NATIONAL ACADEMIES *Sciences Engineering Medicine*

# Roundtable on Macroeconomics and Climate-related Risks and Opportunities

Policy + Social Science Primers

JANUARY 2023

# Session 4:
# Policy + Social Science Primers



NATIONAL ACADEMIES *Sciences Engineering Medicine*

# Policy Pathways to Address Climate Change: Opportunities and Risks

*Rachel Cleetus*

*NAS Roundtable on Macroeconomics and Climate-related Risks and Opportunities*

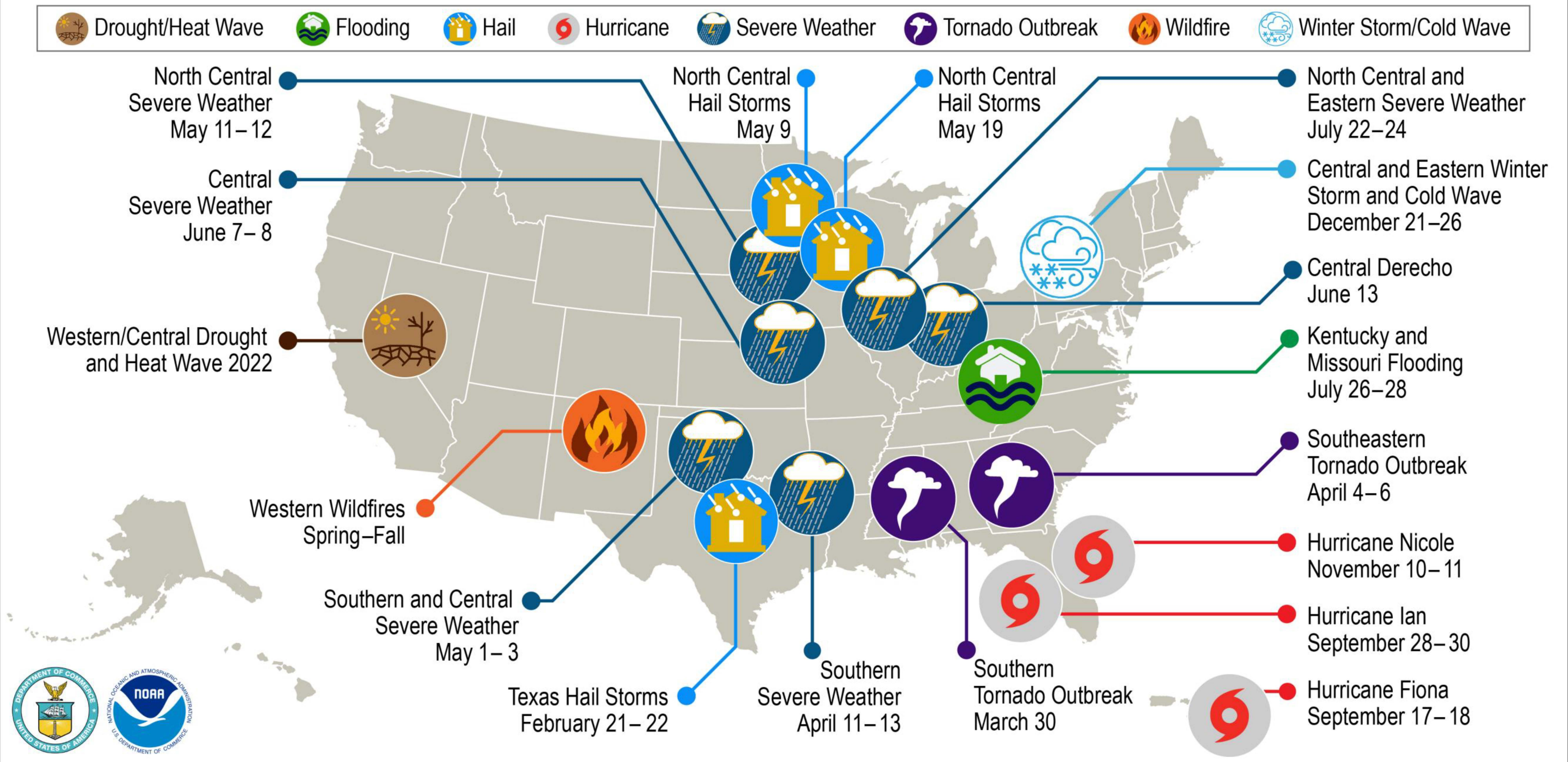
*January 23, 2023*

Union of Concerned Scientists

# Growing **Physical risks** from climate change

- Extreme events
- Slow-onset disasters
- Compounding and cascading impacts
- Potential tipping points
- Intersection with socioeconomic and racial inequities

# U.S. 2022 Billion-Dollar Weather and Climate Disasters

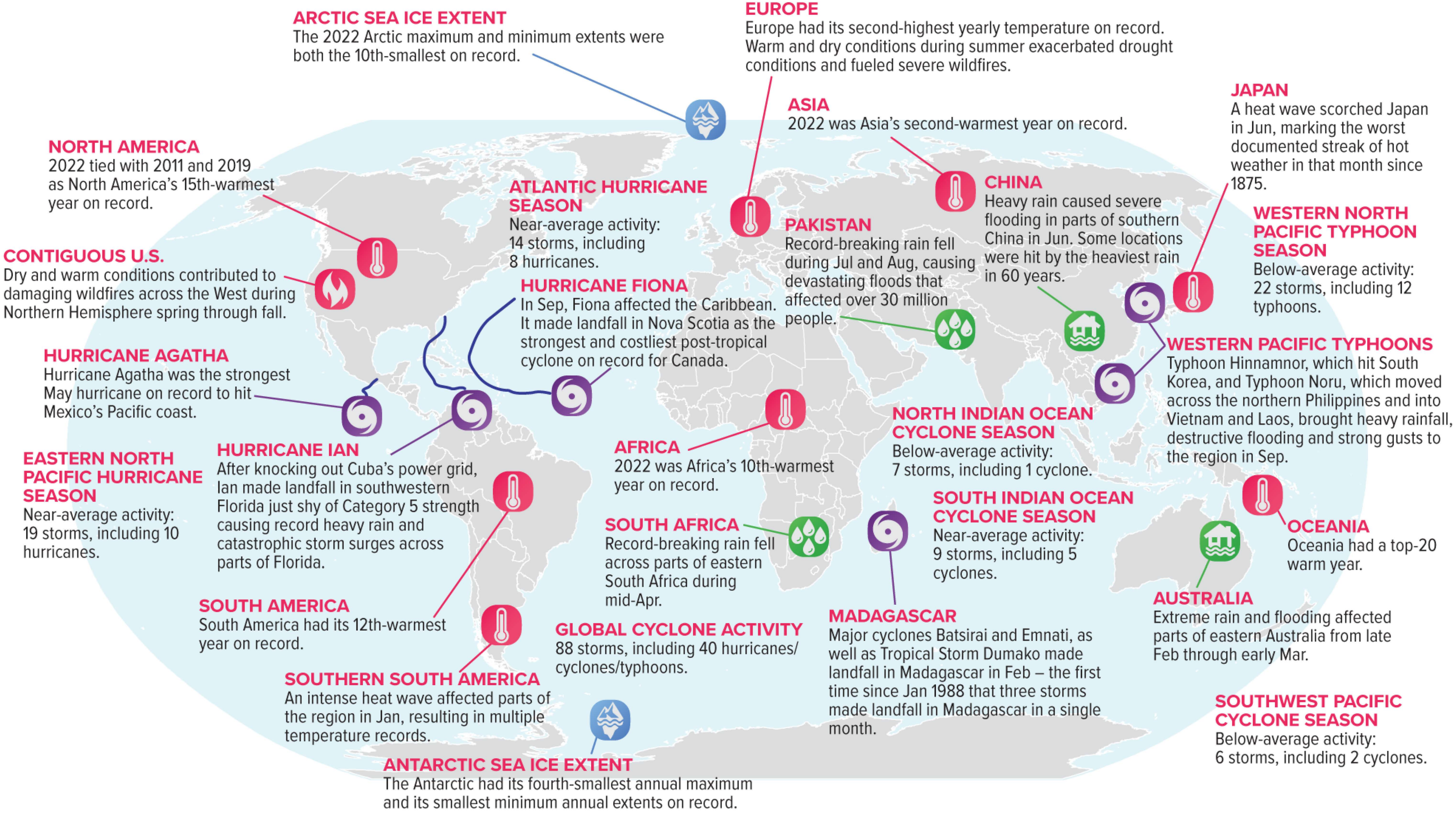



*This map denotes the approximate location for each of the **18 separate billion-dollar weather and climate disasters that impacted the United States in 2022.***

# Selected Significant Climate Anomalies and Events in 2022

**GLOBAL AVERAGE TEMPERATURE**

**The Jan-Dec 2022 average global surface temperature was the sixth highest since global records began in 1880.**




Please note: Material provided in this map was compiled from NOAA's State of the Climate Reports. For more information please visit: https://www.ncei.noaa.gov/access/monitoring/monthly-report/global/

