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TOO HOT TO HANDLE: CURBING MOBILE HOME HEAT DEATHS IN A WARMING CLIMATE

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ABSTRACT

As global warming intensifies, ensuring that its impacts do not disproportionately burden disadvantaged populations has become a growing policy concern. Within the United States, mobile home residents increasingly face climate injustices but are often overlooked in climate policy discussions. Even after accounting for income and race, mobile home residents experience substantially higher indoor heat risks than

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single-family home residents. Mobile home residents also comprise a disproportionately high percentage of indoor heat deaths. The heat vulnerability of these Americans is even greater for those living in the numerous sparsely-shaded mobile home parks occupying cities and towns throughout the country's Sun Belt region. These residents typically do not own the land beneath their homes and often lack resources to combat indoor heat risks or to have a meaningful voice in driving policy changes capable of addressing their plight. Although mobile homes built in the United States today must conform to federal building standards that require better insulation, millions of Americans still reside in older mobile homes that are poorly suited to protect them from rising temperatures. This paper highlights the emerging mobile home heat crisis in the United States and identifies specific short-term and longer-term policy strategies capable of addressing it. Greatly improving mobile home residents' access to home weatherization and utility assistance programs, requiring mobile home park landscaping and designs to better combat heat island effects, and ultimately phasing out nonconforming mobile homes will all be necessary to ensure that millions of vulnerable Americans can seek comfortable refuge as climate change worsens in the coming decades.

INTRODUCTION

Although extremely hot weather is more predictable than hurricanes, tornadoes, earthquakes, and most other severe weather events, extreme heat kills more people annually in the United States than any of those disasters.¹ Why do heat-related deaths continue to occur at such an alarming rate? Researchers at Arizona State University recently focused on this question while examining heat deaths in Maricopa County, Arizona.² The question itself is not novel—many others have studied the

¹ Michael B. Gerrard, *Heat Waves: Legal Adaptation to the Most Lethal Climate Disaster (So Far)*, 40 U. ARK. LITTLE ROCK L. REV. 515, 517 (2018) (“More people in the United States now die from heat than from any other weather-related event, and the heat-related death numbers are probably understated because ‘heat’ usually is not the stated cause on death certificates.”).

² See KNOWLEDGE EXCH. FOR RESILIENCE, ARIZ. STATE UNIV., IMPROVING HEAT RESILIENCE AMONG ECONOMICALLY INSECURE PHOENICIANS THROUGH KNOWLEDGE EXCHANGE (2020) [hereinafter IMPROVING HEAT RESILIENCE] (on file with authors); Katsiaryna Varfalameyeva, *An Illusion of Affordability: the Economic Costs of Heat Exposure for Mobile Housing in the Phoenix Metropolitan Area* (2020) (unpublished M.A. thesis, Ariz. State Univ.) (on file with authors).

deadly impacts of extreme heat on various subgroups of Americans³—but the researchers uncovered a problem that could grow even more severe as global temperatures continue rising in the coming years. Upon geographically mapping heat mortalities and morbidities in Maricopa County, the researchers repeatedly discovered large clusters of deaths within mobile home parks.⁴

Further qualitative research has revealed striking differences between homes within Maricopa County’s mobile home parks and residences in other parts of the county that make mobile home residents uniquely vulnerable to Arizona’s blistering summer heat. Over an 85-day period in the summer of 2019, researchers measured temperatures inside several mobile homes and learned that indoor temperatures in many of them averaged a punishing 95 degrees.⁵ Some mobile homes lacked air conditioning or even electric power.⁶ Other mobile home dwellers had electricity service but declined to use it to cool their homes because they could not afford to pay resulting utility bills.⁷ In one home, Tanya, a stroke survivor, endured indoor temperatures as high as 111 degrees.⁸ In another home, 97-year-old Albert relied on a leaking swamp cooler and multiple fans instead of air conditioning.⁹ Overall, slightly less than 5% of Maricopa County residents live in mobile homes, yet these residents comprise more than 29% of the area’s indoor heat deaths.¹⁰

The problem of extreme heat vulnerability in mobile homes is not confined to Arizona and is likely to become more widespread in the coming decades. At least one study has found that being a mobile home

³ See, e.g., Ashley Ward et al., *The Impact of Heat Exposure on Reduced Gestational Age in Pregnant Women in North Carolina, 2011–2015*, 63 INT’L J. BIOMETEOROLOGY 1611 (2019); Margaret M. Kovach et al., *Area-Level Risk Factors for Heat-Related Illness in Rural and Urban Locations Across North Carolina, USA*, 60 APPLIED GEOGRAPHY 175 (2015); Yuming Guo et al., *Heat Wave and Mortality: a Multicounty, Multicommunity Study*, 125 ENVIRONMENTAL HEALTH PERSPECTIVES 087006-1 (2017), <https://doi.org/10.1289/EHP1026>; David M. Hondula et al., *Fine-Scale Spatial Variability of Heat-Related Mortality in Philadelphia County, USA, from 1983-2008*, 11 ENV’T J. 1 (2012).

⁴ Varfalameyeva, *supra* note 2, at 8.

⁵ IMPROVING HEAT RESILIENCE, *supra* note 2, at 1.

⁶ *Id.* at 23.

⁷ Varfalameyeva, *supra* note 2, at 28.

⁸ Mark Kear, Margaret Wilder, Patricia Solís, David Hondula & Mark Bernstein, Opinion, *Self-Isolating from COVID-19 in a Mobile Home? That Could Be Deadly in Arizona*, AZCENTRAL (May 3, 2020, 6:05 AM), <https://www.azcentral.com/story/opinion/op-ed/2020/05/03/arizona-heat-could-kill-self-isolating-coronavirus-mobile-homes/3043693001/>.

⁹ *Id.*

¹⁰ *How the Deadliest Hazard Kills Mobile Home Residents*, ASU KNOWLEDGE EXCH. FOR RESILIENCE (Feb. 18, 2021), <https://storymaps.arcgis.com/stories/84e07969829945cb9968151a5c1b2b76> [hereinafter *Deadliest Hazard*].

resident significantly increases one's risk of visiting an emergency room due to heat-related illness.¹¹ Mobile homes, which provide housing to approximately 22 million Americans,¹² are a particularly important form of housing stock in the country's increasingly hot Sun Belt region stretching from California to the Carolinas.¹³ While average annual temperatures in the contiguous United States continue to rise and are expected to be 2.5 degrees higher by 2050,¹⁴ the Sun Belt's population also continues to rise.¹⁵ These shifts are likely to make a troubling situation even worse. Accordingly, there is a growing need for the federal government and state governments across the Sun Belt region to reform the legal and policy structures that presently expose so many Americans to indoor heat risks.

This article examines the legal and regulatory factors that are perpetuating mobile home heat risks in the United States and identifies specific policy strategies capable of addressing these challenges. Part I provides an overview of how climate change is impacting mobile home residents. Part II outlines various laws associated with heat vulnerability and mobile homes, highlights deficiencies in these laws, and analyzes these deficiencies. Part III identifies and describes several potential short-term and long-term strategies for confronting these problems and ensuring that future generations of Americans are better protected against extreme heat within their homes.

¹¹ Kovach *supra* note 3, at 181 (noting that in both urban and rural settings, "mobile homes predicted a large increase in heat-related [emergency room] visits"). To the authors' knowledge, granular heat-related data (e.g., distinguishing between indoor and outdoor heat deaths or distinguishing between indoor deaths by housing type) is not readily available in U.S. jurisdictions outside Maricopa County.

¹² Ann M. Burkhart, *Taxing Manufactured Homes*, 67 TAX LAW 909, 910 (2014).

¹³ CONSUMER FIN. PROT. BUREAU, MANUFACTURED-HOUSING CONSUMER FINANCE IN THE UNITED STATES 10-12 (2014), https://files.consumerfinance.gov/f/201409_cfpb_report_manufactured-housing.pdf.

¹⁴ Gerrard, *supra* note 1, at 515.

