

{ How the Climate Crisis Shapes EV Adoption

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Desert
Hot Springs
NEXT 3 EXITS

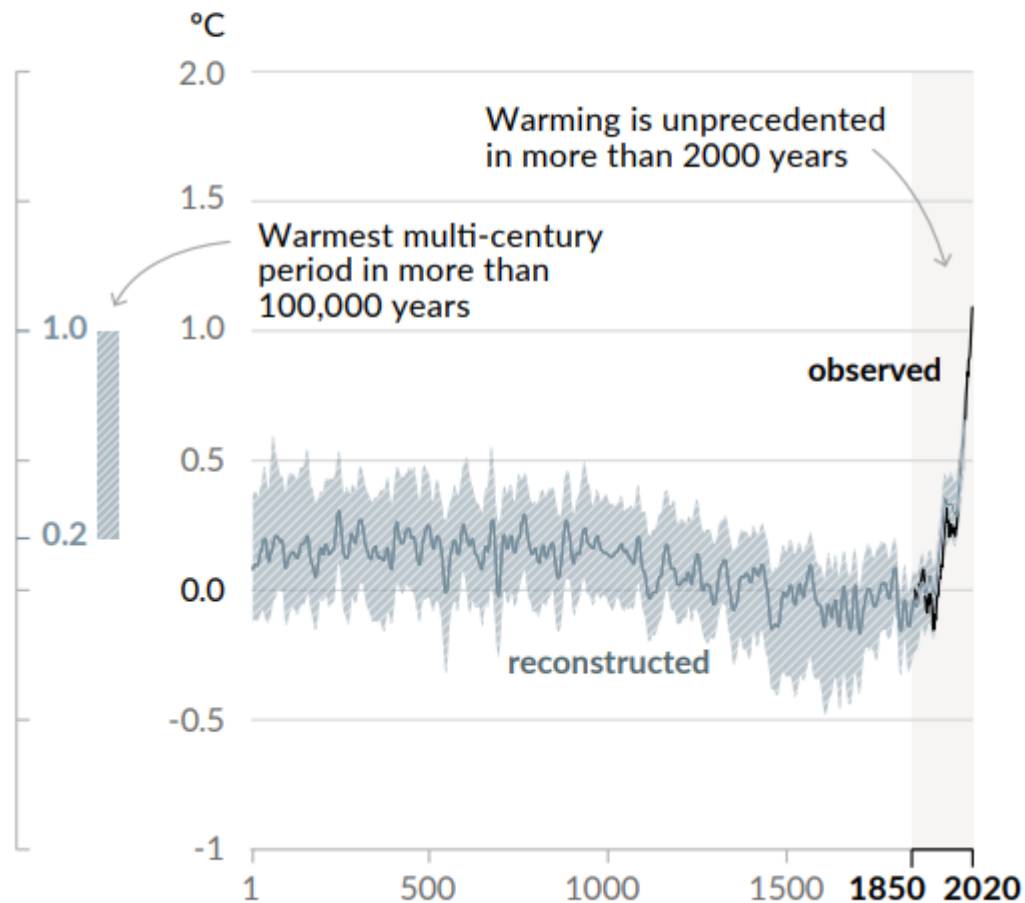
ROCK
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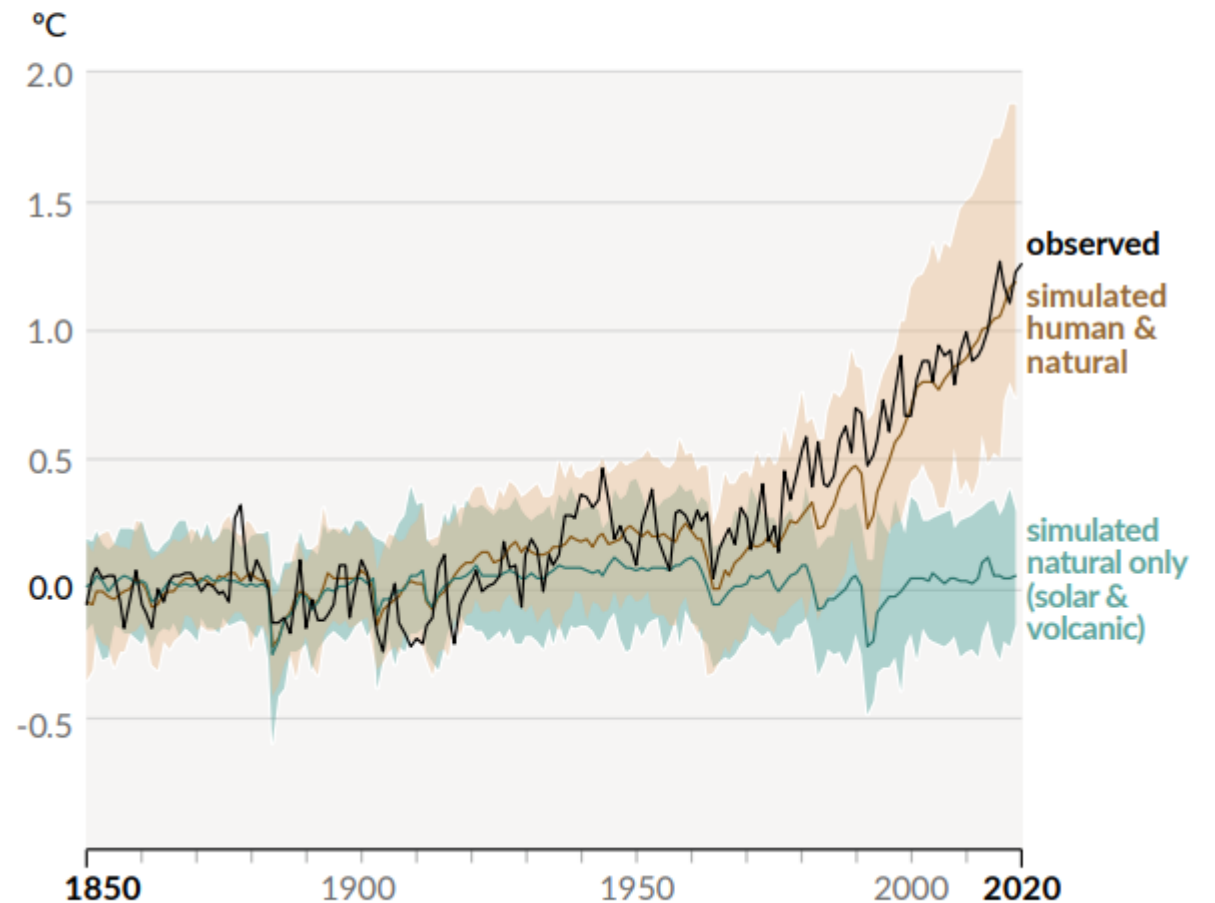
Human influence has warmed the climate at a rate that is unprecedented in at least the last 2000 years