Global Risks Report 2023

# Top 10 Risks

**"Please estimate the likely impact (severity) of the following risks over a 2-year and 10-year period"**

| | 2 years | 10 years |
|---|---|---|
| 1 | Cost of living crisis | Failure to mitigate climate change |
| 2 | Natural disasters and extreme weather events | Failure of climate-change adaption |
| 3 | Geoeconomic confrontation | Natural disasters and extreme weather events |
| 4 | Failure to mitigate climate change | Biodiversity loss and ecosystem collapse |
| 5 | Erosion of social cohesion and societal polarization | Large-scale involuntary migration |
| 6 | Large-scale environmental damage incidents | Natural resource crises |
| 7 | Failure of climate-change adaption | Erosion of social cohesion and societal polarization |
| 8 | Widespread cybercrime and cyber insecurity | Widespread cybercrime and cyber insecurity |
| 9 | Natural resource crises | Geoeconomic confrontation |
| 10 | Large-scale involuntary migration | Large-scale environmental damage incidents |

**Risk categories**

Economic · Environmental · Geopolitical · Societal · Technological

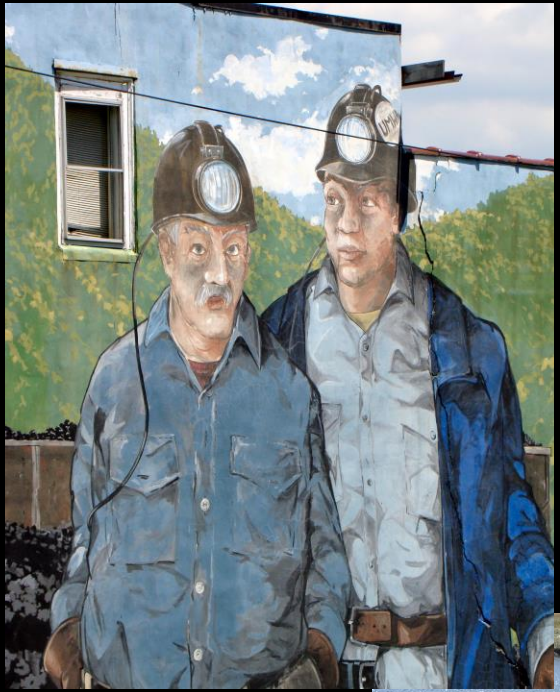
**Source:** World Economic Forum, Global Risks Perception Survey 2022-2023

# Transition risks (and opportunities)

- Decreased demand for carbon-intensive products and practices
- Increased demand for low-carbon, sustainable products and practices
- Reputational risks, including related to “greenwashing”
- Legal liability

# Just & Equitable Clean Energy Transition

- Robust policies and investments to drive a transformative shift to clean energy
- Anticipatory investments in fossil-dependent workers and communities
- Investments in domestic clean energy manufacturing and supply chains
- Clean-up of legacy pollution in EJ communities



# Robust Climate Risk Disclosure

- Helps correct a major market failure and helps address systemic risks to the financial system, investors and communities

- Mandatory climate risk disclosure—transparent, uniform disclosure of Scope 1, 2 and 3 emissions as well as climate risks, based on the best available science

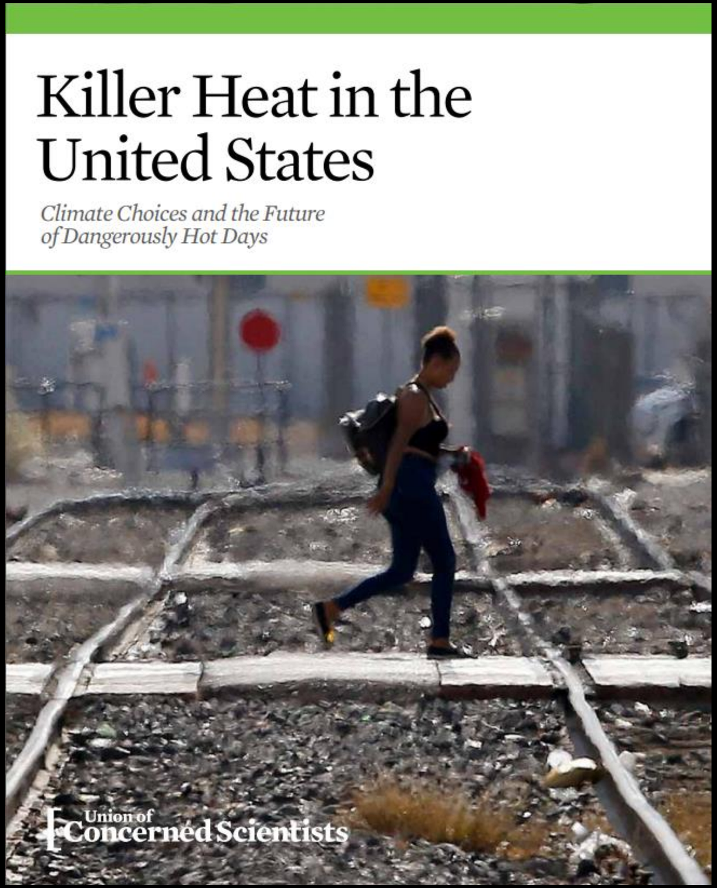
- Coordinated and comprehensive approach—international to national

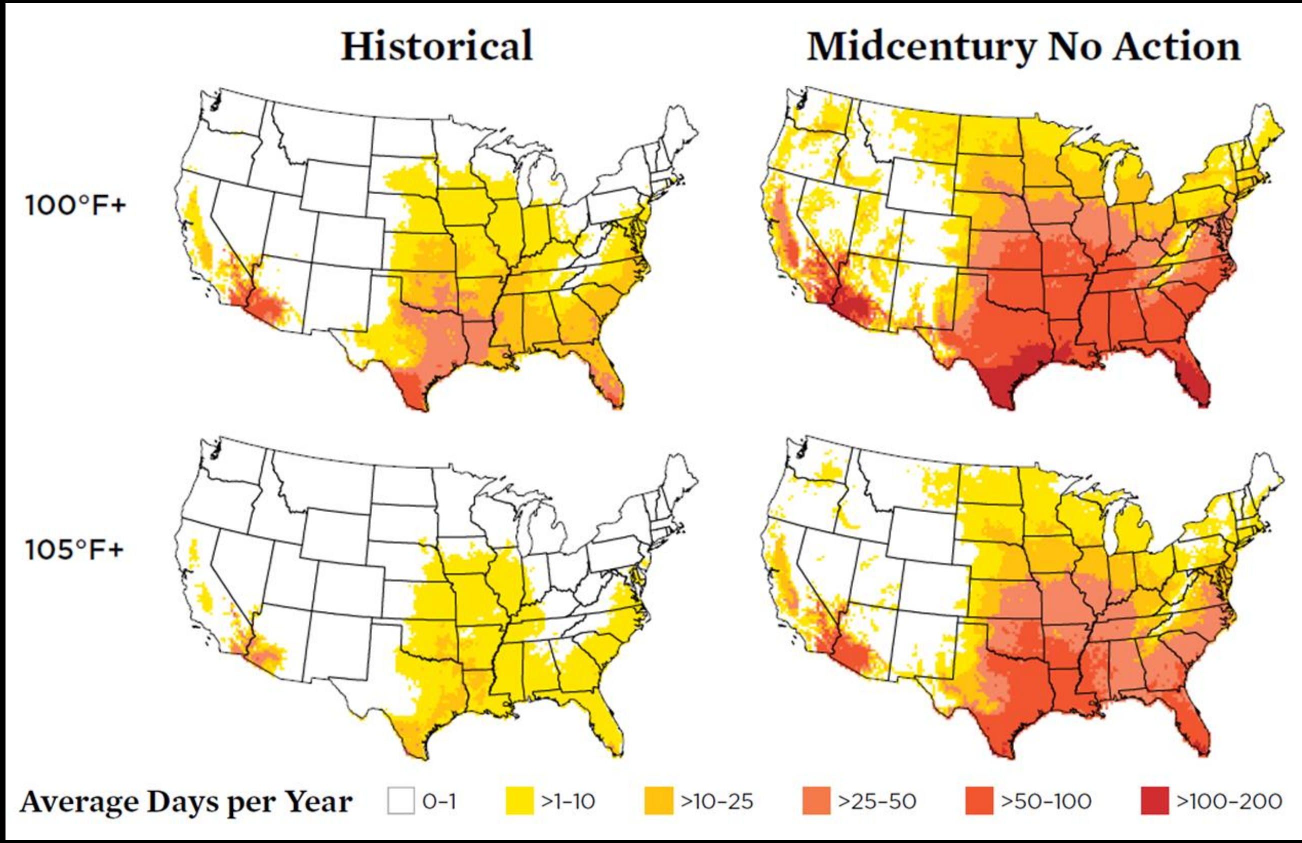
# Underwater: Rising Seas, Chronic Floods and Implications for Coastal Real Estate