¹⁵ U.S. CENSUS BUREAU, MOST OF THE COUNTIES WITH THE LARGEST POPULATION GAINS SINCE 2010 ARE IN TEXAS (Mar. 26, 2020), <https://www.census.gov/newsroom/press-releases/2020/pop-estimates-county-metro.html>; Elliot Davis, *2020 Census Shows Fastest-Growing States*, U.S. NEWS & WORLD REPORT, <https://www.usnews.com/news/best-states/slideshows/these-are-the-10-fastest-growing-states-in-america> ("The population in the South grew 10.2% since 2010, while the West was close behind at 9.2%.").

I. RISING TEMPERATURES AND MOBILE HOMES

As global temperatures increase, temperatures inside many American mobile homes are rising to hazardous levels. In this warming climate, homes increasingly serve as crucial places of refuge from summer heat. Sadly, a significant number of American homes offer inadequate relief. These worsening problems are exposing the reality that, although mobile homes may initially seem an affordable housing option, they involve significant hidden and sometimes fatal costs.¹⁶

A. *Global Warming*

Humankind is living today in the hottest global environment it has ever experienced.¹⁷ The global temperature for the year 2020 was more than one degree Celsius above the twentieth century average.¹⁸ 2020 ranked second only to 2016 as the hottest year in recorded history.¹⁹ The acute effects of these changes are most pronounced in regions that already experience extreme heat. In the United States, areas such as the Southwest are seeing summer temperatures rise across sun-bleached deserts and sweltering valleys. For example, Phoenix, Arizona continues to experience rising temperatures year after year and had a record-breaking 53 days of temperatures of 110-degrees or greater in the year 2020.²⁰ In September of that year, Los Angeles County experienced its highest temperature on record at 121 degrees.²¹

Although the effects of rising temperatures tend to draw the most attention in historically warm regions, those areas are not the only ones seeing rising temperatures. Cities such as Burlington, Vermont; Chattanooga, Tennessee; and Helena, Montana were listed just below Phoenix in a list of the top ten fastest warming cities in the United

¹⁶ Varfalameyeva, *supra* note 2, at 3.

¹⁷ See *More Near-Record Warm Years Are Likely on Horizon*, NAT'L CTRS. FOR ENV'T INFO. (Jan. 29, 2021), <https://www.ncei.noaa.gov/news/projected-ranks>.

¹⁸ See *Climate at a Glance*, NAT'L CTRS. FOR ENV'T INFO., (Sept. 2021), https://www.ncdc.noaa.gov/cag/global/time-series/globe/land_ocean/ytd/11/1880-2020.

¹⁹ See *id.*

²⁰ See Cameron La Fontaine, *Phoenix Breaks Record for Most 100-Degree Days in a Year*, 12 NEWS (Oct. 14, 2020), <https://www.12news.com/article/weather/phoenix-breaks-record-for-most-100-degree-days-in-a-year/75-486371bd-ce3f-4fd0-b069-43a8a80262ee>.

²¹ Matthew S. Schwartz, *Record Heat Wave Creates 'Kiln-Like' Conditions in California*, NPR (Sep. 7, 2020), <https://www.npr.org/2020/09/07/910440067/record-heat-wave-creates-kiln-like-conditions-in-california>.

States.²² Reports suggest that billions of humans across the planet will soon find themselves in “near un-livable” conditions as population growth surges in areas already experiencing high temperatures such as India and Africa.²³ The climate crisis has reached a point at which nearly all corners of the planet are now experiencing its repercussions.

B. *Hot Weather’s Effects on Humans*

One troubling consequence of the warming planet is the growing incidence of heat-related mortalities and morbidities in the United States. Extreme heat is the deadliest of all climate-related disasters in the country and has also proven deadly across the globe.²⁴ In 2020, Maricopa County saw a record numbers of deaths,²⁵ with a total of 207 confirmed deaths attributed to heat and another 134 still under investigation.²⁶ Clark County, Nevada, saw 437 heat-associated deaths from 2007 to 2016.²⁷ In France, over 15,000 deaths were attributed to extreme heat events that struck Western Europe in August 2003.²⁸ A heat wave in Pakistan in 2015 took the lives of over 1,000 people.²⁹ Heat is projected to be a contributing factor to the premature deaths of tens of thousands of Americans each year before the end of the century.³⁰

²² Debra Utacia Kroll, *In Phoenix, Rising Temperatures Day and Night Kill More People Each Year*, AZCENTRAL (Aug. 27, 2020), <https://www.azcentral.com/in-depth/news/2020/08/26/heat-killing-more-people-cities-sizzle-hotter-temperatures/4553439002/>.

²³ *Climate Change: More Than 3bn Could Live in Extreme Heat by 2070*, BBC (May 5, 2020), <https://www.bbc.com/news/science-environment-52543589>.

²⁴ Alissa Walker, *Our Cities Are Getting Hotter—And it’s Killing People*, CURBED (June 21, 2019), <https://archive.curbed.com/2018/7/6/17539904/heat-wave-extreme-heat-cities-deadly/>.

²⁵ Ian James, *Heat Killed a Record Number of People in Arizona Last Year, “a Staggering Increase,”* AZCENTRAL (Jan. 31, 2021), <https://www.azcentral.com/story/news/local/arizona-environment/2021/01/31/heat-killed-record-number-people-arizona-last-year/4294654001/>.

²⁶ MARICOPA CNTY. PUB. HEALTH, HEAT ASSOCIATED DEATHS & HOSPITAL VISITS 2020 WEEKLY REPORT WEEK 44 (10/25-10/31), at 1 (2020), <https://www.maricopa.gov/ArchiveCenter/ViewFile/Item/5131>.

²⁷ Christopher Flavelle & Nadja Popovich, *Heat Deaths Jump in Southwest United States, Puzzling Officials*, N.Y. TIMES (Aug. 26, 2019), <https://www.nytimes.com/2019/08/26/climate/heat-deaths-southwest.html>.

²⁸ U.S. ENV’T PROT. AGENCY, EXCESSIVE HEAT EVENTS GUIDEBOOK 5 (2006), https://www.epa.gov/sites/production/files/2016-03/documents/ehguide_final.pdf.

²⁹ Aoun Sahi, *Temperatures Cool, but Death Toll Tops 1,000 in Pakistani Heat Wave*, L.A. TIMES (June 25, 2015), <https://www.latimes.com/world/asia/la-fg-death-toll-pakistan-heat-wave-20150625-story.html>.

³⁰ Flavelle & Popovich, *supra* note 27.

Heat can be a killer whether it is experienced outside or indoors.³¹ In Maricopa County, indoor heat deaths comprise roughly 30-40% of all heat associated deaths.³² In Japan, heat stroke was most often found to occur indoors during the summer.³³ People tend to seek refuge from heat at home, and if their homes are not suitable to protect them during an extreme heat event, their risk of dying from indoor heat rises.³⁴ Conversely, proper housing and access to cool air can usually prevent indoor heat deaths.³⁵

Even if it does not prove fatal, excessive indoor heat causes far more than discomfort. Exposure to extreme heat can result in hyperthermia—a condition at which the human body becomes unable to properly cool itself.³⁶ Hyperthermia often manifests in the form of heat exhaustion, which is characterized by symptoms such as muscle cramping, fatigue and headaches.³⁷ Unless treated, heat exhaustion can lead to heat stroke.³⁸ The high body temperatures experienced during heat stroke and the body's inability to cool through sweating can lead to organ damage or, in severe instances of heat stroke, multiple organ failure and death.³⁹ Prolonged excessive heat exposure can likewise exacerbate other health issues, such as disruptions in insulin uptake for those with diabetes.⁴⁰ Researchers have also found correlations between extreme heat and pre-term delivery among pregnant women who cannot find relief from such conditions.⁴¹

C. *Demographic Risk Factors for Heat-Related Illness*

While indoor heat risks are experienced to some degree by communities throughout the country, some regions and populations are

³¹ See WORLD HEALTH ORG., WHO HOUSING AND HEALTH GUIDELINES 44-45 (2018), https://www.ncbi.nlm.nih.gov/books/NBK535293/pdf/Bookshelf_NBK535293.pdf.

