousand Tiny Cuts

Despite the public's greater familiarity with more visibly salient climate risks such as wildfires, hurricanes, and drought, recent research suggests that the stealthier and somewhat routine setbacks of a hotter climate may exact some of the largest costs, especially in the near term. My research provides new evidence that hotter temperature is already affecting the economy in profound and highly unequal ways, including direct physical injuries to workers and long-term effects on student achievement and learning.

Heat and Labor

For instance, consider the effect of heat on labor. We may all be familiar with the way hotter temperature – particularly in settings without adequate air conditioning – can affect our ability to concentrate and get our jobs done. But how often do those of us in this room think about the consequences of hotter temperature for our own health and safety?

New evidence suggests that extreme temperatures increase workplace safety risks significantly, especially for workers in baseline dangerous – often manual labor-intensive – occupations and industries. In research done by myself and colleagues at UCLA and Stanford, which will be published as a working paper next week, we find using data from over 11 million worker's compensation claims in California that hotter temperature increases workplace accidents and injuries substantially.[3] Working on a day with temperatures above 90°F leads to a 5 to 9 percent increase in same-day injury claims: a day above 100°F leads to a 10 to 15 percent increase.

Perhaps surprisingly, the vast majority of these excess claims are for injuries that are ostensibly unrelated to temperature: things like falling off a ladder or mishandling dangerous machinery. Also notable is the fact that, in addition to large effects in predominantly outdoor industries like construction, agriculture, and mining, heat leads to significant increases in injuries even in some indoor industries, including manufacturing, warehousing, and wholesale. This is important because over 24 million Americans work

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[1] Burke, Marshall, Solomon M. Hsiang, and Edward Miguel. "Global non-linear effect of temperature on economic production." *Nature* 527.7577 (2015): 235-239. Hsiang, Solomon, et al. "Estimating economic damage from climate change in the United States." *Science* 356.6345 (2017): 1362-1369. Burke, Marshall, W. Matthew Davis, and Noah S. Diffenbaugh. "Large potential reduction in economic damages under UN mitigation targets." *Nature* 557.7706 (2018): 549-553.

[2] Pankratz, Nora MC, and Christoph M. Schiller. "Climate change and adaptation in global supply-chain networks." *Available at SSRN* 3475416 (2019). Bakkensen, Laura A., and Lint Barrage. *Flood risk belief heterogeneity and coastal home price dynamics: Going under water?*. No. w23854. National Bureau of Economic Research, 2017. Global Financial Stability Report: Markets in the Time of COVID-19 (imf.org)

[3] Park, R. Jisung, Pankratz, Nora, and A. Patrick Behrer. "Temperature, Workplace Safety, and Labor Market Inequality" IZA Discussion Paper (2021).

in manufacturing, wholesale, and transportation and warehousing, which is over twice as many as work in agriculture, construction, and mining.[4]

These patterns are consistent with a recent study of Texas workers which finds that a day above 100°F increases injuries by over 8 percent[5], and with research that finds hotter temperature to adversely affect cognitive performance and decision-making in both outdoor and indoor environments.[6]

All told, we estimate hotter temperature currently causes upwards of 15,000 injuries per year in California alone. This compares to official estimates of workplace heat illnesses/injuries nationally on the order of 4,000 or fewer per year.[7] Official statistics rely on medical diagnoses, but it is often difficult to determine on a case-by-case basis whether heat was a contributing cause. The National Institute of Occupational Safety and Health (NIOSH) therefore notes that official statistics are likely to under-state true heat-related risks.[8] Our estimates utilize empirical methods that measure excess injuries caused by hotter temperature within a given zip code, and all worker compensation claims regardless of whether they are officially recognized as being heat-related, and are therefore likely paint a more comprehensive picture of heat-related workplace safety burdens than many previous studies.