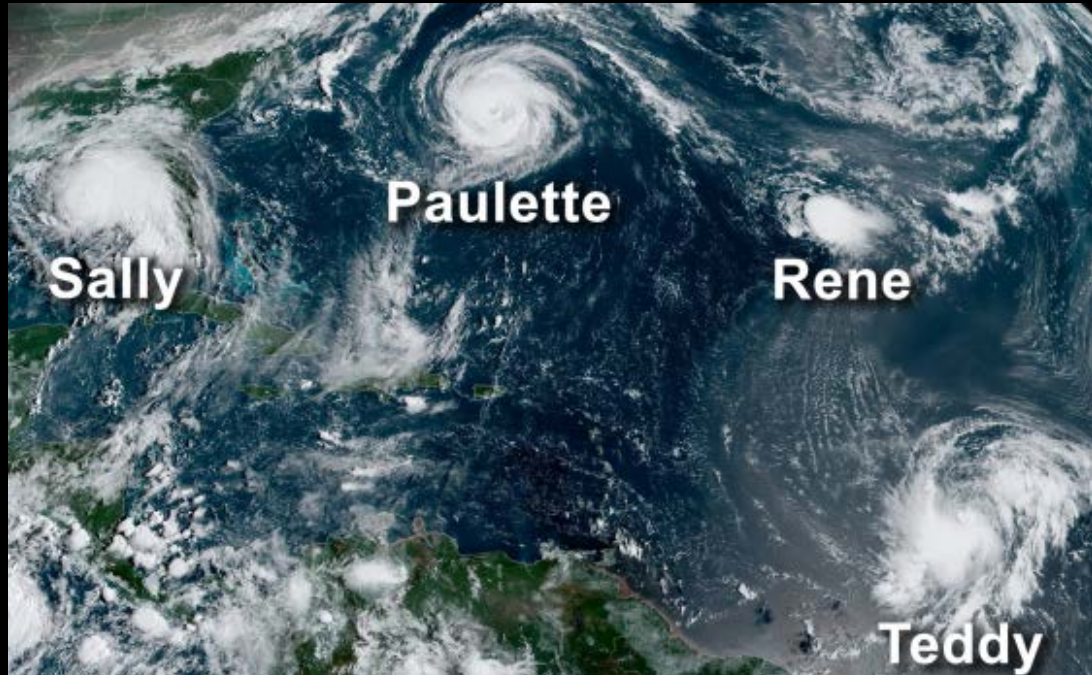
Changes in global surface temperature relative to 1850-1900

a) Change in global surface temperature (decadal average) as **reconstructed** (1-2000) and **observed** (1850-2020)



b) Change in global surface temperature (annual average) as **observed** and simulated using **human & natural** and **only natural** factors (both 1850-2020)





Too Hot to Work

Assessing the Threats Climate Change Poses to Outdoor Workers

HIGHLIGHTS
Outdoor workers face severe risks from extreme heat—risks that will increasingly threaten the health and livelihood of tens of millions of outdoor workers in the United States as climate change induces dangerously hot days more frequently and intensely. With economic and legal systems that routinely discount their lives and safety, workers who experience heat-related injuries or illnesses on the job have little to no resources. By midcentury, with no action to reduce global warming emissions, an estimated \$5.4 billion in outdoor workers' earnings could be at risk annually due to extreme heat. Even with bold action to limit emissions, outdoor workers will face severe and rising risks from extreme heat. Policymakers and employers must take actions to protect outdoor workers.

The COVID-19 pandemic underscored weaknesses and stark variations in the protections available to workers in the United States. Across the nation, millions of people lost their jobs or were furloughed, their financial present and futures suddenly cast into doubt. And while those in some types of jobs could reduce their exposure to COVID-19 by working from home, workers in many outdoor occupations were deemed essential. In planting and harvesting food to fill our plates, responding to community emergencies, caring for our roads and rails, and delivering supplies that shored up could not provide, they risked infection, illness, and even death—their own, or their families—as they performed their daily work.

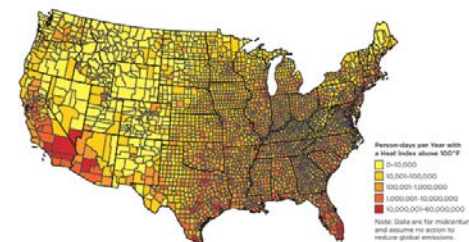
Yet the novel coronavirus is only the latest addition to a long list of on-the-job hazards confronting outdoor workers. Each summer, the roughly 12 million outdoor workers across the United States—from construction workers to farmworkers to emergency responders—regularly face a brutal choice: risk their health by enduring dangerous exposure to heat or risk their jobs by staying home.



Illustration of a worker experiencing heat stress during a break from working during a heat wave in Chicago in June 2012, as temperatures approached 90°F. Between now and midcentury, continued global warming will increasingly expose outdoor workers to dangerous conditions, necessitating immediate adjustments or reductions in work hours, and is projected to put workers' earnings at risk.