³² MARICOPA COUNTY PUBLIC HEALTH, HEAT-ASSOCIATED DEATHS IN MARICOPA COUNTY, AZ FINAL REPORT FOR 2019, at 12 (2019), <https://www.maricopa.gov/ArchiveCenter/ViewFile/Item/4959>.

³³ WORLD HEALTH ORG., *supra* note 31, at 45.

³⁴ *Id.*

³⁵ *Id.*

³⁶ CTR. FOR DISEASE CONTROL & PREVENTION, HEAT-RELATED ILLNESS 1 (2017), https://www.cdc.gov/pictureofamerica/pdfs/picture_of_america_heat-related_illness.pdf.

³⁷ *Id.*

³⁸ *Id.* at 2.

³⁹ *Id.*

⁴⁰ Kroll, *supra* note 22.

⁴¹ Rebecca Lindsey, *Extreme Heat Increases Pregnant Women's Risk of Pre-Term Delivery*, CLIMATE.GOV (Sept. 30, 2019), <https://www.climate.gov/news-features/featured-images/extreme-heat-increases-pregnant-women%E2%80%99s-risk-pre-term-delivery>.

more vulnerable to indoor heat exposure than others.⁴² Many factors contribute to one's vulnerability to heat-related health and safety risks, ranging from age and ethnicity to education level and household income.⁴³ Age is one of the greatest indicators of susceptibility to heat-related illness and death.⁴⁴ In Maricopa County, adults aged 50 and over have accounted for about 89% of indoor heat-related deaths in recent years.⁴⁵ Populations residing in diverse inner-city neighborhoods also tend to have proportionally more heat deaths than those in whiter, wealthier, and more educated neighborhoods.⁴⁶

Even among low-income citizens generally, mobile home residents face a particularly high risk of death from indoor heat exposure. For example, mobile homes in Maricopa County account for more than 25% of indoor heat-related deaths despite housing less than 5% of the county's residents.⁴⁷ Research has also found disproportionate rates of heat morbidity and mortality in mobile home parks even when compared to similarly socio-economically situated neighborhoods comprised of traditional homes.⁴⁸

D. *Heat in the Built Environment*

While several demographic factors, including location, age, race, class, and education level, contribute to the disparate impacts of global warming of particular groups and individuals, the built environment is partly responsible for those differences, especially in urban areas. For

⁴² See, e.g., Karen Savage, *Newest Climate Liability Suits: Climate Justice Is Racial Justice*, CLIMATE DOCKET (June 30, 2020), <https://www.climatedocket.com/2020/06/30/climate-liability-lawsuits-racial-justice> (“Segregated urban neighborhoods experience greater rates of heat-related illnesses due to the prevalence of paved surfaces and a lack of green infrastructure.”).

⁴³ See Cory Sanchez, *Tricks of the Shade: Heat Related Coping Strategies of Urban Persons in Phoenix, Arizona 4-5* (May 2011) (unpublished M.S. thesis, Ariz. State Univ.) (on file with Arizona State University Library); Kovach, *supra* note 3, at 179.

⁴⁴ Kovach, *supra* note 3, at 180.

⁴⁵ Varfalameyeva, *supra* note 2, at 7.

⁴⁶ Meg Anderson & Sean McMinn, *As Rising Heat Bakes U.S. Cities, The Poor Often Feel It Most*, NPR (September 3, 2019), <https://www.npr.org/2019/09/03/754044732/as-rising-heat-bakes-u-s-cities-the-poor-often-feel-it-most>; Winston T. L. Chow et al., *Vulnerability to Extreme Heat in Metropolitan Phoenix: Spatial, Temporal, and Demographic Dimensions*, 64 PRO. GEOGRAPHER 286, 290 (2012) (“[E]lderly, minority, and low-income residents [are] more exposed to heat stresses than their younger, white, more affluent counterparts.”).

⁴⁷ Varfalameyeva, *supra* note 2, at 3, 16.

⁴⁸ *Id.* (comparing the heat complications mobile home park residents to those of predominantly minority, low-income people residing in traditional homes in South Phoenix).

instance, tree-covered landscapes often provide protection from extreme heat in the form of shade and evapotranspiration.⁴⁹ In contrast, “heat island effects” in some concrete-laden urban areas exacerbate already extreme temperatures.⁵⁰ As humans face rising temperatures around the world, adequate shelter becomes an increasingly important way to prevent illness or death. However, as cities grow and the built environment expands, some of this land development may actually intensify heat-related challenges.

A community’s landscaping and design can also have a substantial impact on the comfort level of those living in urbanized environments. Urban heat islands are urban areas that see hotter temperatures relative to adjacent rural areas.⁵¹ Sprawling concrete structures and paved roads trap heat, often for hours after the sun has gone down.⁵² Tall glass buildings can reflect and intensify sunlight and block winds, further facilitating the rise in temperature.⁵³ Following a rise in heat deaths in Baltimore, the University of Maryland and NPR conducted a joint study that found a pattern of housing segregation forcing Black residents into urban heat islands.⁵⁴ Homes in these neighborhoods saw indoor heat indexes as high as 119 degrees due to the absence of tree canopy coverage, urban sprawl, and a lack of air conditioning.⁵⁵ While most mobile home parks are not found at the heart of major cities, the built environments of many of these parks create similar effects.⁵⁶

E. *Mobile Home Use in the United States*

The manufactured home or “mobile home” (MH) occupies a unique space in the American housing landscape.⁵⁷ Because of the

⁴⁹ *Heat Island Effect*, EPA, <https://www.epa.gov/heatislands#:~:text=Heat%20islands%20are%20urbanized%20areas,as%20forests%20and%20water%20bodies> (last visited Feb. 11, 2021).

⁵⁰ *Id.*

⁵¹ Jessica Abbinett et al., *Heat Response Plans: Summary of Evidence and Strategies for Collaboration and Implementation*, CDC, 14 (2020), https://www.cdc.gov/climateandhealth/docs/HeatResponsePlans_508.pdf.

⁵² Marcus C. Sarofim, et al., *Temperature-Related Death and Illness*, in THE IMPACTS OF CLIMATE CHANGE ON HUMAN HEALTH IN THE UNITED STATES 43, 54, https://health2016.globalchange.gov/high/ClimateHealth2016_02_Temperature.pdf.

⁵³ Abbinett et al., *supra* note 51.

⁵⁴ Savage, *supra* note 42.

⁵⁵ *Id.*

⁵⁶ See *Deadliest Hazard*, *supra* note 10; see *infra* notes 90-94 and accompanying text.

⁵⁷ For purposes of this article, “MH” refers to a factory-built housing structure that can be moved (usually by towing from factory to final resting place) on a chassis. Sarah Baird, *Mobile Homeland*, CURBED (Sep. 13, 2017), <https://www.curbed.com/2017/9/13/>

inherent differences between MHs and traditional housing (also called “stick-built” or “site-built” homes), residents of MHs are particularly vulnerable to the heat-related dangers discussed above. Certain aspects of the history of MHs and their role in the U.S. economy has contributed to these differences.

1. *History and Statistics of the Mobile Home*

Like many modern amenities, MHs are a product of the post-World War II population boom.⁵⁸ Emerging in the midst of a domestic housing shortage, the MH industry grew rapidly because it offered an inexpensive, transportable housing option for lower-income Americans.⁵⁹ As the MH grew in popularity, so too did public awareness of their comparatively low-quality construction and lack of durability.⁶⁰ Accordingly, in 1974, Congress enacted legislation “to reduce the number of personal injuries and deaths and the amount of insurance costs and property damage resulting from mobile home accidents and to improve the quality and durability of mobile homes.”⁶¹ The Manufactured Home Construction and Safety Standards resulting from this bill empowered the Department of Housing and Urban Development (HUD) to promulgate rules regulating the industry.⁶² These so-called “HUD codes,” significantly overhauled in 1994, remain the nation’s primary MH standards today.⁶³

At present, roughly 22 million Americans live in MHs.⁶⁴ MHs tend to comprise a higher percentage of the housing stock in southern and western states, comprising as much as 17% of one such state’s overall

16275948/mobile-manufactured-homes-clayton-trailers. It does not refer to a trailer or recreational vehicle (RV), nor does it refer to a modular home—these are also factory-built, but they are transported in pieces instead of on a single chassis and assembled on site. *Id.*

⁵⁸ Annemarie Michele Galeucia, *Mobile Homes: Class Space and Race in Idealized Landscapes of Home* 4333 LSU DOCTORAL DISSERTATIONS 1, 14 (2016).