Union of Concerned Scientists

Photo: Will Brown

# Extreme Heat Risks

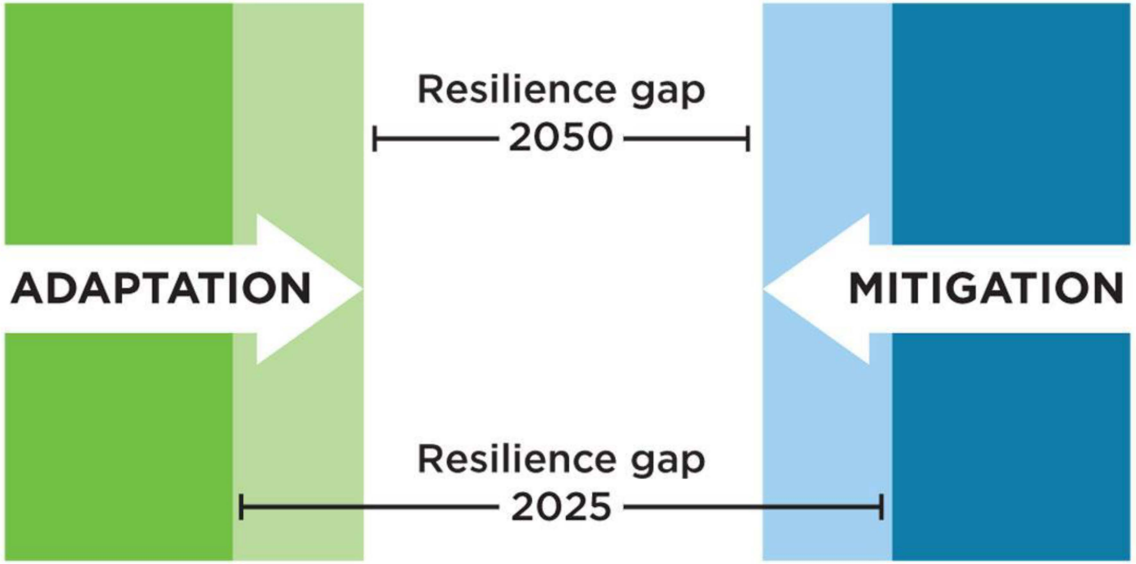


## Climate Resilience:
***Keeping Communities Safe***

## Mitigation:
***Net zero emissions by 2050***

## The Resilience Gap




*The "resilience gap" represents the degree to which a community or nation is unprepared for damaging climate effects—and therefore the degree to which people will suffer from climate-related events. The arrows show the two ways to narrow the gap. We can adapt (left arrow) by preparing for climate impacts, and mitigate carbon emissions (right arrow) to slow the pace at which climate risks grow more severe or more common over time. The changing size of the resilience gap in 2025 versus 2050 conveys the potential for society's resilience gap to be narrowed, though not eliminated, through concerted effort on both fronts.*

# Choices and Opportunities

- Communicate risks clearly and transparently
- Align policies and market incentives with science and justice
- Make transformative clean energy and climate resilience investments
- Build inclusive and transparent governance institutions


# Thank you. Any questions?

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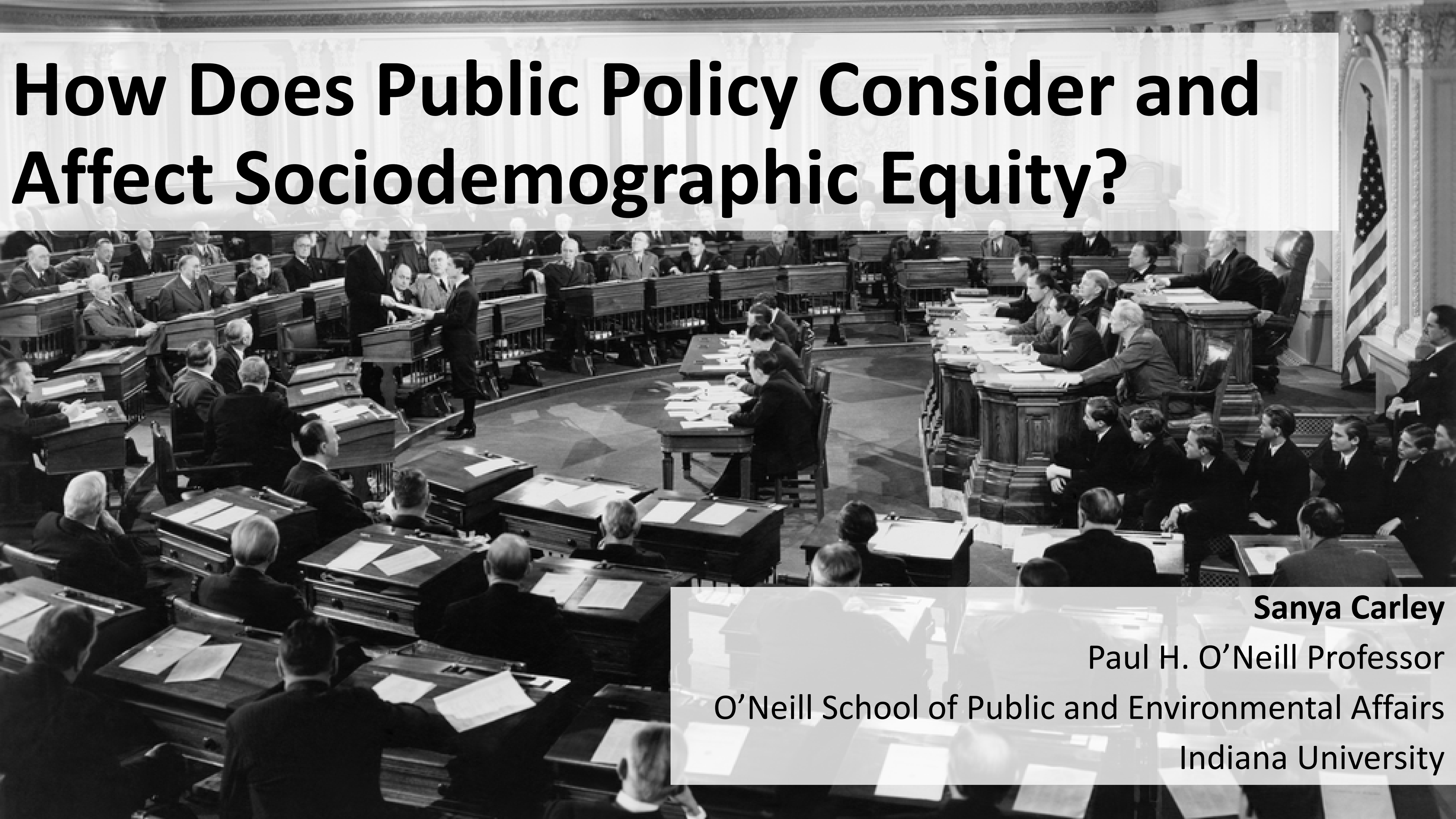
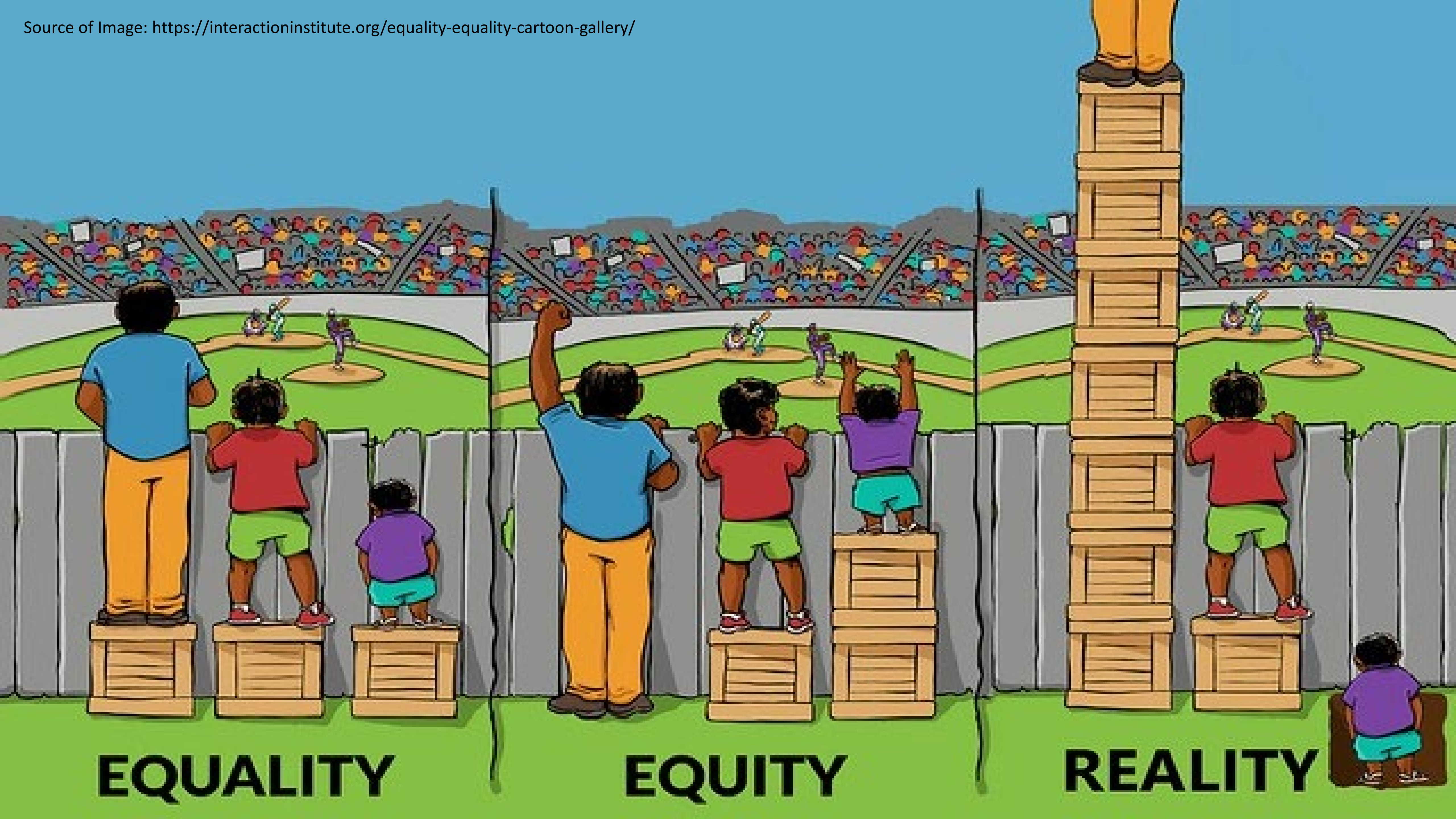
Union of Concerned Scientists