In part because lower income workers tend to work in more dangerous occupations, and to live and work in places that experience more dangerous heat, they are at least 5 times more likely to be hurt on the job due to heat than high income (top quintile) workers.[9] Many of these workers have relatively low levels of formal education, and have seen stagnant or declining wage prospects in recent decades.

Workplace injuries not only have large direct health care costs, but lead to persistent wage impacts that affect injured workers' entire subsequent earnings trajectories. For instance, research shows workers injured on the job face a subsequent earnings penalty of 8% on average, and 30% for permanent disability. Serious injuries that require hospitalization can also raise recruiting, training, and insurance costs for employers, and can have ripple effects for society at large in the form of increased disability payments and greater risk of personal bankruptcies. Including both the direct medical costs and indirect costs such as time away from work, increased risk of layoff, future chronic health issues, and productivity spillovers, each workplace injury serious enough to be reported to worker's comp costs society nearly $50,000, which means that the total societal costs of injuries caused by heat is approximately $750 million per year in California alone.[10]

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[4] https://www.bls.gov/bls/industry.htm

[5] Dillender, Marcus. "Climate Change and Occupational Health Are There Limits to Our Ability to Adapt?." *Journal of Human Resources* 56.1 (2021): 184-224.

[6] Graff Zivin, Joshua, Solomon M. Hsiang, and Matthew Neidell. "Temperature and human capital in the short and long run." *Journal of the Association of Environmental and Resource Economists* 5.1 (2018): 77-105. Heyes, Anthony, and Soodeh Saberian. "Temperature and decisions: evidence from 207,000 court cases." *American Economic Journal: Applied Economics* 11.2 (2019): 238-65.

[7] For instance, the BLS reports 2,830 nonfatal occupational injuries and illnesses involving days away from work in 2015: https://www.bls.gov/opub/ted/2017/work-injuries-in-the-heat-in-2015.htm.

[8] For instance, in Jacklitsch et al. (2016): "Estimating the public health impact of extreme heat is difficult because hospitals and health care providers are not required to report heat-related illnesses, such as heat stroke and heat exhaustion, to public health agencies. In addition, heat-related deaths are often misclassified or unrecognized." Jacklitsch, Brenda L, W Jon Williams, Kristin Musolin, Aitor Coca, Jung-Hyun Kim, and Nina Turner (2016), "Occupational exposure to heat and hot environments: revised criteria 2016."

[9] Park, R. Jisung, Pankratz, Nora, and A. Patrick Behrer. "Temperature, Workplace Safety, and Labor Market Inequality" IZA Discussion Paper (2021). Dillender, Marcus. "Climate Change and Occupational Health Are There Limits to Our Ability to Adapt?." *Journal of Human Resources* 56.1 (2021): 184-224.

[10] Leigh, J Paul (2011), "Economic burden of occupational injury and illness in the united states." *The Milbank Quarterly*, 89, 728–772.

Heat and Learning

Another example of heat's hidden impacts is on learning and human capital formation. When we think of weather-related disruptions to schooling, we may typically think of snow days; "heat days" are certainly less common, or at least they have been historically.[11]

Work that I have done shows that students' cognitive performance declines significantly on hotter days. In a study of over 4 million high school exam records, I find that students taking an exam on a 90°F day are nearly 10 percent less likely to pass the exam, and subsequently less likely to graduate with a high school diploma.[12]

Hotter temperature may also reduce the rate of learning over time. In a study of approximately 12,000 schools across the U.S., colleagues at BU, Georgia State, and College Board and I find that a 2° Celsius (3.6°F) hotter-than-average year reduces learning by approximately 3 percent, with far larger effects for Black and Hispanic students, and which accumulate over time.[13]

Despite the fact that the US is among the most highly air-conditioned countries, a significant fraction of students appear to attend schools without working AC. Publicly available data on school AC is lacking nationally, but recent surveys suggest that many large urban districts do not have universal air conditioning. For instance, only 60 percent of classrooms in Philadelphia, 55 percent in Baltimore, and 17 percent in Milwaukee public schools are fully equipped with AC.[14] Importantly, in what was one of the first nationwide surveys of school air conditioning, we found that the quality of school infrastructure is highly correlated with income and race: schools with more under-represented minorities are less likely to have AC, even controlling for average climate.[15]