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FIGURE 1. Outdoor Workers' Exposure to Extreme Heat



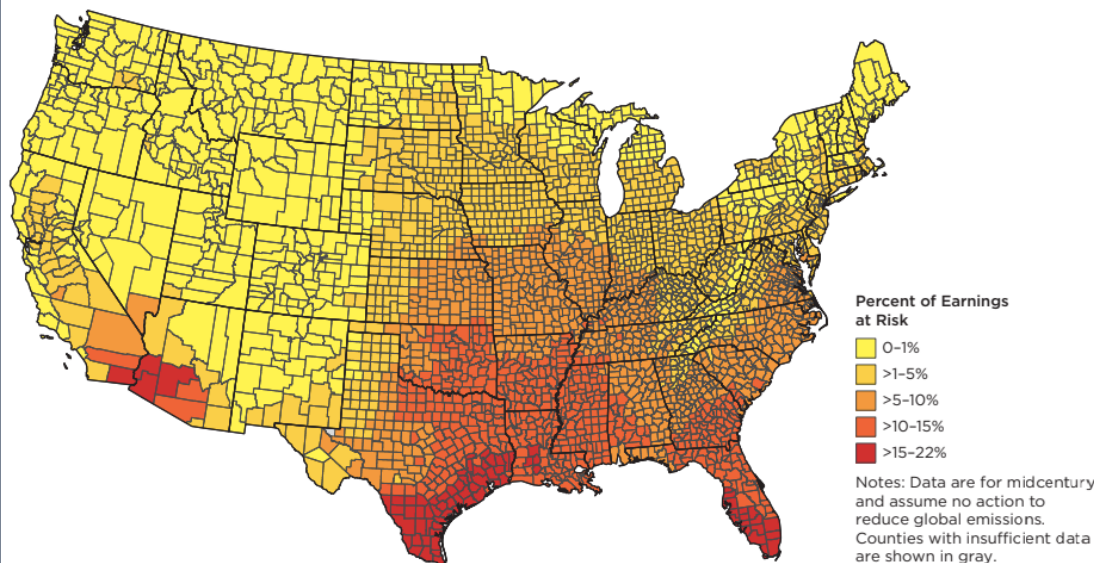
Because urban areas have more outdoor workers than do rural areas, overall exposure of outdoor workers to days with a heat index above 100°F is higher in urban areas. This is true both historically and in midcentury projections based on no action to reduce global emissions.

SOURCE: U.S. CLIMATE ADAPTATION BASED ON DATA FROM THE U.S. CENSUS BUREAU, 2017

HEAT ENDANGERS BOTH URBAN AND RURAL OUTDOOR WORKERS
The increased exposure of outdoor workers to extreme heat would affect both urban and rural counties (Figure 1). Owing to their larger populations, urban counties typically have more outdoor workers than do rural counties, which means more people exposed to extreme heat. The counties projected to have the highest number of workers exposed to extreme heat by midcentury include some of the nation's largest cities, such as Chicago, Houston, Miami, and Phoenix. On the other hand, outdoor workers comprise a larger proportion of the rural workforce. With no climate action, that would increase to 16.4 million outdoor workers and affect more than 90 percent of all counties in the contiguous United States. This unsafe or lost work time could translate into staggering health concerns and sizeable earnings losses for the workers, substantial productivity losses for employers, and potential disruptions in the products and services provided to families and communities by outdoor workers. Earnings losses would compound existing income inequalities for many communities of color. In Nevada, for example, the nearly one-third of Black/African Americans who are employed in outdoor work would be at risk of losing significant income as a result of extreme heat.

With slow or no action to reduce global emissions, outdoor workers' exposure to days with a heat index above 100°F would increase three or fourfold by midcentury.

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Percent of annual outdoor worker earnings at risk of being lost in each county of the contiguous United States at midcentury (2036-2065) with no action on climate change.

Underwater

Rising Seas, Chronic Floods, and the Implications for US Coastal Real Estate



Union of Concerned Scientists

level rise-induced flooding (Stolley 2017). But many smaller municipalities will not be able to draw up similar resources or act quickly enough while they are still credit-worthy, highlighting the need for marshaling a national response to help ensure that there is equitable, timely access to adaptation measures for all communities.

RISKS TO THE WIDER ECONOMY: LENDERS, TAXPAYERS, DEVELOPERS, AND INVESTORS

Mortgages on homes that could be chronically flooded during the terms of the loan are inherently riskier. As chronic inundation worsens, homeowners will begin to find themselves with mortgages that exceed the value of their homes, and with homes that grow unlivable or difficult to insure. With no obvious option for reversing that trend, some might choose to abandon their homes and allow banks to foreclose on their mortgages. Lenders who provide mortgages, however, rely on

Mortgages on homes that could be chronically flooded are inherently riskier, potentially with neither homeowner nor lender realizing it.

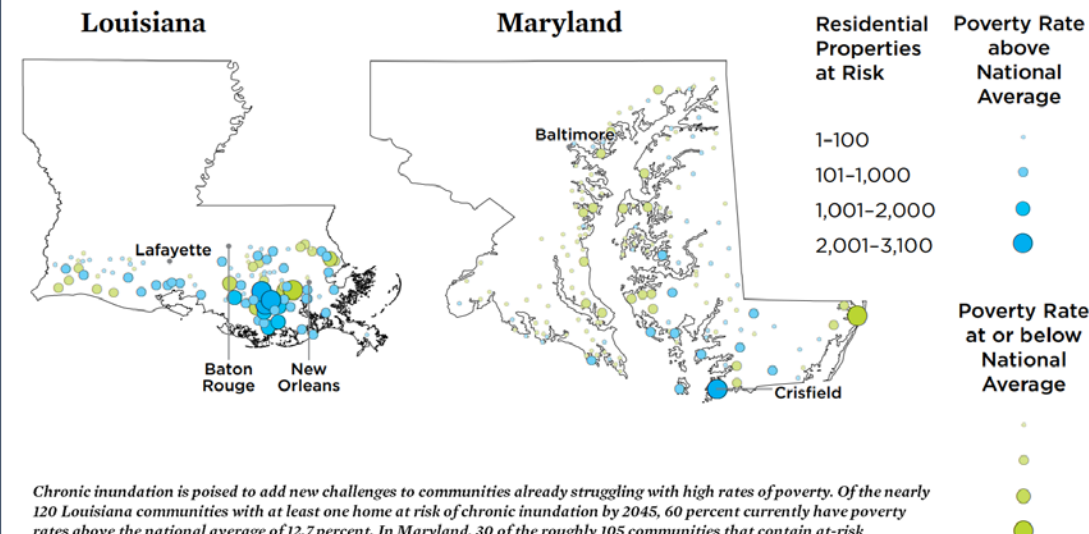
the security that the value of the property will be maintained, or even appreciate, so that their financial position is secure even in the event of foreclosure. That may cease to be the case for many coastal properties, many of which today carry these risky mortgages with neither homeowner nor lender realizing it (Federal Reserve 2018). Mortgage-backed securities and