# How Does Public Policy Consider and Affect Sociodemographic Equity?

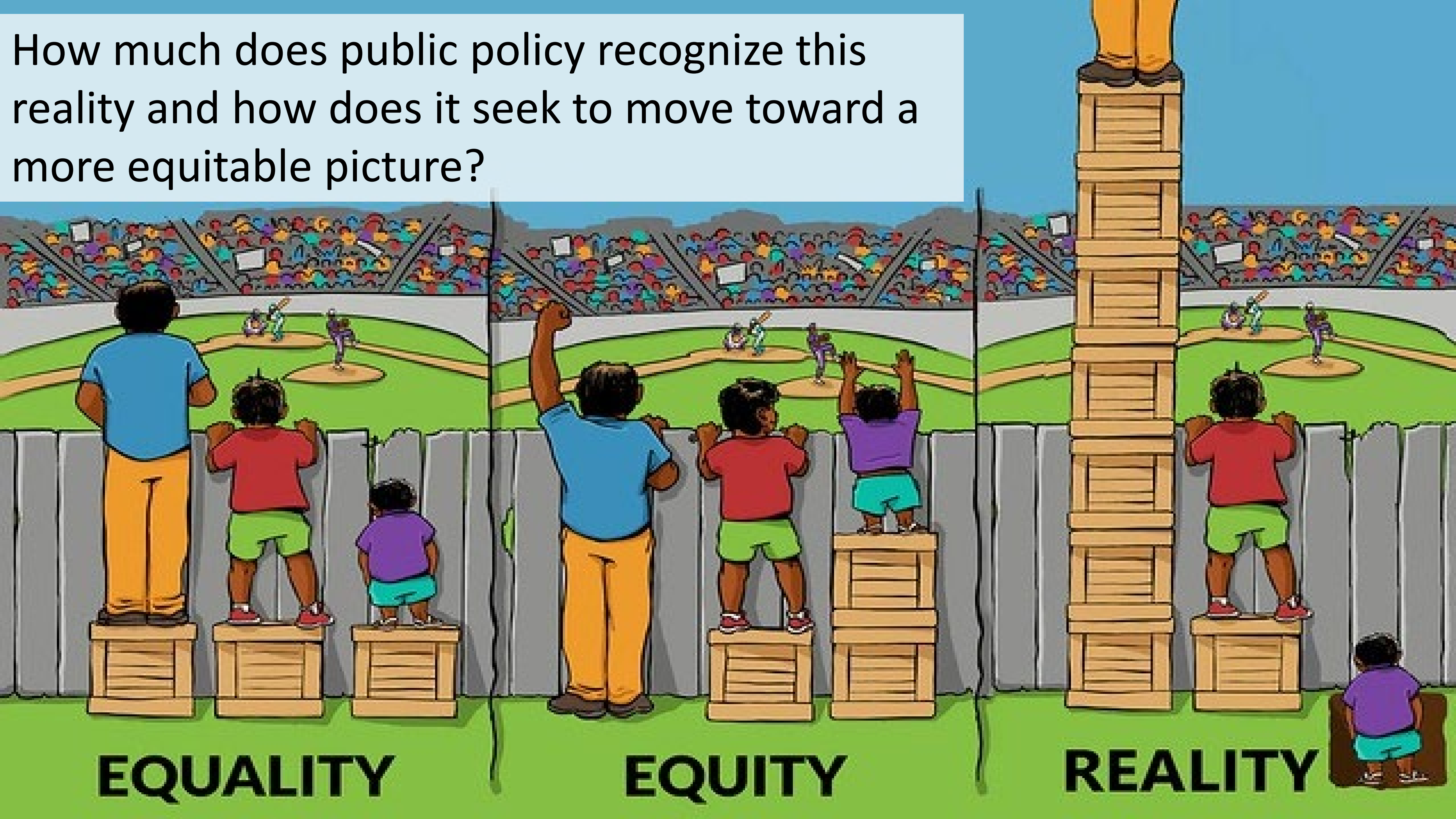


**Sanya Carley**
Paul H. O’Neill Professor
O’Neill School of Public and Environmental Affairs
Indiana University

Source of Image: https://interactioninstitute.org/equality-equality-cartoon-gallery/



How much does public policy recognize this reality and how does it seek to move toward a more equitable picture?



# Typical Policy Decision-Making

Will this policy help advance economic growth and/or development?

Do the societal benefits outweigh the costs?

Is this the most efficient approach to addressing the problem?

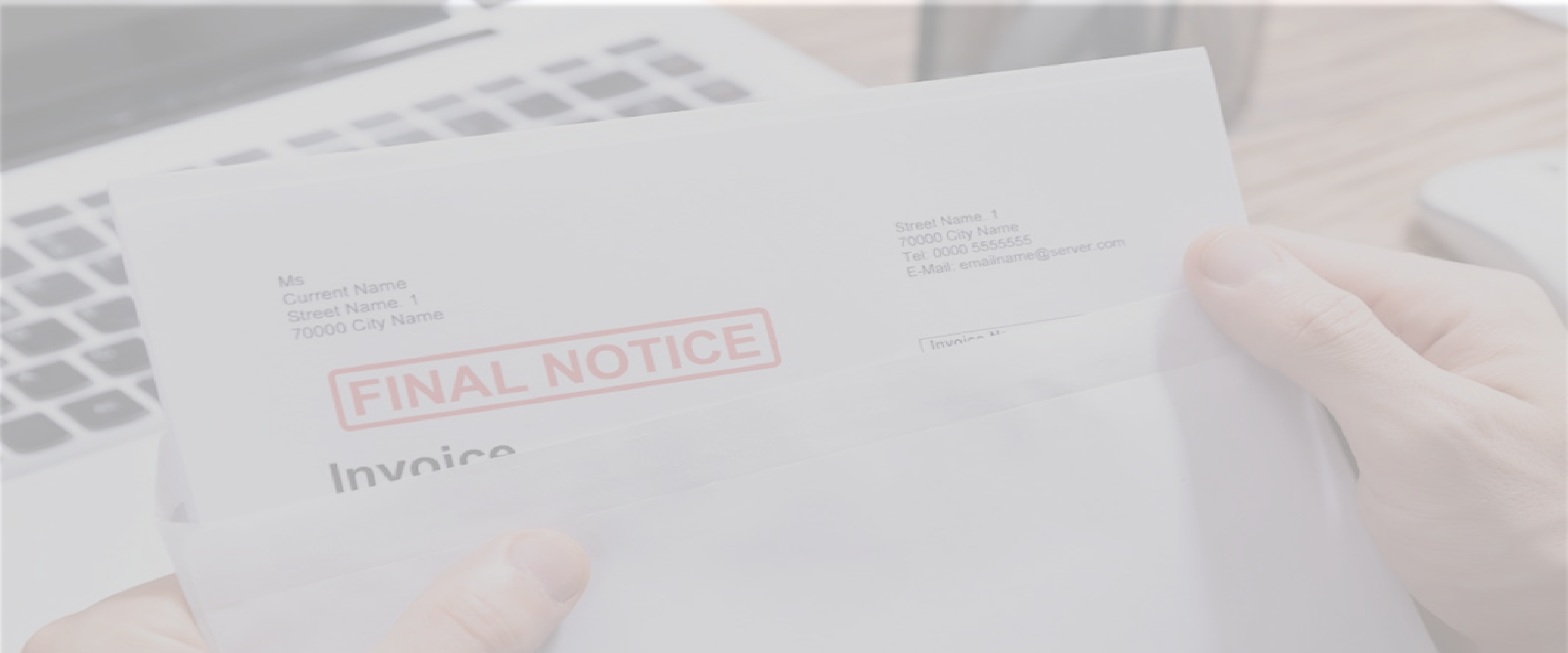
# Less Typical Policy Decision-Making

Will this policy help improve the economic conditions for those who have been historically disadvantaged or marginalized?

Will this policy create or exacerbate disparities across sociodemographic groups (e.g., by race, income, age, gender, occupation)

Will this policy result in “sacrifice zones”?