A growing body of evidence suggests that it may be these subtler impacts of climate change that cumulatively comprise the lion's share of economic costs. For instance, the mortality costs of heat alone may be larger than the combined costs of agricultural losses and sea-level rise. Even in the case of wildfires, evidence suggests that it may be the smoke that causes more collective suffering, simply spread more thinly across a wider base of individuals.[16]

3. Climate Change May Exacerbate Inequality

It is worth taking a step back to review the broader economic context in which these damages are occurring. Climate change hits us as a time of growing wage inequality, stagnant upward economic mobility, and longstanding racial gaps in wealth and the means to accumulate it: including notable gaps in educational achievement. Economic inequality between those with and without access to higher education has grown enormously, particularly since the 1990's. And while the promise of America is that every individual has a fair chance at success, persistent educational achievement gaps hamper upward economic mobility for many racial minorities. Even today, the average Black student scores three quarters of a

[11] This may be changing. https://www.nytimes.com/2018/09/06/nyregion/heat-day-schools-extreme-climate-change.html
[12] Park, R. Jisung. "Hot temperature and high stakes performance." *Journal of Human Resources* (2020).
[13] Park RJ, Goodman J, Hurwitz M, Smith J. Heat and learning. American Economic Journal: Economic Policy. 2020 May;12(2):306-9.
[14] https://www.the74million.org/article/exclusive-too-hot-to-learn-records-show-nearly-a-dozen-of-the-biggest-school-districts-lack-air-conditioning/
[15] Park RJ, Goodman J, Hurwitz M, Smith J. Heat and learning. American Economic Journal: Economic Policy. 2020 May;12(2):306-9.
[16] Carleton, Tamma A., et al. *Valuing the global mortality consequences of climate change accounting for adaptation costs and benefits*. No. w27599. National Bureau of Economic Research, 2020. Burke, Marshall, et al. "The changing risk and burden of wildfire in the United States." *Proceedings of the National Academy of Sciences* 118.2 (2021).

standard deviation below the average White student on measures of standardized achievement, roughly equivalent to 3 years of formal schooling.[17]

Emerging evidence suggests that the hidden costs of heat in particular may exacerbate underlying inequalities by race and income within the US. Not only will climate change exacerbate regional inequalities[18], differences in risks due to occupation or housing characteristics may lead to divergent impacts across individuals within districts, cities, and even households. For instance, we find that heat-related risks on the job are far greater for lower income workers within California, particularly younger men without a bachelor's degree. Similarly, in the case of students, we find that the effect of heat on learning is far more negative for Black and Hispanic minorities and students in lower income school districts. The effect of a day above 80°F is 2 to 3 times larger for Black and Hispanic students than whites.[19]

This has important implications for racial inequality and environmental justice. The hidden consequences of heat for workplace safety and health may imply that headline wage statistics understate the extent of total compensation inequality, which may be further exacerbated by climate change.[20] In the context of student achievement, we estimate that differences in the thermal environment in which learning occurs – including school and home air conditioning – contribute up to 7 percent of racial achievement gaps. The implication is that leveling the environmental playing field may close racial achievement gaps by a quarter of the total gains achieved over the previous 4 decades.