Some communities and individuals are better positioned to absorb economic blows than others, and while wealthier homeowners, business owners, and communities may not become more vulnerable, people who are less well-off will bring a greater percentage of their wealth to bear on chronic flooding. Low-income homeowners and renters, for example, may have fewer resources to invest in flood-proofing measures against losing their homes. This mounting flood risk may spell dire consequences for many, and without policies in place to help, will spell ruin for some.

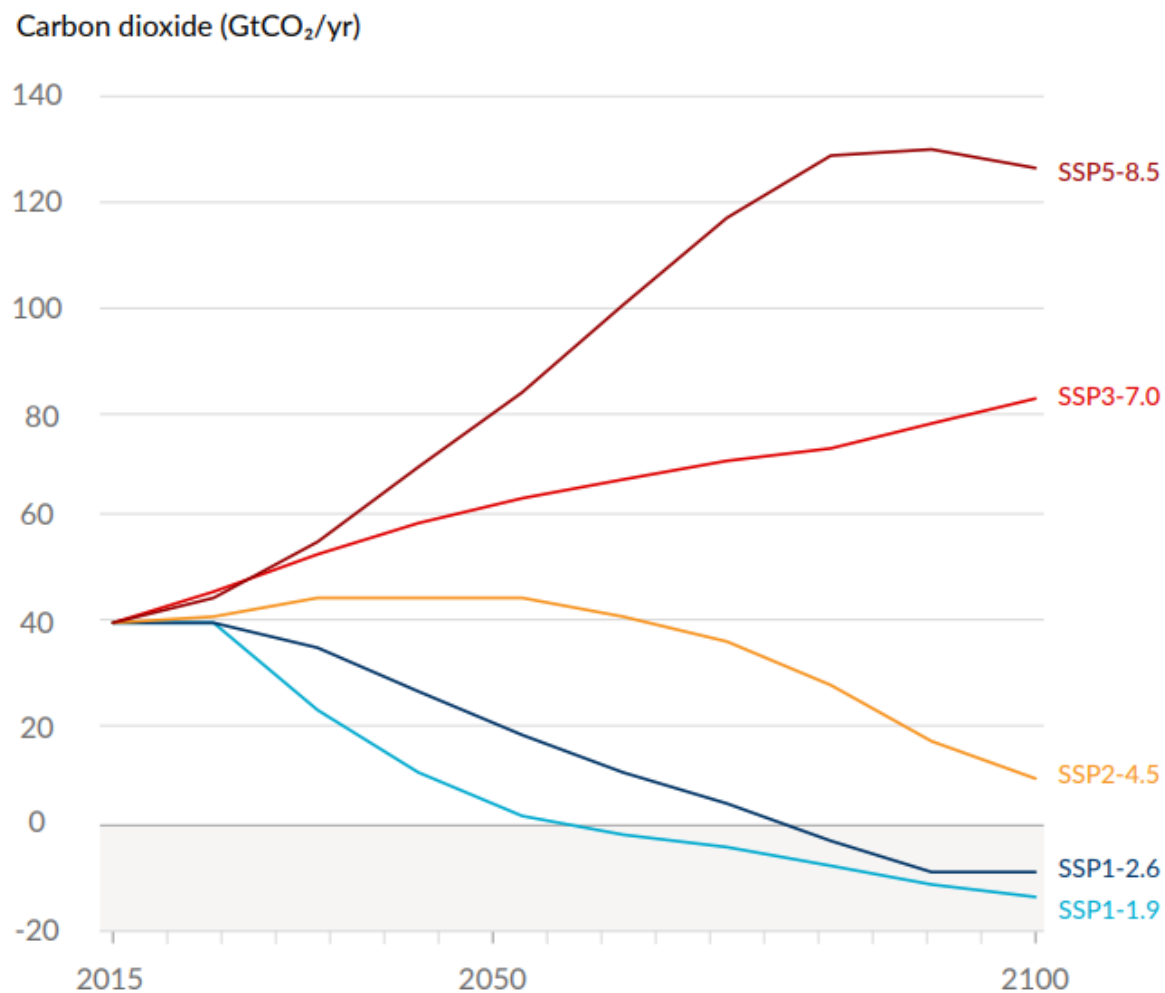
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FIGURE 5. Communities at Risk: Snapshots from Louisiana and Maryland