# Examples of where public policy can create or exacerbate sociodemographic disparities

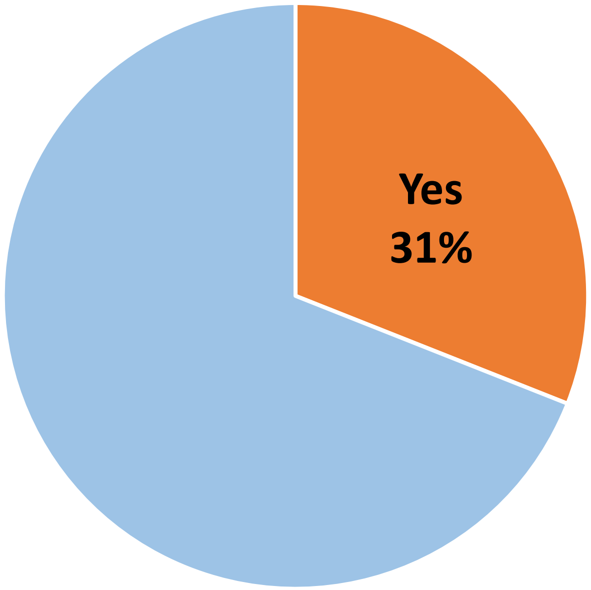



# Energy Insecurity and Energy Poverty

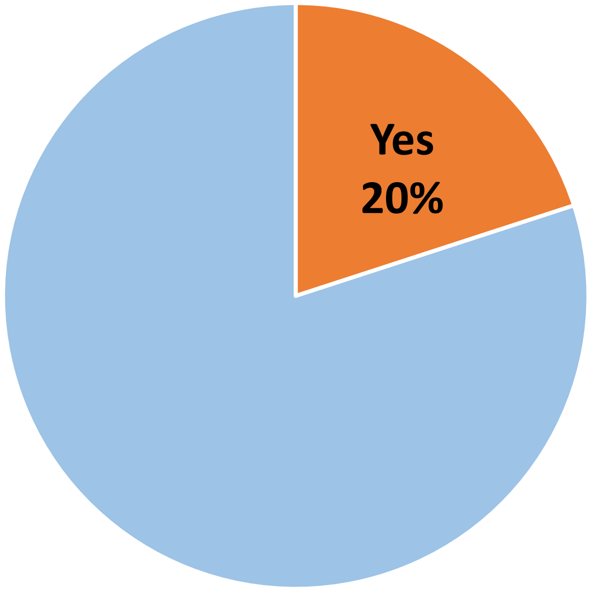
Inability to meet one’s household energy demands; exposure to energy deprivation

# Energy Insecurity in the United States

**Report difficulty paying household energy bills or maintaining adequate temperatures in the house**

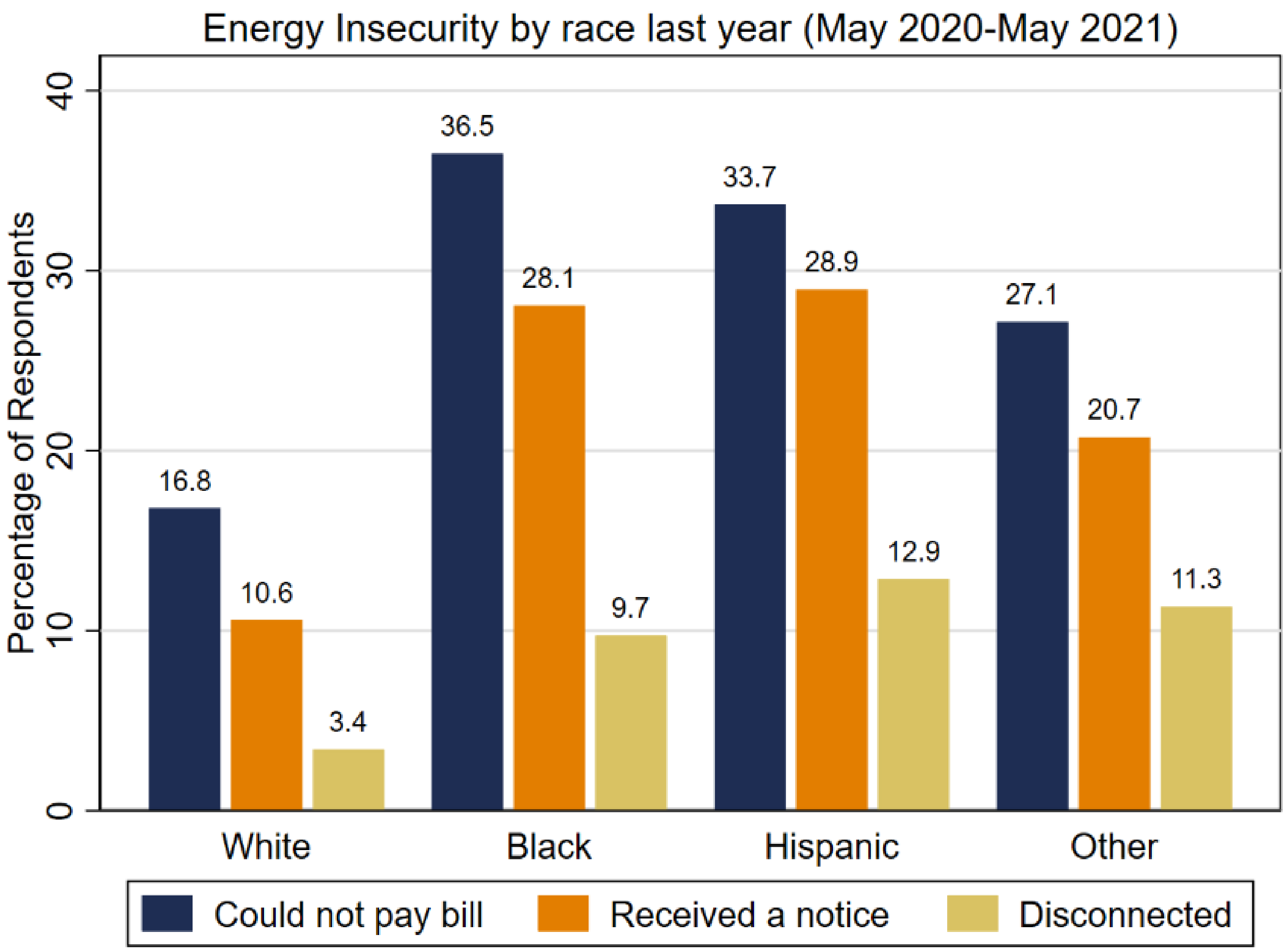



**Report that, due to high energy bills, it is necessity to forego buying other necessary household items such as food**






Source: U.S. Energy Information Administration. 2015. One in three U.S. households face challenges in paying energy bills in 2015. Residential Energy Consumption Survey.




# Energy Insecurity: Disparities by Race

Source: Memmott, Carley, Graff, Konisky. 2021. Socioeconomic disparities in energy insecurity among low-income households before and during the COVID-19 pandemic. *Nature Energy 6.*

# Technology Access

# Access to Low-Carbon Technologies

- Disproportionately owned by wealthier and white households
- Financial incentives for such also disproportionately flow to these same households
- Early stage innovation rarely considers low-income users and their unique barriers to adoption and use
- In some cases, these technologies are **more** expensive in marginalized communities (e.g., the LED lightbulb)
- Implications for electricity and natural gas rates: the more households that switch to prosumer or another mode of energy (e.g., gas to electrification), the more rates will rise for remaining consumers

Sources: Borenstein and Davis 2016; Sunter et al. 2019; Yozwiak et al. 2022. Reames et al. 2018; Davis and Hausman 2021.

# Coal Communities and the Transition to Low-Carbon Electricity

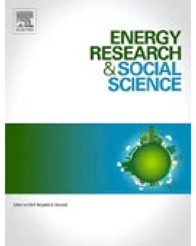
# Appalachian Coal Communities and the Transition