These are just two examples. Recent research shows that hotter temperature also increases violent crime at far higher rates in lower income neighborhoods[21], and that it also increases the likelihood of violence among the prison population[22], who often do not have access to air conditioning. Similarly, heat waves have been shown to significantly increase birth complications, at far greater rates for Black mothers than whites.[23]

Without remedial investments in climate mitigation and resiliency-enhancing infrastructure, climate change may further widen economic inequality and exacerbate racial gaps in health, learning, earnings, and wealth. The effects of climate on human capital inequality is particularly concerning given the growing importance of cognitive skills in the labor market, and the well-documented correlation between hotter local temperatures, income, and race.[24]

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[17] Autor, David H. "Skills, education, and the rise of earnings inequality among the "other 99 percent"." *Science* 344.6186 (2014): 843-851. Goldin, Claudia, and Lawrence F. Katz. "Extending the race between education and technology." *AEA Papers and Proceedings*. Vol. 110. 2020. Reardon, Sean F., et al. "Patterns and trends in racial academic achievement gaps among states, 1999-2011." *Unpublished Working Paper. Center for Education Policy Analysis, Stanford University* (2013).

[18] Hsiang, Solomon, et al. "Estimating economic damage from climate change in the United States." *Science* 356.6345 (2017): 1362-1369.

[19] Park, R. Jisung, A. Patrick Behrer, and Joshua Goodman. "Learning is inhibited by heat exposure, both internationally and within the United States." *Nature human behaviour* 5.1 (2021): 19-27. Park RJ, Goodman J, Hurwitz M, Smith J. Heat and learning. American Economic Journal: Economic Policy. 2020 May;12(2):306-9.

[20] Park, R. Jisung, Pankratz, Nora, and A. Patrick Behrer. "Temperature, Workplace Safety, and Labor Market Inequality" IZA Discussion Paper (2021).

[21] Heilmann, Kilian, Matthew E. Kahn, and Cheng Keat Tang. "The urban crime and heat gradient in high and low poverty areas." *Journal of Public Economics* 197 (2021): 104408. Behrer, A. Patrick, and Valentin Bolotnyy. "Heat, Crime, and Punishment." Stanford Hoover Working paper (2021).

[22] Mukherjee, Anita, and Nicholas Sanders. "The Causal Effect of Heat on Violence: Social Implications of Unmitigated Heat Among the Incarcerated." *NBER Working Paper* w28987 (2021).

[23] Kim, Jiyoon, Ajin Lee, and Maya Rossin-Slater. "What to Expect When It Gets Hotter: The Impacts of Prenatal Exposure to Extreme Temperature on Maternal Health." *American Journal of Health Economics* 7.3 (2021): 000-000.

[24] Albouy, David, et al. "Climate amenities, climate change, and American quality of life." *Journal of the Association of Environmental and Resource Economists* 3.1 (2016): 205-246. Hsu, Angel, et al. "Disproportionate exposure to urban heat island intensity across major US cities." *Nature communications* 12.1 (2021): 1-11.

4. Policy-Relevant Data Gaps Remain

The data I've presented here provide some early clues regarding the potential consequences of climate change for economic inequality and environmental justice: specifically, what economists refer to as the (progressive or regressive) distribution of climate damages. But research on the economics of climate inequality is still nascent, and many important data gaps remain. To start, better data collection on workplace climate risks seems critical.

However, beyond heat, it is still not generally known how climate risk from hurricanes, windstorms, or wildfires is distributed across individuals by income, race, or national origin within the US. Available cross-country evidence suggests that tornado exposure is actually more concentrated in rich countries, whereas hurricane and cyclone impacts are roughly evenly distributed across rich and poor countries.[25]

Even in cases where researchers have uncovered evidence of regressive damages, there are still important knowledge gaps regarding why these inequalities arise, and what can be done about them from a policy perspective. Not only is this potentially important for modeling future climate damages, is it arguably critical for designing effective adaptation policy.

Consider the effect of temperature on workers. It matters whether, in the face of repeated climate shocks, workers are able to effectively adapt: for instance, by switching industries, moving to cooler environments, or by communicating with employers about workplace risks and how best to reduce them. At the moment, there are more questions than answers. Are low income workers constrained in their job-switching or relocation decisions by limited access to credit? Does imperfect competition in the labor market – what economists call monopsony[26] – make it harder for workers to bargain for safer workplaces? How does the presence of unions affect workplace climate adaptation?