⁵⁹ *Id.*

⁶⁰ Baird, *supra* note 57; see National Mobile Home Construction and Safety Standards Act of 1974, Pub. L. No. 93-383, 88 Stat. 700 (1974) (codified as amended at 42 U.S.C. §§ 5401-5426).

⁶¹ National Mobile Home Construction and Safety Standards Act of 1974 § 602.

⁶² *Id.*

⁶³ 24 CFR §§ 3280.1–3280.904; Baird, *supra* note 57; *Manufactured Home Construction and Safety Program*, HUD, https://www.hud.gov/program_offices/housing/rmra/mhs/csp (last visited Feb. 19, 2021).

⁶⁴ Burkhart, *supra* note 12, at 910.

occupied housing units.⁶⁵ Once they are delivered from the factory to a plot of land, fewer than 5% of MHs ever move again.⁶⁶ To relocate a MH typically costs at least \$5,000, which is out of the reach of most residents.⁶⁷ The median annual income of MH residents is roughly \$28,400, which is about 23% below the federal poverty line.⁶⁸ The median age for MH residents is 52.6, and nearly a quarter of MH residents are 65 years older or older.⁶⁹

2. *Building Standards*

The construction standards applicable to MHs are markedly lower than those that apply to most stick-built single-family homes. Foundation-built homes must typically comply with state or local building codes.⁷⁰ In contrast, MHs—because of their unique history and role in the country’s housing stock—are instead subject to federal manufacturing standards.⁷¹ Even for several years after Congress enacted the nation’s first federal MH standards, MHs continued to be woefully energy-inefficient: pre-1980s MHs consume an average of 53% more energy per square foot than all other types of homes.⁷² Although HUD updated its regulations to emphasize greater energy efficiency in 1994,⁷³ millions of homes manufactured prior to this update (and even prior to

⁶⁵ This 17% figure describes the state of South Carolina. CONSUMER FIN. PROT. BUREAU, *supra* note 13. Other noteworthy percentages: 16% in New Mexico, 15% in Mississippi. *Id.*

⁶⁶ Frank Rolfe, *The Truth About My Notorious Waffle House Quote*, MOBILE HOME UNIVERSITY (last visited Sept. 2, 2020), <https://www.mobilehomeuniversity.com/articles/the-truth-about-my-notorious-waffle-house-quote>.

⁶⁷ *Id.*

⁶⁸ *Deadliest Hazard*, *supra* note 10.

⁶⁹ *Id.*

⁷⁰ Land use laws (of which building codes are a part) are considered to be within the purview of the states, rather than the federal government. *See* *Euclid v. Ambler Realty Co.*, 272 U.S. 365, 389 (1926) (finding that a city could use its police power to implement a comprehensive land use plan for the community); Jerold S. Kayden, *National Land-Use Planning in America: Something Whose Time Has Never Come*, 3 WASH. U. J.L. & POL’Y 445, 447 (2000) (“Unlike many other countries, the United States does not have a national land-use planning law.”).

⁷¹ 42 U.S.C. §§ 5401-5426 (“Congress finds that manufactured housing plays a vital role in meeting the housing needs of the Nation.”); *see also* MANUFACTURED HOUS. INST., UNDERSTANDING TODAY’S MANUFACTURED HOUSING 3 (2018), <https://www.manufacturedhousing.org/wp-content/uploads/2017/10/Understanding-Manufactured-Housing.pdf> (describing the difficulties manufacturers faced prior to the HUD Codes, due to interstate shipment and a lack of uniform state laws governing MHs).

⁷² Baird, *supra* note 57.

⁷³ *Id.*

the 1976 promulgation of the first HUD codes) still exist in the nation's housing stock today.⁷⁴ Even most of today's new MHs lack the quality of their site-built counterparts.⁷⁵

Even if the federal government were to adopt new weatherization regulations aimed at ensuring heat resilience in MHs, enforcing such rules may prove a difficult challenge. HUD requires all MHs purchased after 1976 to have so-called "HUD tags" affixed to their exterior certifying that they conform to federal standards.⁷⁶ However, HUD relies on local inspectors to confirm that MH meet the agency's various requirements, and there are some doubts about the efficacy of these inspections.⁷⁷

3. *Ownership*

The ownership structure surrounding most MHs further complicates efforts to ensure MHs are heat-resilient. Although roughly 80% of MH residents own their MH unit, only 14% of those owners also own the land beneath them.⁷⁸ This creates inequities in multiple ways. First, land ownership is required to title (or re-title) a MH as real property.⁷⁹ This is significant because, as chattel, MHs typically qualify only for mortgage interest rates that are two to three times higher than those secured with real property.⁸⁰ Accordingly, roughly 68% of MH loans in the United States today fit the Home Mortgage Disclosure Act of 2012's definition of a "higher-priced mortgage loan" compared to just 3% of site-built home loans.⁸¹ Even loans for higher-end MHs have comparatively high rates.⁸² Second, the lack of land ownership associated with MHs tends to cause them to depreciate rather than appreciate in value, making it

⁷⁴ *Id.*

⁷⁵ JUSTIN TALBOT, AMERICAN COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY, MOBILIZING ENERGY EFFICIENCY IN THE MANUFACTURED HOUSING SECTOR 5 (2012) ("Energy standards in the HUD Code have been updated once since its inception By contrast, the International Energy Conservation Code [which most states adopt to govern site-built home standards] . . . is updated every three years.").

⁷⁶ Galeucia, *supra* note 58, at 170-71.

⁷⁷ *Id.* at 132 ("Often times, local inspectors pass homes that are either not properly sited or are close, but not within, the 1994 rules for weather upgrades.").

⁷⁸ ESTHER SULLIVAN, MANUFACTURED INSECURITY: MOBILE HOME PARKS AND AMERICANS' TENUOUS RIGHT TO PLACE 16 (2018).

⁷⁹ *Id.*

⁸⁰ Rana Foroohar, Why Big Investors Are Buying Up American Trailer Parks, FIN. TIMES (Feb. 7, 2020), <https://www.ft.com/content/3c87eb24-47a8-11ea-ae2-9ddbdc86190d>.

⁸¹ CONSUMER FIN. PROT. BUREAU, *supra* note 13, at 6.

⁸² *Id.*

comparatively more difficult for MH households to build wealth over time.⁸³ Lastly, MH residents face the possibility of park owners deciding to sell the land or redevelop it into more valuable uses, forcing mass relocations for hundreds of families, many of whom cannot afford the move.⁸⁴

In recent years, MH parks have become an increasingly attractive investment for major institutional investors, potentially creating even more obstacles to better protecting MH residents from extreme heat. Private equity firms have purchased more than 100,000 MH sites in the past five years alone.⁸⁵ Institutional investors accounted for 17% of the \$4 billion in MH transactions in 2018, compared to just 9% of transactions in 2013.⁸⁶ Investing in MH parks often produces large and stable returns because MH park residents are less likely to move than those in other forms of housing, so it can be easier to keep vacancies low while raising rents over time.⁸⁷ For example, a pension fund that invested \$179 million into MH communities nationwide saw a 30% return between September 2016 and December 2017.⁸⁸ In the words of the owner of one major MH park empire, “[w]e traditionally raise our rents by an average of 10% a year . . . , and it’s pretty much true for the

⁸³ Will Van Vector, *Buying a Mobile Home Instead of a Regular Home: Pros and Cons*, NOLO, <https://www.nolo.com/legal-encyclopedia/buying-mobile-home-instead-regular-home-pros-cons.html> (last visited Oct. 5, 2021). Some sources claim that mobile homes may appreciate in price, but these are focused on mobile homes titled as real property, meaning the homeowner owns the land as well. Laurie Goodman et al., *New Evidence Shows Manufactured Homes Appreciate as well as Site-Built Homes*, URBAN INST. (Sept. 13, 2018), <https://www.urban.org/urban-wire/new-evidence-shows-manufactured-homes-appreciate-well-site-built-homes> (citing a government study that was “limited to [manufactured home] loans titled as real property and guaranteed by [Fannie Mae or Freddie Mac].”).