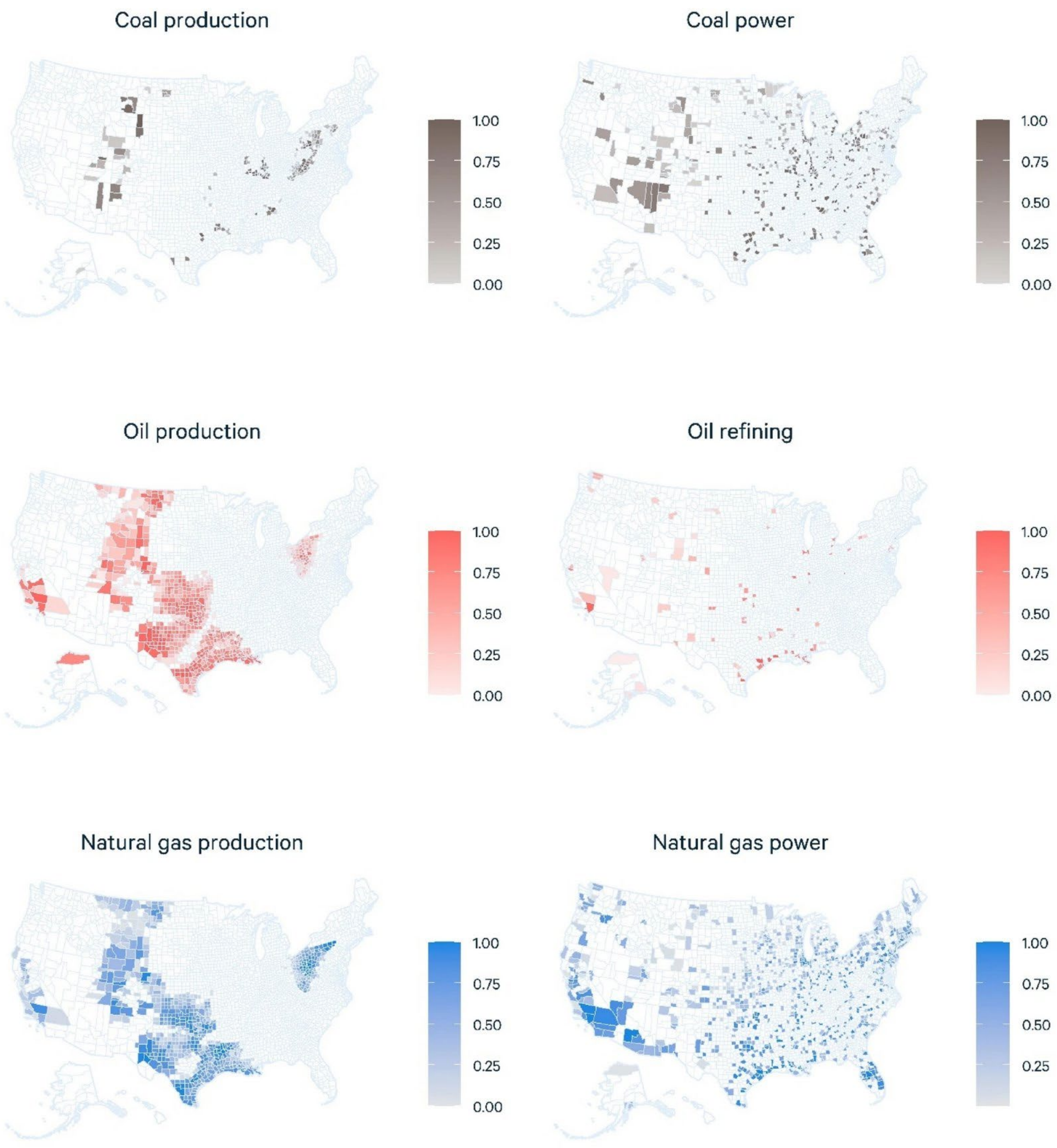
Loss of employment, economic activity, and tax revenue

Significant personal, household, and community hardship

Opportunities for new employment?

Source: Carley, S., Evans, T. P., Konisky, D. 2018. Adaptation, culture, and the energy transition in American coal country. *Energy Research & Social Science* 37: 133-139.

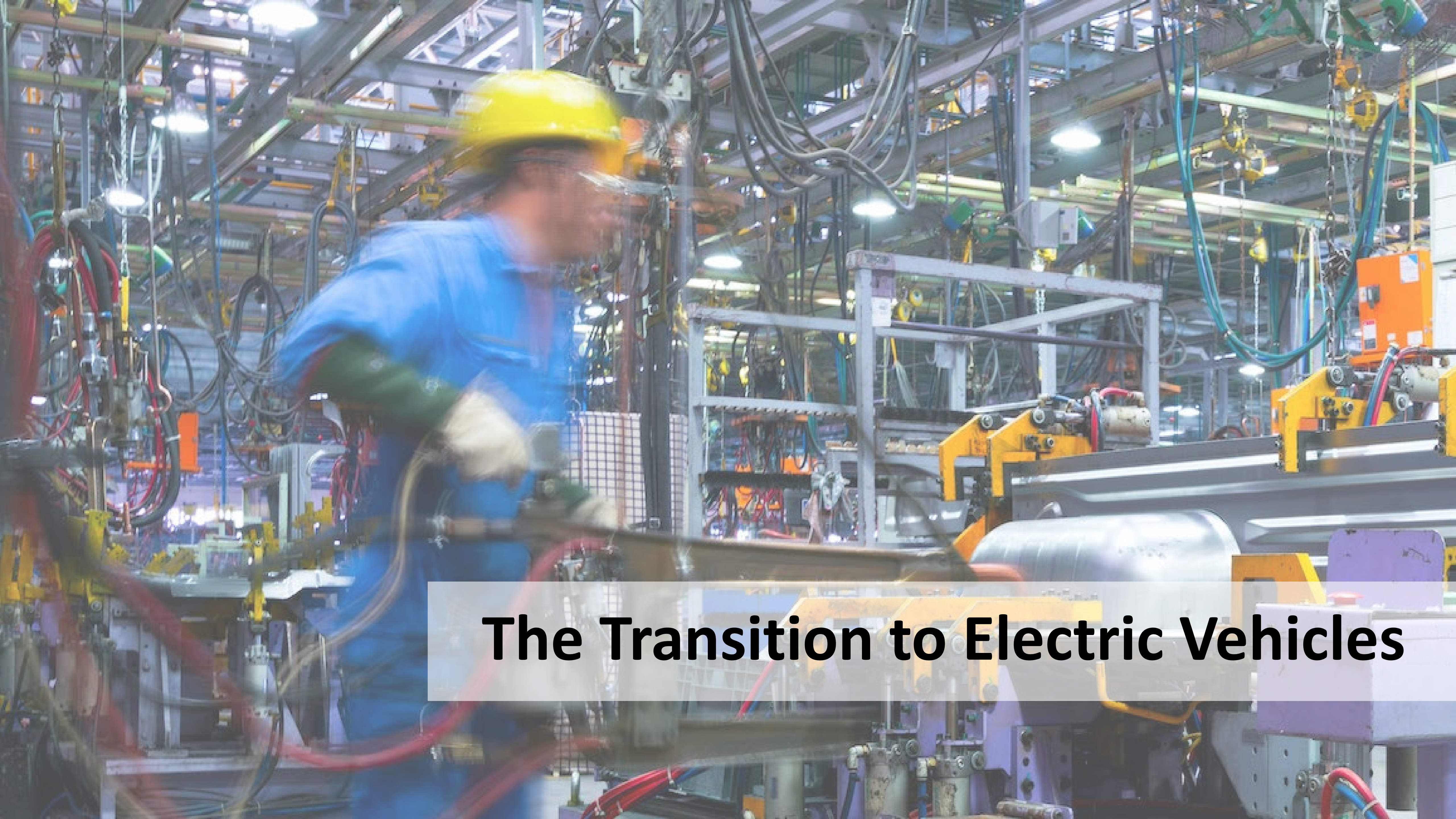





# Mapping Vulnerability for Fossil Fuel Communities

Source: Raimi, D., Carley, S., Konisky, D.M. 2022. Mapping county-level vulnerability to the energy transition in U.S. fossil fuel communities. *Scientific Reports.*

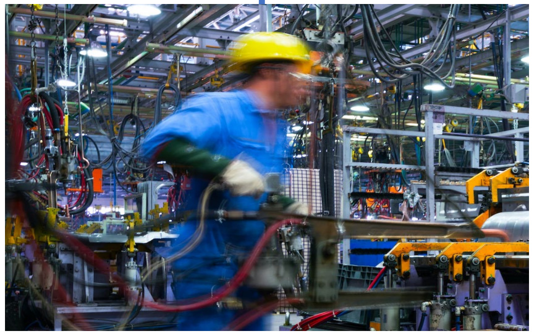
nature SCIENTIFIC REPORTS



# The Transition to Electric Vehicles

# Transitioning to Electric Vehicles: A Lifecycle Perspective

Resource Extraction: Rare Earth Mineral Mining → Supply Chains and Automobile Production → Consumer Use → Disposal of Waste



# New Policy Developments that Focus Specifically on Socioeconomic Equity

# Promising Developments for Consideration of Sociodemographic Equity in Policymaking

- Executive Order 13985, Advancing Racial Equity and Support for Underserved Communities Through the Federal Government
- Justice40 Initiative: 40% of all benefits must go to disadvantaged communities

# References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- Yozwiak, M., Carley, S., Konisky, D.M. 2022. Clean and just: Electric vehicle innovation to accelerate more equitable early adoption. Information Technology & Innovation Foundation report