Having a better understanding of the causes of inequality in climate impacts will help policymakers understand where and how to target policy efforts – whether it involves addressing clear market failures like credit or information asymmetries, or simply providing targeted, means-tested transfers to lower income populations.

A related information gap relates to the effectiveness of existing social safety net programs in buffering climate shocks, particularly for vulnerable populations. While there is some evidence that automatic stabilizers such as unemployment insurance are effective in the wake of more salient disasters such as hurricanes[27], and that programs like means-tested home energy subsidies may be effective at blunting the harmful effects of heat waves for the poor[28], it is as yet unclear whether and how existing social safety net programs perform in the context of less salient shocks such as hotter temperature or smoke from wildfires. There is still much we do not yet know regarding the climate resilience benefits of existing or proposed programs, and how best to strike the delicate balance between building resilience while creating the right incentives for individuals, communities, and companies to adjust their behavior in ways that minimizes personal and economic harm.

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[25] Hsiang, Solomon, Paulina Oliva, and Reed Walker. "The distribution of environmental damages." *Review of Environmental Economics and Policy* 13.1 (2019): 83-103.

[26] https://obamawhitehouse.archives.gov/sites/default/files/page/files/20161025_monopsony_labor_mrkt_cea.pdf

[27] Deryugina, Tatyana. "The fiscal cost of hurricanes: Disaster aid versus social insurance." *American Economic Journal: Economic Policy* 9.3 (2017): 168-98.

[28] Cicala, Steve. *The Incidence of Extreme Economic Stress: Evidence from Utility Disconnections*. No. w28422. National Bureau of Economic Research, 2021.

5. The Potential for Inequality-Reducing Co-Benefits

I've provided preliminary evidence that, in the US, damages from hotter temperature are disproportionately felt by lower income communities and racial minorities. To the extent that such patterns hold generally, the implication would be that the benefits from climate mitigation – reducing greenhouse gases – may be progressive. That is, reducing emissions may be inequality-reducing, or at least lean against further widening of inequality due to climate change.

As noted above, it is worth being clear that there is much we do not yet know about the distribution of climate damages, and I caution against blanket statements about climate inequality as if it is a foregone conclusion. It's important that policymakers get this right. One can imagine a scenario in which funding is allocated for climate adaptation and resiliency projects that end up subsidizing the already relatively well off. Whether that's desirable is I think a question open for debate, but the point is that we certainly would want to have the facts right when engaging that discussion.

But there is another more immediate way in which addressing climate change could have outsized benefits for historically disadvantaged communities: the potential health, education, and productivity co-benefits of cleaning the air we breathe.

Studies now show that air pollution can have profound adverse consequences for health, cognitive performance, and economic opportunity: including effects on birth defects, student achievement, violent crime, worker productivity, and even the onset of dementia.[29] Once again, the effects are subtle but pervasive. For instance, students taking exams on a highly polluted day (AQI above 100) experience a negative effect on performance similar to or larger than the effect of a hot (90°F) day. Importantly, we know that local air pollution is highly correlated with income and race.

This means that, if designed properly, investments in clean energy, clean transportation, and other low-carbon infrastructure would not just slow climate change but could also reduce air pollution. Estimates suggest that if the U.S. were to reduce emissions in a manner consistent with our prior pledges under the Paris Accords, the resulting air quality improvements would save 300,000 premature deaths by 2030.[30]

Here, it is important to note that policies that increase the cost of energy have the potential to exact higher costs (as a proportion of expenditures) on lower income populations.[31] But recent analyses suggest that smart policy design – including targeted rebates – can overcome the potential regressivity of such policies. Similarly, while market-based policies bring the possibility of "environmental justice gaps", wherein shifting of emissions lead to greater concentration of existing pollution in lower-income neighborhoods, recent evidence suggests that these concerns can be addressed with smart policy design.[32]