⁸⁴ Esther Sullivan, *Displaced in Place: Manufactured Housing, Mass Eviction, and the Paradox of State Intervention*, 82 AM. SOCIO. REV. 243, 244 (2017) (“Most U.S. states have not enacted laws to regulate mobile home park closures and the mass evictions that result.”).

⁸⁵ JIM BAKER ET AL., PRIVATE EQUITY GIANTS CONVERGE ON MANUFACTURED HOMES 4 (2019), <https://pe stakeholder.org/wp-content/uploads/2019/02/Private-Equity-Giants-Converge-on-Manufactured-Homes-PESP-MHAction-AFR-021419.pdf>.

⁸⁶ Foroohar, *supra* note 80.

⁸⁷ BAKER ET AL., *supra* note 85, at 8; Rupert Neate, *America’s Trailer Parks: The Residents May Be Poor but the Owners Are Getting Rich*, THE GUARDIAN (May 3, 2015), <https://www.theguardian.com/lifeandstyle/2015/may/03/owning-trailer-parks-mobile-home-university-investment>; Rolfe, *supra* note 66.

⁸⁸ Peter Whoriskey, *Billion-Dollar Empire Made from Mobile-Home Parks as Residents Scrape by*, WASH. POST (Feb. 16, 2019), <https://www.seattletimes.com/business/real-estate/billion-dollar-empire-made-from-mobile-homes/#:~:text=Over%20the%20past%20three%20years,and%20Americans%20for%20Financial%20Reform.>

industry. Our world record [rent increase] went from \$125 to \$275 in one month.”⁸⁹

4. *The Parks*

The settings in which MHs congregate often exacerbate the indoor heat vulnerabilities of these structures. MH parks are often densely distributed across black asphalt lots with little to no shade.⁹⁰ As more cities sprawl outward, MH parks are increasingly surrounded by more urbanized environments.⁹¹ These parks are often tucked away from sight, at the edges of town or hidden behind tall walls.⁹² The social stigmas associated with MH parks and MH residents and the physical isolation of these parks from other neighborhoods often weaken the social connection between park residents and surrounding communities.⁹³ In addition to the parks’ physical characteristics, this separation may also contribute to heat vulnerability.⁹⁴

Many homes across the United States are poorly equipped to prevent indoor heat problems attributable to global warming, and inadequate air conditioning is another common struggle for MH-residing Americans.⁹⁵ During an extreme heat event, air conditioning (A/C) units are often viewed as the quickest and most effective design solution to protect against heat injury or death.⁹⁶ A study by Maricopa County Public Health found an A/C unit was present in 91% of recorded indoor heat deaths but that the units were non-functioning in 87% of those instances.⁹⁷ While energy-efficient A/C appliances continue to grow in popularity in the

⁸⁹ Neate, *supra* note 87.

⁹⁰ See *Deadliest Hazard*, *supra* note 10.

⁹¹ Foroohar, *supra* note 80.

⁹² Amy J. Schmitz, *Promoting the Promise Manufactured Homes Provide for Affordable Housing*, 13 J. AFFORDABLE HOUS. & CMTY. DEV. L. 384, 395 (2004) (“Zoning boards routinely push MH parks to undesirable, low-property-value areas.”).

⁹³ PAOLA SCOMMEGNA, POPULATION REFERENCE BUREAU, STUDY FINDS U.S. MANUFACTURED-HOME OWNERS FACE ‘QUASI-HOMELESSNESS’ (2004), <https://www.prb.org/studyfindsusmanufacturedhomeownersfacequasihomelessness/> (“[M]ost [MH] park residents [are] much less connected than residents of a typical small-town neighborhood.”).

⁹⁴ Chow et al., *supra* note 46, at 299-300 (Highlighting the vulnerabilities that many low-income and minority communities experience due to lack of social cohesion and suggesting improvements to facilitate the sharing of heat stress information and advanced heat wave warnings).

⁹⁵ Sarofim et al., *supra* note 52, at 55.

⁹⁶ See Abbinett et al., *supra* note 51.

⁹⁷ MARICOPA COUNTY PUBLIC HEALTH, *supra* note 32, at 15.

United States,⁹⁸ they are not always within the financial reach of low-income MH households who arguably need them most. Furthermore, as temperatures across the globe continue to rise, areas that already perennially experience extreme heat may see that trend begin to outpace technological advancements designed to affordably and reliably cool buildings.⁹⁹

II. EXISTING LEGAL FRAMEWORK

In addition to the practical disadvantages highlighted above, MHs differ from site-built homes in at least one other critical way: their residents are less likely to qualify for aid programs designed to reduce indoor heat risks. While federal and state governments offer various forms of income-based assistance for home weatherization programs, these programs are not equally available to all low-income individuals. Some such programs focus primarily on Americans in cold-weather regions or exclude MH residents from eligibility because of the nature of their relationship to utility companies. Others are mere pilot programs that are not sufficiently funded to address MH owners' problems.

A. *Federal Assistance for Heat Resilience*

Although there are no federal assistance programs targeted directly at MHs and their residents, the U.S. government does offer a few limited aid programs that help increase heat resiliency in some MHs. Residents may qualify under certain programs for funding to pay their utility bills or make energy efficiency improvements to their homes. Some other existing programs also incentivize MH manufacturers to produce more resilient homes. However, in the face of global warming, unless energy efficiency standards aimed at MHs are raised further and federal assistance programs receive more funding, MH households will continue to struggle to afford keeping cool.¹⁰⁰

⁹⁸ U.S. ENV'T PROT. AGENCY, ENERGY STAR BY THE NUMBERS – 2019 (2020), https://www.energystar.gov/sites/default/files/asset/document/2020_EPA_ES_Factsheet_ByTheNumbers_v4_For508.pdf.

⁹⁹ Flavelle & Popovich, *supra* note 27.

¹⁰⁰ See Conor Harrison & Jeff Popke, "Because you Got to Have Heat": The Networked Assemblage of Energy Poverty in Eastern North Carolina, 101 ANNALS OF THE ASS'N OF AM. GEOGRAPHERS 949 (2011).

1. *Low-Income Home Energy Assistance Program (LIHEAP)*

The most prominent federal energy assistance program is structured in a way that unjustifiably precludes many MH residents from eligibility. Congress established the Low-Income Home Energy Assistance Program (LIHEAP) in 1981 and delegated to the Department of Health and Human Services (HHS) the power to administer the program.¹⁰¹ States must apply annually to HHS and, as part of their application, agree to “provide, in a timely manner, that the highest level of assistance will be furnished to those households which have the lowest incomes and the highest energy costs or needs in relation to income.”¹⁰² Most of the LIHEAP money states receive goes toward helping individuals pay bills for heating and cooling.¹⁰³ Once a state government receives federal grant money under LIHEAP, citizens must apply for assistance through a process within their respective states. Applicants qualify only if they fall below certain income thresholds.¹⁰⁴ Most importantly, qualified applicant households must pay for their energy directly, or “in the form of rent” to be eligible.¹⁰⁵ This language effectively prevents many MH residents from accessing the aid.