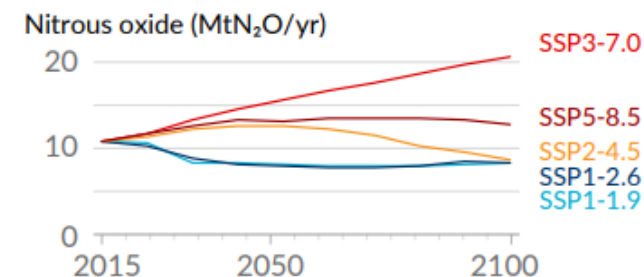
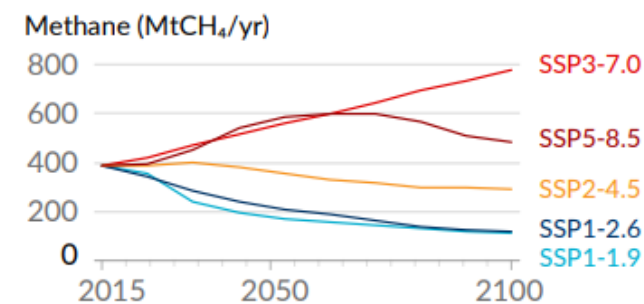


Future emissions cause future additional warming, with total warming dominated by past and future CO₂ emissions

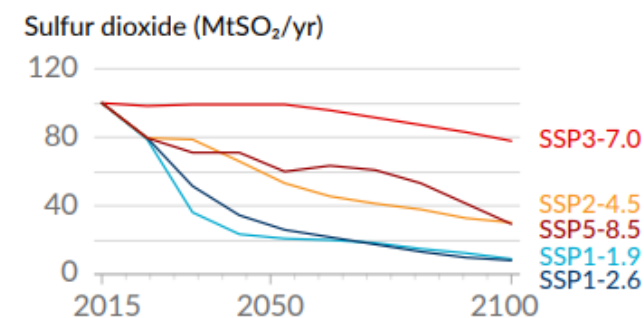
a) Future annual emissions of CO₂ (left) and of a subset of key non-CO₂ drivers (right), across five illustrative scenarios



Selected contributors to non-CO₂ GHGs



One air pollutant and contributor to aerosols



CONSENSUS STUDY REPORT

ACCELERATING DECARBONIZATION OF THE U.S. ENERGY SYSTEM



Policy	Technological Goals	Socioeconomic Goals	Government Entities	Appropriation, if Any	Notes
Set rules/standards to accelerate the formation of markets for clean energy that work for all.					
Set national standards for light-, medium-, and heavy-duty zero-emissions vehicles, and extend and strengthen stringency of CAFE standards. Light-duty ZEV standard ramps to 50% of sales in 2030; medium- and heavy-duty to 30% of sales in 2030.	   	 	Congress	None.	
Invest (research, technology, people, and infrastructure) in a U.S. net-zero carbon future.					
Expand EV charging network for interstate highway system. ^e	  		Congressional directive to Federal Highway Administration (FHWA) and National Institute of Standards and Technology (NIST); congressional appropriations to DOE	\$5 billion over 10 years to expand changing infrastructure.	FHWA to expand its "alternative fuels corridor" program. NIST to develop interoperability standards for level 2 and fast chargers. DOE to fund expansion of interstate charging to support long-distance travel and make investments for EV charging for low-income businesses and residential areas.
Revitalize clean energy manufacturing. ^h	  	  	Congressional appropriation and direction of Green Bank and U.S. Export-Import Bank	Manufacturing subsidies for low-carbon products starting at \$1 billion per year and phased out over 10 years. No additional appropriation required for loans and loan guarantees from Green and Export-Import Bank.	Export-Import Bank should make available at least \$500 million per year in low-carbon product and clean-tech export financing and eliminate support for fossil technology exports.
Assist families, businesses, communities, cities, and states in an equitable transition, ensuring that the disadvantaged and at-risk do not suffer disproportionate burdens.					
Please note that the primary policies targeting fairness, diversity, and inclusion during the transition are the Office of Equitable Energy Transitions and the National Transition Corporation, which are the fourth and fifth policies in this table.					
Establish National Laboratory support to subnational entities for planning and implementation of net-zero transition.	    	  	Congressional appropriation	Additional funding to national laboratories' annual funding commencing at the level of \$200 million per year, rising to \$500 million per year by 2025, and \$1 billion per year by 2030.	To establish a coordinated, multi-laboratory capability to provide energy modeling, data, and analytic and technical support to cities, states, and regions to complete a just, equitable, effective, and rapid transition to net zero.