# How does public policy affect human and economic well-being?

Professor Jason Hickel

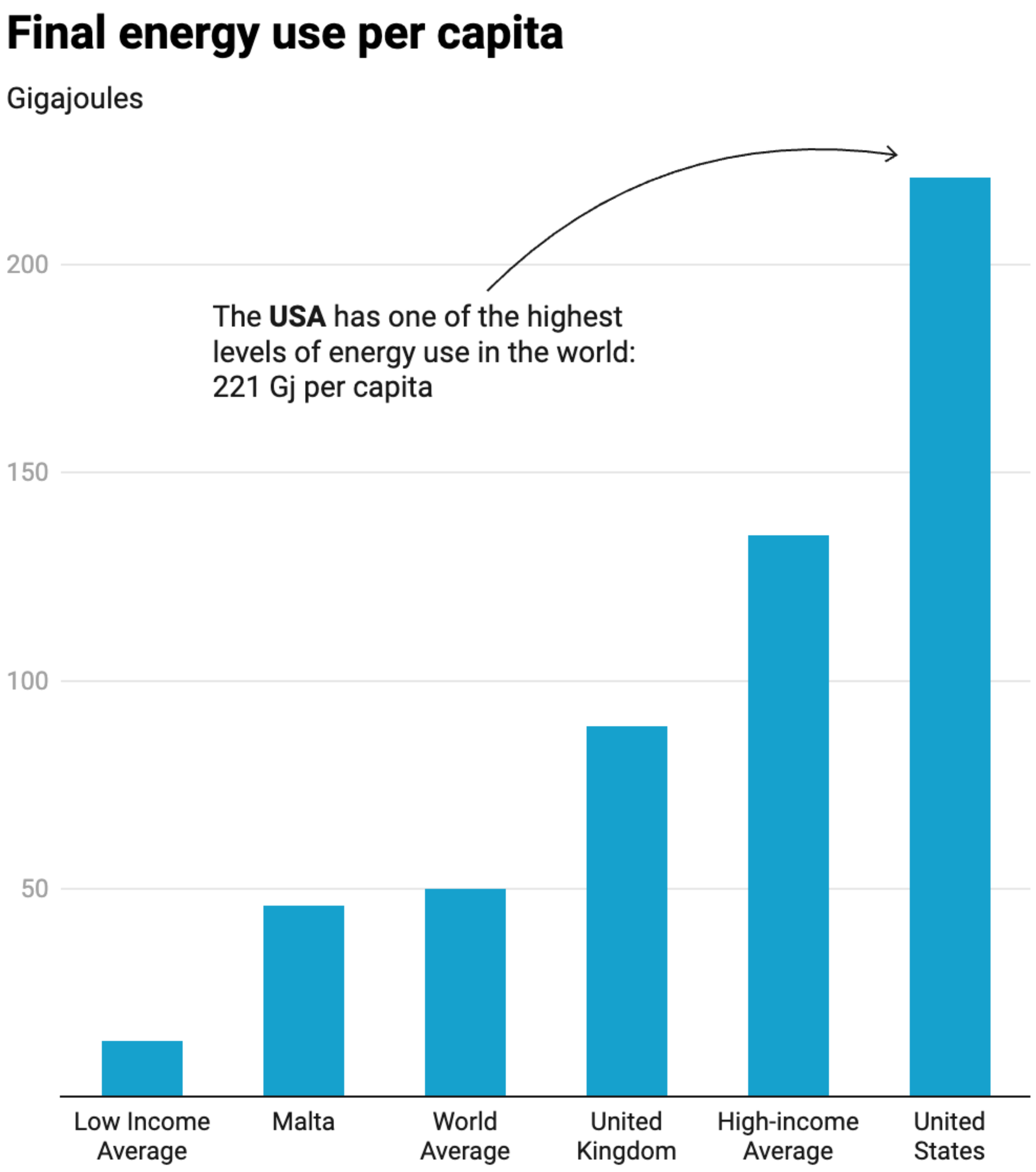
Institute for Environmental Science and Technology (ICTA-UAB)

International Inequalities Institute, London School of Economics

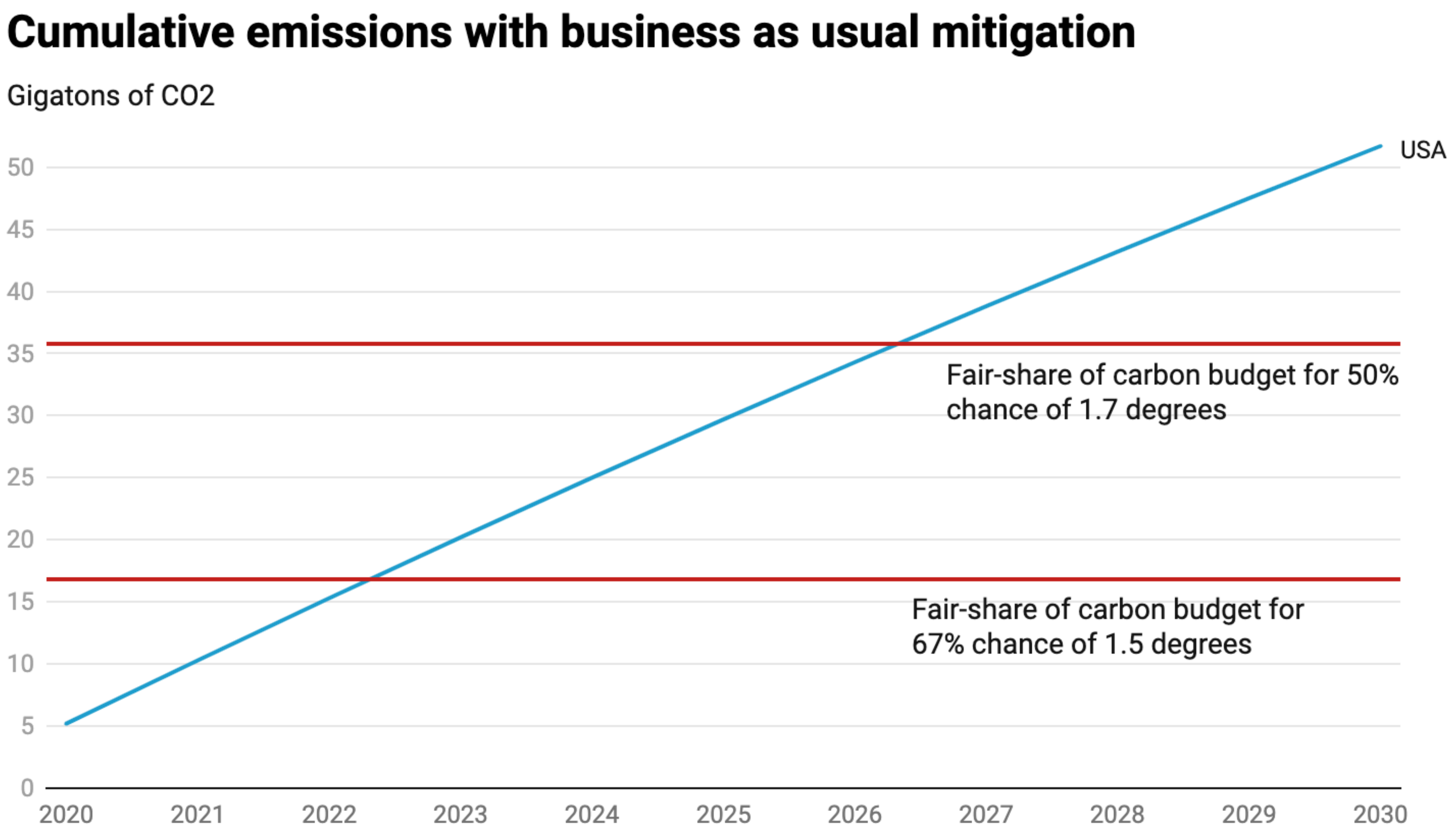
# Global energy inequality

Rich countries use 3x more energy per capita than the world average.

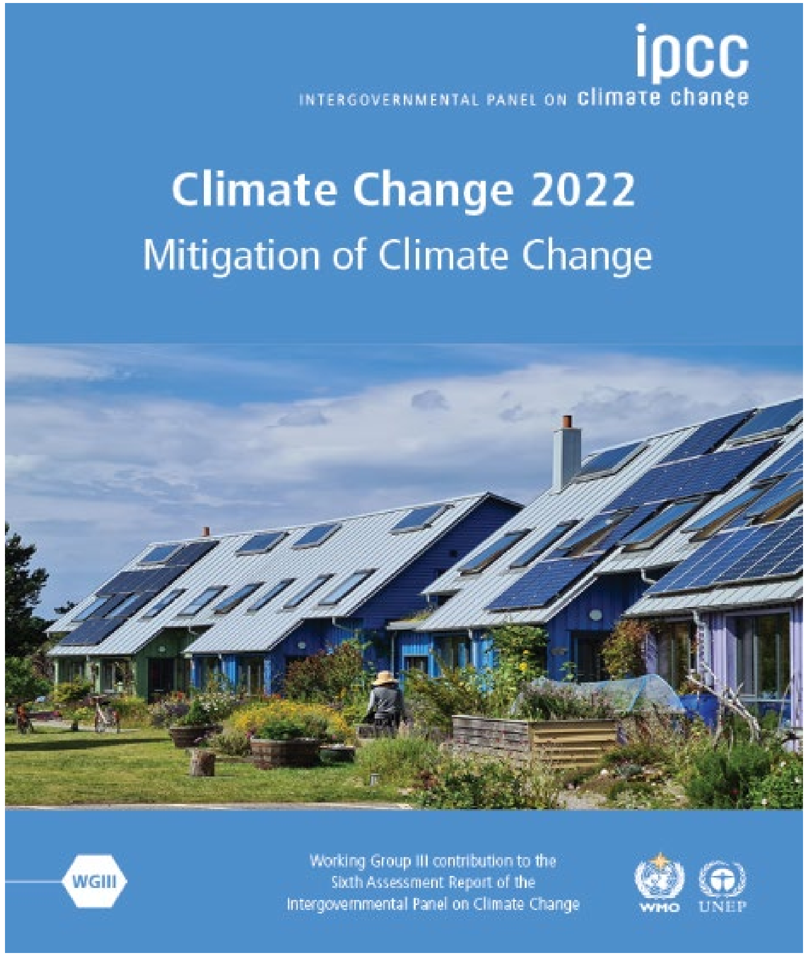
The United States has one of the highest levels of energy use in the world, 65% higher than the high-income average.