The master meter system used in many MH parks throughout the country unintentionally disqualifies many MH residents from qualifying for LIHEAP assistance. Under this master meter system, an electric utility sends a single monthly bill to the park’s property manager or owner who then divides the bill equally among all tenants.¹⁰⁶ Master meter systems are used in many housing types, including apartments, condominiums, and MH parks.¹⁰⁷ However, when a MH park utilizes this structure, individual households within the park do not pay for their energy usage as part of their rent; thus, they are ineligible for LIHEAP.¹⁰⁸

¹⁰¹ 42 U.S.C. §§ 8621–8630.

¹⁰² 42 U.S.C. § 8624.

¹⁰³ *Id.*

¹⁰⁴ *Id.*

¹⁰⁵ 42 U.S.C. § 8622.

¹⁰⁶ PUB. UTILS. COMM’N OF NEV., MOBILE HOME PARK GUIDE 2 (2013), http://puc.nv.gov/uploadedFiles/pucnv.gov/Content/About/Docs/Forms/MHP_Guide.pdf (“If the mobile home park is not equipped with submeters, the total utility charge, excluding any billing for common area usage, is prorated to all tenants by dividing the total amount of the utility bill, excluding common areas and late fees, by the number of tenants.”).

¹⁰⁷ *See, e.g., id.*; N.Y. LOCAL LAW 88, § 1 (2009) (“[M]ost large buildings have one master meter for electricity that measures building-wide usage, as opposed to separate meters that provide such information on a per tenant basis.”).

¹⁰⁸ 42 U.S.C. § 8622.

Additionally, MH residents may need to be direct utility customers to be eligible for other energy assistance programs.¹⁰⁹

By contrast, when a MH park operates under a master *sub*-meter system the managing entity divides up the park’s utility bill among all tenants in proportion to their electricity usage such that a tenant who uses more electricity during the billing cycle pays a higher bill.¹¹⁰ With such a sub-metered system, LIHEAP applicants need only provide information verifying that they pay for their own energy.¹¹¹ Studies show that simply switching from a master meter system to a master sub-meter system leads tenants to reduce their electricity use.¹¹²

Another aspect of LIHEAP’s existing structure that has hampered efforts to address the MH heat problem is the fact that HHS tends to award significantly more LIHEAP money to cold-weather states. In 2017, states in New England and the upper Midwest received the most money per capita, while states in the South and West received the least.¹¹³ For example, in 2017, North Dakotans received \$34 per capita while Arizonans received only \$3 per capita—far below the national

¹⁰⁹ See CAL. PUB. UTILS. COMM’N, R.11-02-018, DECISION ON ISSUES CONCERNING VOLUNTARY CONVERSION OF ELECTRIC AND NATURAL GAS MASTER-METERED SERVICE AT MOBILEHOME PARKS 35 (2014), <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M089/K008/89008491.PDF> (“[B]ecause they are not utility customers, [MH residents] are ineligible to participate in established public purpose and load management programs widely available to those who receive direct service, including for example, those developed to promote low-income energy efficiency, the California Solar Initiative and advanced metering infrastructure.”).

¹¹⁰ See PUB. UTILS. COMM’N OF NEV., *supra* note 106.

¹¹¹ See, e.g., ARIZ. DEP’T OF ECON. SEC., LOW INCOME HOME ENERGY ASSISTANCE PROGRAM POLICY AND PROCEDURE MANUAL 21 (2020), https://des.az.gov/sites/default/files/LIHEAP_Policy_Manual_2021.pdf (“In situations where the [utility] accountholder is not the applicant, documentation must be obtained that transfers responsibility for utility costs from the accountholder to the applicant.”); N.Y. STATE OFF. OF TEMP. & DISABILITY ASSISTANCE, HOME ENERGY ASSISTANCE PROGRAM MANUAL 18 (2015), <https://otda.ny.gov/programs/heap/heap-manual.pdf> (“Each household must document that they pay a vendor directly for actual charges incurred for the cost of energy or document that they pay indirectly for the cost of energy that is included in their rent.”).

¹¹² Zhiqiang (John) Zhai & Andrea Salazar, *Assessing the Implications of Submetering with Energy Analytics to Building Energy Savings*, 1 ENERGY & BUILT ENV’T 27, 27 (2020) (“Occupants that are more aware of their energy use tend to turn off unneeded lights, be more conscientious about their use of mechanical cooling and heating systems, unplug unused appliances to eliminate phantom loads, and generally try to conserve energy.”).

¹¹³ Phillip Oliff, Rebecca Thiess & Brakeyshia Samms, *Federal Funding for Low-Income Energy Assistance Highest in New England, Upper Midwest*, PEW RSCH. CTR. (Feb. 21, 2018), <https://www.pewtrusts.org/en/research-and-analysis/articles/2018/02/21/federal-funding-for-low-income-energy-assistance-highest-in-new-england-upper-midwest>.

\$10-per-capita average.¹¹⁴ This results in Arizona, for example, being able to help only a small percentage of vulnerable households of any construction type.¹¹⁵ Nationwide, evidence suggests that LIHEAP funding is woefully inadequate to cover the millions of Americans—including those living in MHs—who are unable to cover the cost of cooling their homes.¹¹⁶ Even before the economic downturn brought on by the COVID-19 pandemic, an estimated 7 million eligible households applied for, but failed to receive, LIHEAP aid.¹¹⁷

2. *Weatherization Assistance Program*

Existing home weatherization assistance programs also fail to adequately address the heat protection needs of millions of American MH households. More energy-efficient homes require less money for utility bills. However, state and federal weatherization aid funding falls far behind that of utility assistance funding, which is already inadequate to cover many vulnerable Americans. Recognizing that low-income Americans tend to live in energy-inefficient dwellings and that improving those dwellings would reduce costs and energy consumption, Congress enacted the Weatherization Assistance Program (WAP) in 1976.¹¹⁸ Unlike LIHEAP, WAP is administered by the Department of Energy. However, funds from the two programs are typically combined at the state level (along with non-federal funds) to weatherize homes.¹¹⁹ Like LIHEAP, WAP was initially designed to focus on cold-weather

¹¹⁴ *Id.*

¹¹⁵ Letter from Kyrsten Sinema et al., United States Senators and Representatives, to Mitch McConnell et al., Leaders of Congress, (May 8, 2020), <https://schweikert.house.gov/sites/schweikert.house.gov/files/Final%20LIHEAP%20AZDel%20Pandemic%20Letter%202020.pdf> (stating that Arizona “continues to reach just four percent of its at-risk households” with LIHEAP funding).

¹¹⁶ NAT'L ENERGY ASSISTANCE DIR.'S ASS'N, 2018 NATIONAL ENERGY ASSISTANCE SURVEY at ii (2018), <https://neada.org/wp-content/uploads/2019/02/liheapsurvey2018.pdf> (finding that, despite receiving LIHEAP benefits, nearly half of the surveyed households skipped paying or paid less than their entire energy bill, and more than a third still received a notice or threat to discontinue service).

¹¹⁷ Carlos Martín, *Families Need More Help to Keep the Lights on and the Water Running During the Pandemic*, URBAN INST. (Apr. 15, 2020), <https://www.urban.org/urban-wire/families-need-more-help-keep-lights-and-water-running-during-pandemic>.

¹¹⁸ NAT'L ASS'N OF STATE CMTY. SERV. PROGRAMS, WEATHERIZATION ASSISTANCE PROGRAM FUNDING REPORT PY 2019, at 2 (2020), https://nascsp.org/wp-content/uploads/2020/12/NASCSP-2019-WAP-Funding-Survey_Final.pdf.