A Transformative Climate Action Framework

*Putting People at the Center of Our Nation's
Clean Energy Transition*

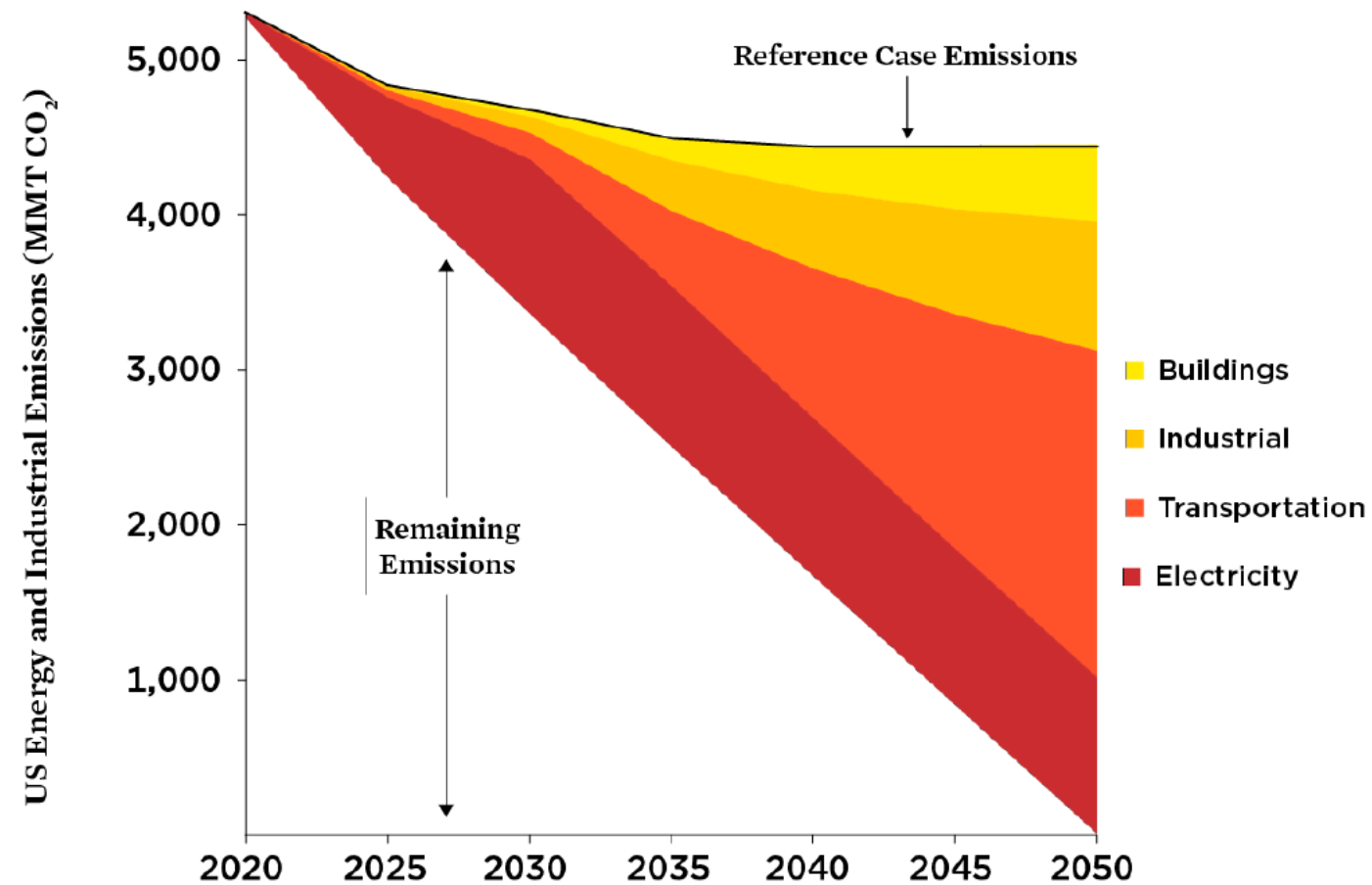
Principles for a Transformative Energy Transition

We propose three core principles for a transformative clean energy transition. This holistic approach must:

- **effectively address the climate crisis;**
- **advance equity and justice;**
- **drive systemic, not just incremental, change.**

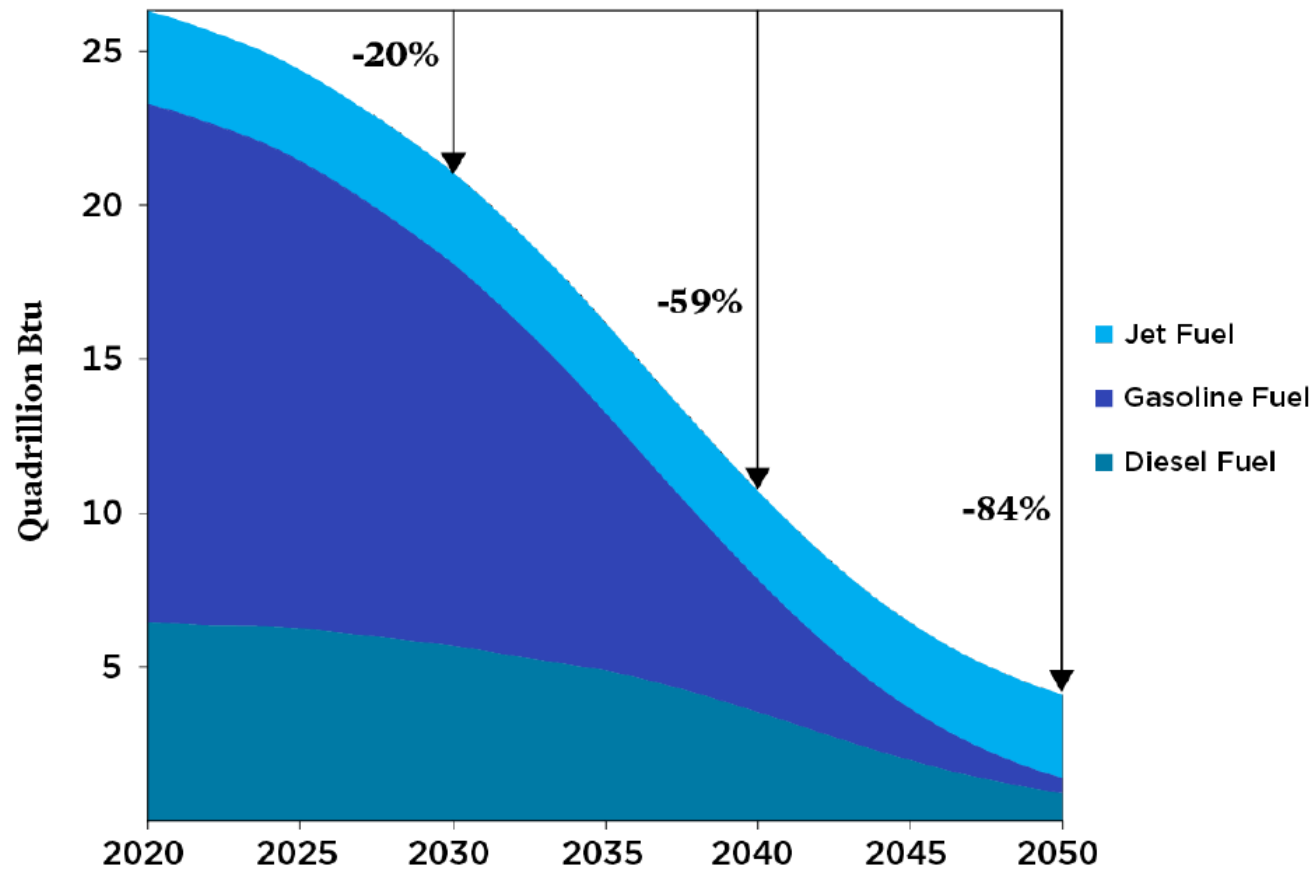
These principles for what the transition ahead must aim to achieve are grounded in our understanding of how we got to this place of compounding and intersecting crises.