# Depleting Paris carbon budget fair-shares…

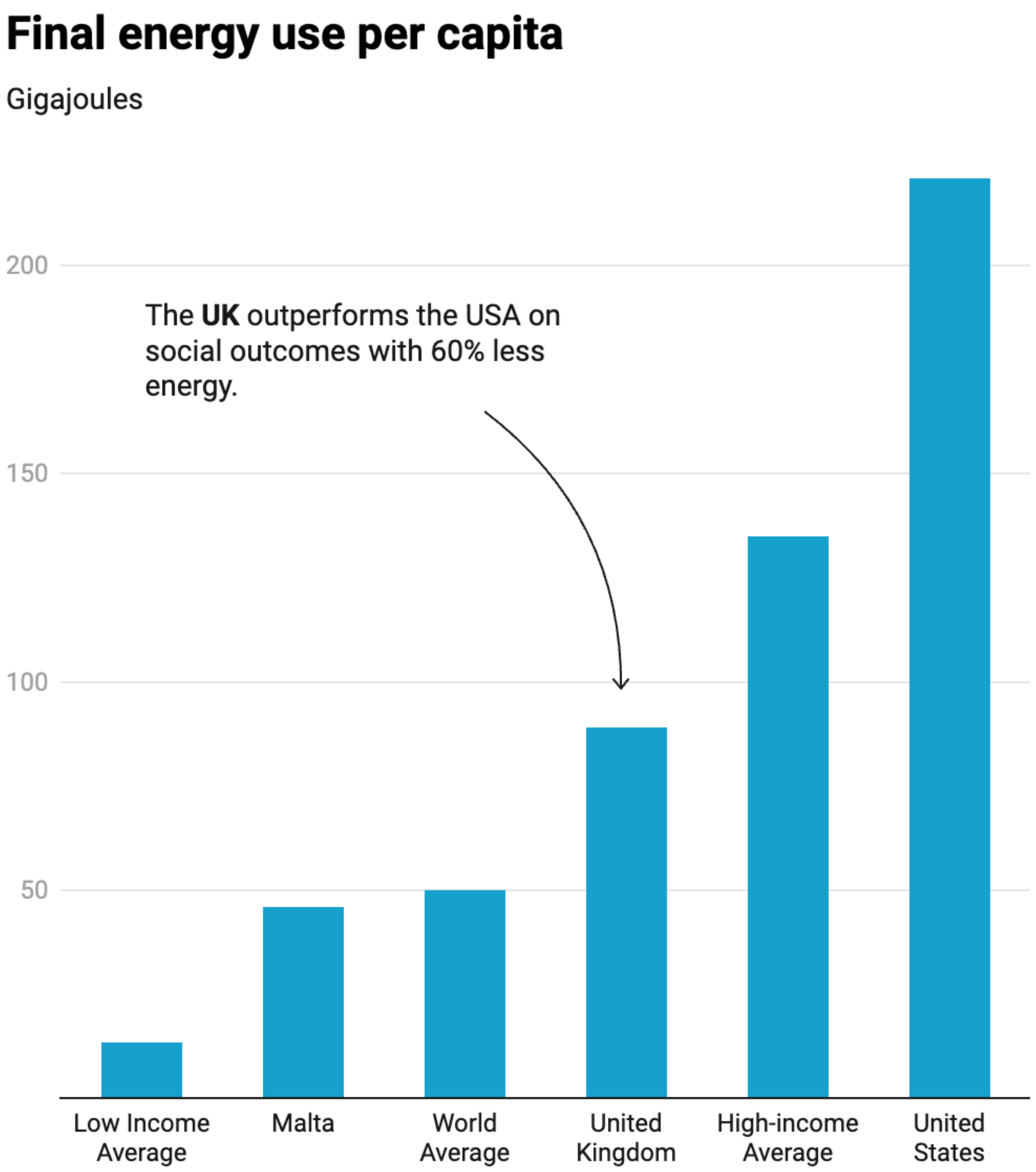


# IPCC: high-income nations may need to consider demand-side strategies




Reducing excess energy demand makes it possible to achieve rapid decarbonization without having to rely on speculative technological solutions.

The relationship between energy use and social outcomes is **mediated by public policy**



# Policy interventions enabling well-being at lower energy use

- Reduce inequality
- Improve democratic quality
- Ensure universal access to high-quality public services

*E.g., Sen 1981; Lena and London 1993; Millward-Hopkins et al 2020; Wiedmann et al 2020; Vogel et al 2021; Millward-Hopkins 2022, etc.*

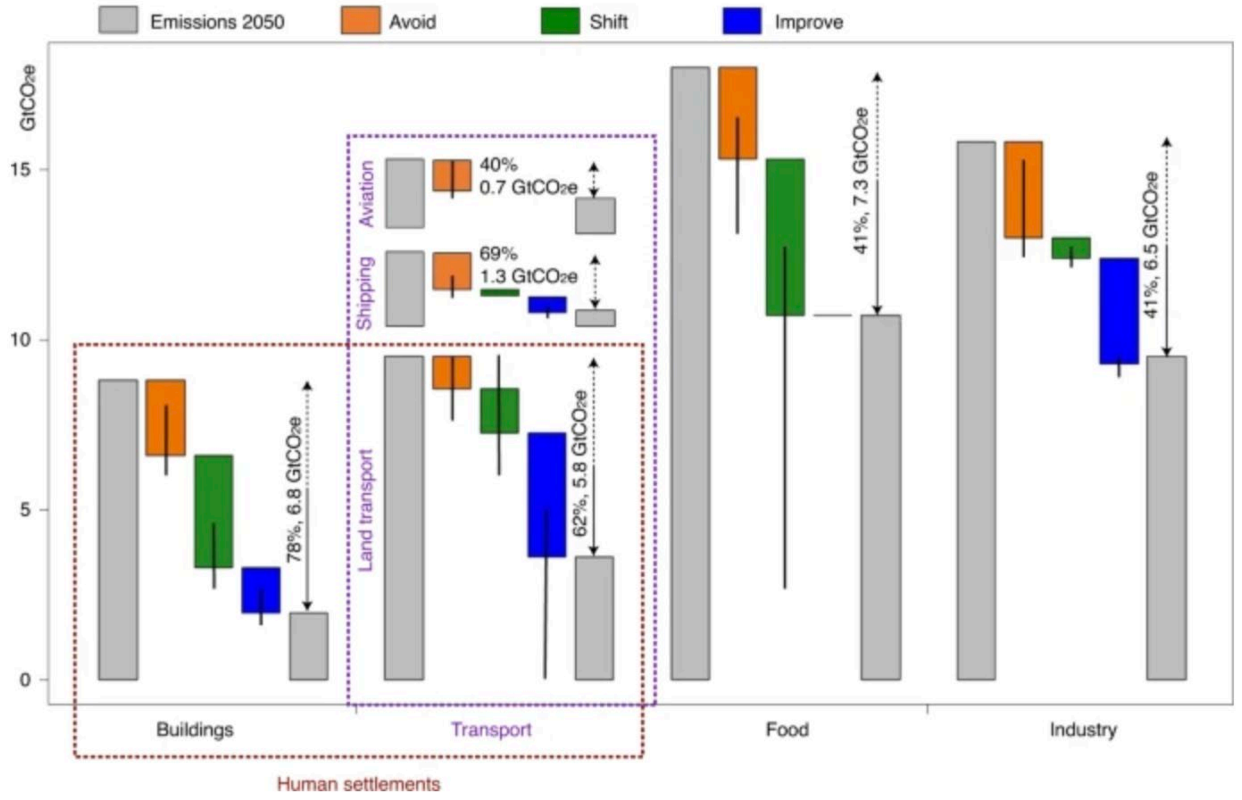
nature climate change

Article | Published: 25 November 2021

# Demand-side solutions to climate change mitigation consistent with high levels of well-being

Felix Creutzig, Leila Niamir, Xuemei Bai, Max Callaghan, Jonathan Cullen, Julio Díaz-José, Maria

**Fig. 1: Mitigation potentials in end-use sector classified in ASI options.**




Demand-side mitigation stragies can reduce emissions in end-use sectors by 40-80%, while improving well-being.

# Sectoral policies:

**Food**. Reduce production of red meat, improve access to nutritious, sustainable diets (*EAT-Lancet Commission*), reduce food waste.

**Mobility**. Reduce production of and reliance on private cars, improve access to high-quality public transit, cycling, and active mobility.

**Industry**. Limit planned obsolesence, lengthen product lifespans, ensure repairability ("right-to-repair" rules, etc).

**Housing**. Reduce wastefully large houses, ensure longer-lasting buildings, improve insulation, shift to more efficient heating/cooling/lighting.