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[29] Isen, Adam, Maya Rossin-Slater, and W. Reed Walker. "Every breath you take—every dollar you'll make: The long-term consequences of the clean air act of 1970." *Journal of Political Economy* 125.3 (2017): 848-902. Persico, Claudia L., and Joanna Venator. "The effects of local industrial pollution on students and schools." *Journal of Human Resources* 56.2 (2021): 406-445. Ebenstein, Avraham, Victor Lavy, and Sefi Roth. "The long-run economic consequences of high-stakes examinations: Evidence from transitory variation in pollution." *American Economic Journal: Applied Economics* 8.4 (2016): 36-65. Bishop, Kelly C., Jonathan D. Ketcham, and Nicolai V. Kuminoff. *Hazed and confused: the effect of air pollution on dementia*. No. w24970. National Bureau of Economic Research, 2018. Graff Zivin, Joshua, and Matthew Neidell. "The impact of pollution on worker productivity." *American Economic Review* 102.7 (2012): 3652-73. Colmer, Jonathan, and John Voorheis. "The grandkids aren't alright: the intergenerational effects of prenatal pollution exposure." (2020).

[30] Shindell, Drew T., Yunha Lee, and Greg Faluvegi. "Climate and health impacts of US emissions reductions consistent with 2 C." *Nature Climate Change* 6.5 (2016): 503.

[31] Pizer, William A., and Steven Sexton. "The distributional impacts of energy taxes." *Review of Environmental Economics and Policy* 13.1 (2019): 104-123.

[32] Hernandez-Cortes, Danae, and Kyle C. Meng. *Do environmental markets cause environmental injustice? Evidence from California's carbon market*. No. w27205. National Bureau of Economic Research, 2020. Shapiro, Joseph S., and Reed Walker. "Where is Pollution Moving?

So investing in climate mitigation and clean energy infrastructure may have both short and long term benefits that also address environmental justice concerns.

6. Proactive Climate Adaptation Policy

Even if we are successful at cutting emissions swiftly, a significant amount of warming will still be baked in to the climate system, at least over the next 2-4 decades. For instance, within many of our lifetimes, individuals in Tampa, FL will likely have experienced over 65 additional days *per year* above 90°F (by 2050), even with aggressive mitigation efforts. That number is approximately 36 days in Baton Rouge, LA, and 46 days in Birmingham, AL.[33]

This means that, in conjunction with aggressive decarbonization efforts ("mitigation"), policymakers may want to think proactively about climate resilience ("adaptation"). This is where the knowledge gaps I mentioned above present both a risk and an opportunity.

An analogy to the Covid-19 response may be instructive. In part because the timing of the crisis was so unpredictable, policy responses to its economic fallout were mostly reactive, and utilized relatively blunt policy instruments. Climate change is a slower-burning crisis with far greater predictability. And we have much more data to lean on, since many of the shocks in the near to medium term will not be qualitatively new – simply more frequent and stronger in intensity. This suggests that it may be possible to engage in more proactive responses that use precision policy tools.

Doing so may require significant investment in data collection, harmonization, and research into the specific market failures that may hamper climate adaptation, and in identifying key dimensions of vulnerability across individuals within the U.S. The Federal government is well-positioned to perform crucial coordination functions.

One possibility is for the Federal government to create a Climate Adaptation and Resiliency Agency[34], or an inter-agency working group similar to the one on the social cost of carbon, but aimed at better understanding the process of – and population-specific barriers to – effective climate adaptation. Such efforts may help provide policymakers with the information necessary to better target adaptation and resiliency investments so that they achieve policy objectives cost-effectively.

Thank you for the opportunity to share my views with the committee.

Environmental Markets and Environmental Justice." *AEA Papers and Proceedings*. Vol. 111. 2021. https://equitablegrowth.org/a-plan-for-equitable-climate-policy-in-the-united-states/

[33] http://www.impactlab.org/

[34] https://democracyjournal.org/arguments/a-moon-shot-for-climate-change/