Figure 1. US CO₂ Reductions by Sector, Zero CO₂ 2050 Case



The power sector plays a key role in driving near-term emissions reductions and as more cars, trucks, homes, and businesses switch from fossil fuels to low-carbon electricity over time. By 2050, nearly half of total CO₂ reductions come from transportation and 30 percent from industry and buildings.

Figure 3. US Transportation Liquid Fuel Use, Zero CO₂ 2050 Case



Rapidly transitioning to zero-emission vehicles, powered by both batteries and fuel cells, and making vehicles more efficient can greatly reduce the use of fossil-based liquid fuels. The use of gasoline, diesel, and jet fuel drops 84 percent by 2050, as all new light-duty passenger vehicle sales are zero-emission by 2035 and all new medium- and heavy-duty vehicles sales are zero-emission by 2040.



Amping Up EV Incentives

Figure 1. Car Market Income Demographics

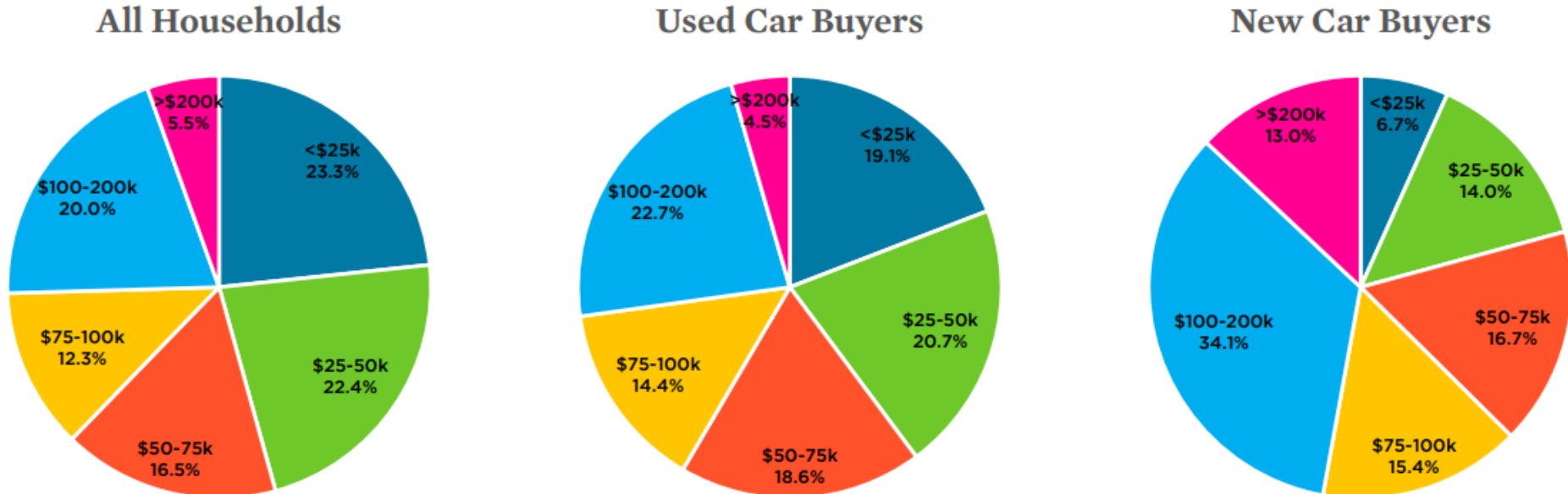
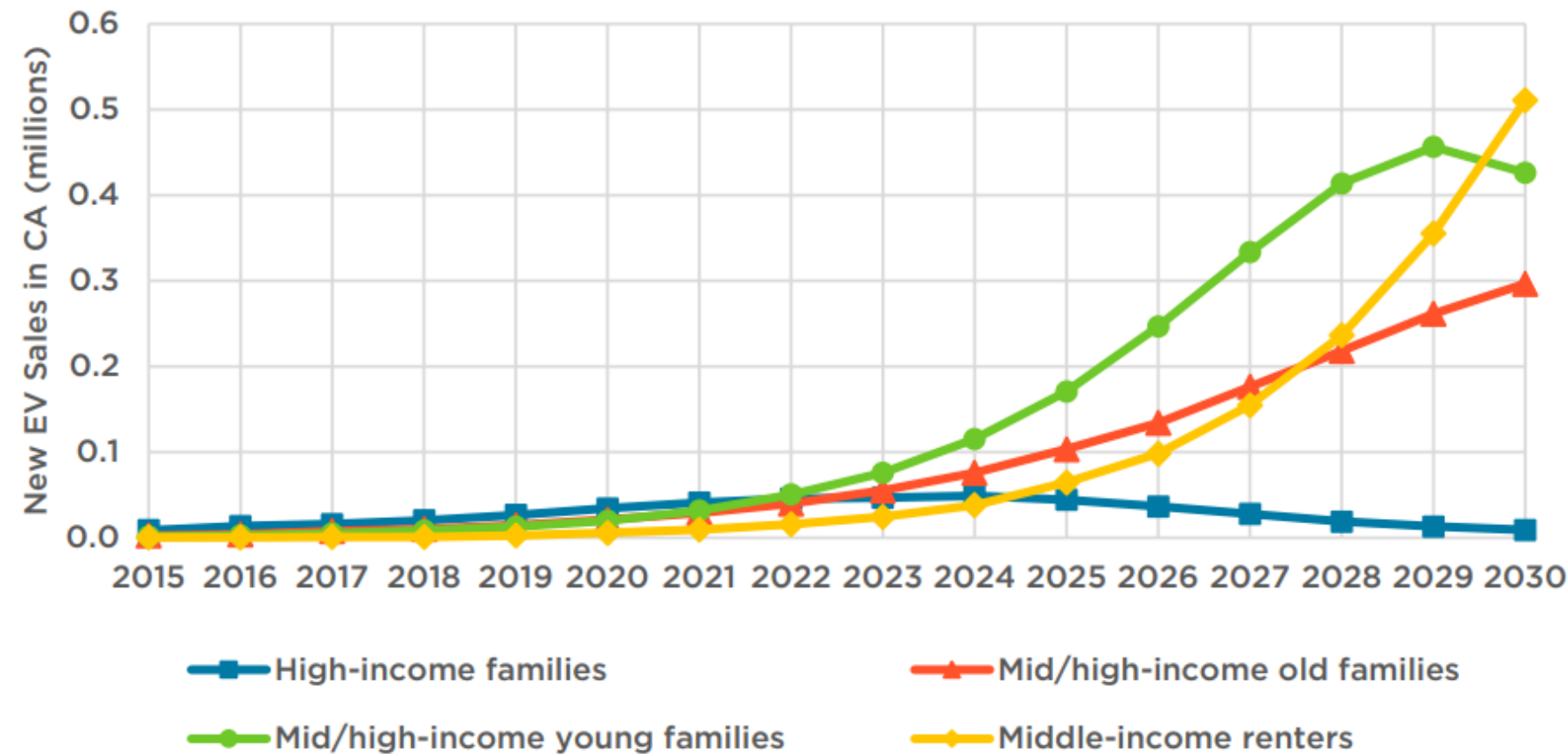