¹¹⁹ *Id.* at 1.

homes,¹²⁰ although a 1995 revision to the formula broadened the scope.¹²¹ The program typically saves families a few hundred dollars per year in energy costs after weatherizing a home,¹²² and some proponents claim it actually returns a net profit in attendant benefits.¹²³ However, states would need far more weatherization funding resources to meet the needs of their vulnerable residents—a need that will only increase in the near future, due to impacts of the COVID-19 pandemic.¹²⁴

3. *Other Federal Initiatives*

In addition to LIHEAP and WAP, a handful of other incentives and aid programs are available that may help small numbers of MH residents but are too meager to significantly address the nation’s growing MH heat problem. For instance, the federal government provides some assistance to MH residents through its Section 504 Home Repair program, administered by the U.S. Department of Agriculture.¹²⁵ However, this program is primarily intended to help farmers and other rural Americans secure adequate housing by issuing low-interest loans and grants.¹²⁶ MH residents can use these loan and grant funds to repair their homes only if (1) they own the land underneath their home, (2) the repairs are needed to remove health or safety hazards, and (3) the home is on a permanent foundation (or will be placed on a permanent foundation using Section

¹²⁰ CORRIE E. CLARK & LYNN J. CUNNINGHAM, CONG. RSCH. SERV., R46418, THE WEATHERIZATION ASSISTANCE PROGRAM FORMULA 3 (2020), https://www.everycrsreport.com/files/2020-06-16_R46418_2db1a927d59728f3322b6b03eea9d6abb5fc7910.pdf (describing the original funding formula, which “emphasized heating demand, resulting in warmer weather states receiving less funds than colder weather states”).

¹²¹ *Id.* at 4.

¹²² *Hearing on Department of Energy Weatherization Assistance Program (WAP) and State Energy Program (SEP) Before the U.S. House Subcomm. on Energy and Water Development of the H. Comm. of Appropriations*, 115th Cong. 2-3 (2018) (testimony of Ray Judy, Energy Servs. Dir., Nat’l Ass’n for State Cmty. Servs. Programs), https://nascsp.org/wp-content/uploads/2018/12/House_NASCSP_WAP-Testimony-FY-2019.pdf.

¹²³ LAURA SHIELDS, NAT’L CONF. OF STATE LEGISLATURES, BOLSTERING FEDERAL ENERGY ASSISTANCE AND WEATHERIZATION WITH STATE CLEAN ENERGY PROGRAMS, (Jan. 11, 2021), <https://www.ncsl.org/research/energy/bolstering-federal-energy-assistance-and-weatherization-with-state-clean-energy-programs.aspx> (“For every \$1 invested in the program, there is a return of \$2.78 in nonenergy benefits, such as fewer sick days and reduced health care costs.”).

¹²⁴ NAT’L ASS’N OF STATE CMTY. SERV. PROGRAMS, *supra* note 118, at 4, 6 (“Leveraging additional resources is necessary to better meet the large backlog of eligible households needing services.”). In addition to increasing the number of households in need of assistance, the pandemic slowed weatherization work during much of 2020. *Id.* at 5.

¹²⁵ 42 U.S.C. §§ 1471-1472.

¹²⁶ *Id.*

504 funds).¹²⁷ Only a fraction of MH residents own the real property under their home,¹²⁸ meaning most are not eligible for this assistance. Moreover, heat-related injuries and deaths are not necessarily caused by specific safety hazards—the structure and regional location of the home itself in a hot climate is the “safety hazard.”

Some federal tax benefit programs are also available for manufacturers of new energy-efficient MHs. Home builders are eligible for a \$2,000 tax credit if the home achieves 50% energy savings for heating and cooling over the 2006 International Energy Conservation Code and an additional \$1,000 tax credit if the home meets Energy Star requirements.¹²⁹ After these tax benefits took effect, the number of Energy Star MHs increased from twenty-five in 2006 to over 20,000 as of 2011.¹³⁰ Unfortunately, there are roughly 2 million pre-1976 MHs in use in the United States alone—not to mention millions of other MHs built after 1976 that also lack Energy Star efficiency.¹³¹

B. *State and Other Assistance for Heat Resilience*

Some state government programs also seek to help MH residents, although these programs, similar to federal programs, are ill-equipped to address the growing hazards to MH residents in a warming climate. State-regulated utilities, which are assured reasonable returns on capital investments under their state charters, can be particularly well-situated to offer aid and have been incentivized or ordered in some states to invest in programs aimed at improving energy efficiency in customers’ homes. For MHs, these programs may take the form of weatherization initiatives, partial forgiveness of monthly bills, or other support. Some states and localities also offer direct energy efficiency incentives such as tax benefits and rebates or require various land use planning methods in efforts to promote heat resiliency within their jurisdictions.

¹²⁷ U.S. DEP’T OF AGRIC., CHAPTER 12: SECTION 504 LOANS AND GRANTS, 12.2 to 12.3 (2017), <https://www.rd.usda.gov/files/3550-1chapter12.pdf>.

¹²⁸ See SULLIVAN, *supra* note 78.

¹²⁹ *Tax Credits for Home Builders*, ENERGY STAR (Jan. 2021), https://www.energystar.gov/about/federal_tax_credits/federal_tax_credit_archives/tax_credits_home_builders.

¹³⁰ *Sustainable and Affordable: New Options in Factory-Built Housing*, ENV’T AND ENERGY STUDY INST. (Jan. 19, 2011), <https://www.eesi.org/briefings/view/sustainable-and-affordable-new-options-in-factory-built-housing>.

¹³¹ Baird, *supra* note 57.

1. *Utility Regulations*

As the entities providing the energy needed for cooling, utilities are uniquely positioned to help address MH heat vulnerability. Balancing electricity supply and demand on the grid is a constant effort for utilities, and they have at their disposal a number of techniques which may affect how and when individuals use electricity.¹³² In an effort to disperse the overall demand on the utility grid at any given time, utilities commonly rely on demand-side management programs to entice consumers to reduce their energy demand during peak hours.¹³³ These demand responses, or modifications to the consumer's patterns of usage, can potentially reduce strain on the grid and allow for a more consistent, safe and reliable operation of utility infrastructure.¹³⁴

Some public utilities commissions throughout the country also impose Energy Efficiency Resource Standards, which may require utilities to offer customer-focused energy efficiency programs.¹³⁵ Such programs can help MH residents protect against the summer heat by offering rebates on a variety of improvements, including energy-efficient HVAC systems, ENERGY STAR appliances, and other repairs and weatherization enhancements.¹³⁶

In addition to helping utilities better manage grid loads, energy efficiency strategies can greatly reduce energy consumption in individual residences and could thus be a valuable resource to MH owners if they were more accessible.¹³⁷ One such strategy is to insulate walls to help prevent the loss of conditioned air, reducing the electricity needed to keep a space at a constant and cool temperature.¹³⁸ Unfortunately, many assistance programs are not available to MH owners for various reasons. Blower tests, for example, aid in effectively weatherizing a home by

¹³² See *Demand-Side Management Programs Save Energy and Reduce Peak Demand*, ENERGY INFO. ADMIN. (Mar. 29, 2019), <https://www.eia.gov/todayinenergy/detail.php?id=38872>.

¹³³ See *id.*

¹³⁴ See *id.*

¹³⁵ U.S. ENV'T PROT. AGENCY, ENERGY AND ENVIRONMENT GUIDE TO ACTION 19 (2015), https://www.epa.gov/sites/production/files/2017-06/documents/guide_action_full.pdf (showing the states with EERS programs as of 2015).

¹³⁶ See, e.g., ARIZ. PUB. SERV. CO., 2016 DEMAND SIDE MANAGEMENT ANNUAL PROGRESS REPORT 25-29 (2017) (detailing some of the utility's rebate programs designed to promote greater energy efficiency).

¹³⁷ Cara Carmichael & Matt Jungclaus, *A Resilience Strategy Based on Energy Efficiency Delivers Five Core Values*, ROCKY MOUNTAIN INST. (Jun. 6, 2018), <https://rmi.org/a-resilience-strategy-based-on-energy-efficiency-delivers-five-core-values/>.