Table 1. Examples of How an Income Cap Impacts Eligibility and Representation

Household Income Cap:	1 Adult	\$25,000	\$37,500	\$50,000	\$75,000	\$100,000	None
	2+ Adults	\$50,000	\$75,000	\$100,000	\$150,000	\$200,000	None
Recent EV Buyers Excluded		94%	80%	70%	38%	29%	0%
Total New-Car Buyer Eligibility		16%	31%	46%	70%	82%	100%
Total Used-Car Buyer Eligibility		35%	54%	69%	87%	94%	100%
Share of Eligible Households Below Median Income		100%	70%	51%	35%	30%	24%
Non-White Share of Eligible Households (34% Nationally)		38%	34%	32%	30%	29%	28%

Figure 2. Diffusion Model of EV Purchases in California



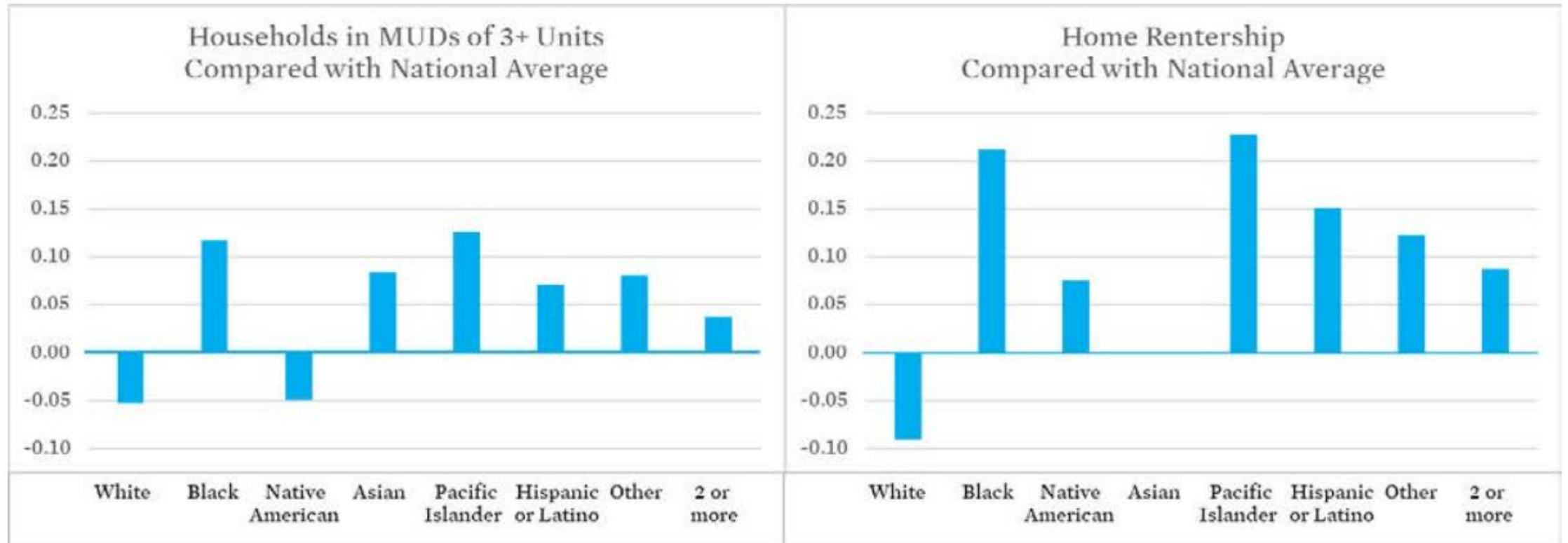
SOURCE(S): REPRODUCED FROM LEE, HARDMAN, AND TAL 2019⁶

Federal Support for EV Charging

FACT SHEET

Samantha Houston, a vehicles analyst in the UCS Clean Transportation program

Figure 1. Housing Type and Renter Status by Race and Ethnicity in the United States



Rethinking policy objectives

Electric vehicle policies

- New vehicle regulations
- Accessible financing
- Used-vehicle incentives
- Early retirement programs

Electric charging policies

- Filling the information gap
- Charging for communities, not passersby
- Building codes

A close-up photograph of a person's hand inserting a white and blue electric vehicle (EV) charging cable into the charging port of a light blue car. The background is a blurred green, suggesting an outdoor setting. A dark grey semi-transparent banner is overlaid on the top left, and another dark grey semi-transparent box is in the bottom right containing text.

{ Thank You

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