¹³⁸ Varfalameyeva, *supra* note 2, at 6.

identifying major air leaks.¹³⁹ However, some MH residents are unable to receive these benefits simply because the necessary equipment may not fit inside their door.¹⁴⁰

2. *MH Energy Efficiency Programs*

Some states have established energy efficiency programs specifically targeting MHs, albeit with limited success. In 1999, Vermont's state legislature created a statewide utility called Efficiency Vermont.¹⁴¹ It offers subsidies for individuals to purchase Zero Energy Modular (ZEM) homes that have triple-paned windows, rooftop solar, good insulation, and other improvements.¹⁴² Buyers also have unique financing options that appear more like a traditional 30-year home mortgage.¹⁴³ From 2013 to 2019, ZEM residents (in just under 100 total homes) saved an estimated \$1 million in total heating and electricity costs.¹⁴⁴ However, even with state subsidies, subsequent surveys showed that ZEM homes were still much more expensive than market prices for MHs in the area and unlikely to have a significant impact statewide.¹⁴⁵ Maine and New York have also piloted replacement programs for old MHs, finding that, in most cases, replacing a home is more cost-effective than repairing it.¹⁴⁶

Some private entities across the country focus on increasing the energy efficiency of MHs. In 2015, Next Step, a Kentucky-based nonprofit, launched SmartMH, a program that seeks to increase the production of energy-efficient manufactured homes by bringing together

¹³⁹ EXPLORING ENERGY EFFICIENCY AND ALTERNATIVES: THE BLOWER DOOR TEST MONTANA STATE UNIVERSITY EXTENSION 1 (2013), <https://e3a4u.info/wp-content/uploads/mobile-home-step3.pdf>.

¹⁴⁰ IMPROVING HEAT RESILIENCE, *supra* note 2.

¹⁴¹ *Our History*, EFFICIENCY VT., <https://www.encyvermont.com/about/history> (last visited Mar. 5, 2021).

¹⁴² *Programs Support Energy-Efficient Modular and Manufactured Housing*, U.S DEP'T OF HOUS. & URB. DEV. (2020), <https://www.huduser.gov/portal/periodicals/em/WinterSpring20/highlight3.html#title>.

¹⁴³ *Id.*

¹⁴⁴ *Id.*

¹⁴⁵ JANE KOLODINSKY ET AL., CTR. FOR RURAL STUD. UNIV. VT, ASSESSMENT OF THE MARKET FOR ENERGY-EFFICIENT FACTORY-BUILT HOMES SOLD IN VERMONT 40 (2017), https://www.uvm.edu/sites/default/files/media/Market_assessment_for_energy-efficient_factory-built_homes_in_VT.pdf.

¹⁴⁶ *Manufactured Housing Resource Guide*, NAT'L CONSUMER L. CENTER, 15 (2010), https://www.nclc.org/images/pdf/manufactured_housing/accessing-public-resources.pdf ("In most cases, it is simply more cost effective to replace the [pre-1976] home than to attempt to repair it.").

buyers, lenders, and retailers.¹⁴⁷ A vital component of SmartMH is its education course, which explains “the long-term benefits of buying a high-quality, energy-efficient home” to prospective buyers, who are then pre-approved by participating lenders.¹⁴⁸ As of September 2019, the program has approximately 1,150 participants.¹⁴⁹

3. *Other Small-Scale Programs*

Numerous other assistance programs, while too small to cover the needs of millions of MH residents, may provide ideas for larger-scale policy strategies to address MH heat risks. For example, some states have enacted laws encouraging MH parks to transition to self-government (i.e., the residents own and operate it as a cooperative). Since 2005, Oregon law has provided a capital gains tax deduction when a manufactured dwelling park is sold to a corporate entity formed by tenants, a nonprofit, or a housing authority.¹⁵⁰ Since 1997, Vermont law has provided a 7% income tax credit on taxable gains from a qualified sale of a MH park to leaseholders in the park or a nonprofit representing them.¹⁵¹ Since 2009, Montana law has provided an exclusion from state income tax on the gains from a qualified sale of a MH park to a residents’ association, nonprofit, or housing authority.¹⁵² Because MH residents lack much bargaining power in the typical park arrangement, this co-op structure could lead to more decisions in the best interest of MH residents. Whether these decisions include improving heat resiliency remain to be seen—regardless, MH resident-owners would still likely be constrained by limited resources as described in Part I.D.1.

Although not directly related to environmental sustainability, some states have likewise passed laws regulating the relationship between MH park owners and tenants that could offer a way out for some MH residents dealing with excessive indoor heat.¹⁵³ Even in states with these

¹⁴⁷ NEXT STEP’S SMARTMH PROGRAM, U.S. DEP’T HOUS. & URB. DEV. (2020), <https://www.huduser.gov/portal/periodicals/em/WinterSpring20/highlight3-sidebar.html>.

¹⁴⁸ *Id.*

¹⁴⁹ *Id.*

¹⁵⁰ WASH. JOINT LEGIS. AUDIT & REV. COMM., 2017 TAX PREFERENCE PERFORMANCE REVIEWS: SALES OF MANUFACTURED AND MOBILE HOME COMMUNITIES (2017), <https://leg.wa.gov/jlarc/taxReports/2017/ManufacturedHomeCommunities/p/default.htm>.

¹⁵¹ *Id.*

¹⁵² *Id.*

¹⁵³ See CAROLYN L. CARTER ET AL., NAT’L CONSUMER L. CENTER, MANUFACTURED HOUSING COMMUNITY TENANTS: SHIFTING THE BALANCE OF POWER (rev. ed. 2004). However, many states in the Southeast, where MHs comprise a large percentage of housing stock, lack any legislation governing the relationship between park owners and residents. *Id.* at 61 (“Alabama, Arkansas, Georgia, Hawaii, Kentucky, Louisiana,

statutes, park owners are still free to sell or redevelop their land into more valuable uses.¹⁵⁴ With a median annual income of \$28,400,¹⁵⁵ many MH park residents face difficult financial decisions in such situations. Some states have sought to address this issue through statutory schemes that collect money for use in MH park relocations. In Florida, for example, MH park owners pay an annual \$1 surcharge for each lot in a park they own.¹⁵⁶ The money is deposited into the Florida Mobile Home Relocation Trust Fund, which then pays MH owners' relocation expenses up to either \$3,000 or \$6,000, depending on the size of the home.¹⁵⁷ For each MH owner who applies for such relocation funding, the park owner must also make a one-time payment of \$2,750 or \$3,750 to the Trust Fund, depending on home size.¹⁵⁸ Arizona, which operates a similar relocation fund, instead levies the surcharge on MH owners and bases the amount on the assessed value of the home.¹⁵⁹ Washington supplies its MH relocation fund by assessing fees on MH transfers.¹⁶⁰

A few local jurisdictions have likewise adopted mandates, incentives, or a mix of both to promote green building and combat indoor heat, although many of the benefits of these programs are beyond the reach of most MH residents. Cities like San Francisco, New York, and Philadelphia have enacted various policies mandating or incentivizing solar panels, green roofs, and cooling vegetation.¹⁶¹ Policies like this, though, are not helpful to MH residents who typically live outside urban centers.¹⁶² Phoenix, similarly, has a resiliency plan that includes intelligent urban design and land use to help the city survive climate change.¹⁶³ Like the green building laws in other cities, though, this is not

Mississippi, Missouri, North Carolina, Oklahoma, South Dakota, Tennessee, Texas, and Wyoming . . . have not enacted manufactured housing community legislation.”)

¹⁵⁴ ADAM RUST, CMTY. REINVESTMENT ASS'N N.C., *THIS IS MY HOME: THE CHALLENGES AND OPPORTUNITIES OF MANUFACTURED HOUSING* 24 (2007) (describing the reasons why MH park owners decide to change course, and the ease with which they can make these decisions).

¹⁵⁵ See *Deadliest Hazard*, *supra* note 10.

¹⁵⁶ FLA. STAT. § 723.007(2) (2020).

¹⁵⁷ FLA. STAT. § 723.0612 (2020).

¹⁵⁸ FLA. STAT. § 723.06116 (2020).

¹⁵⁹ ARIZ. REV. STAT. ANN. § 33-1476.03 (2020).

¹⁶⁰ WASH. REV. CODE § 46.17.155 (2020).

¹⁶¹ Jillian C. Kirn, *Mitigation of Urban Heat Islands: Greening Cities with Mandates Versus Incentives*, NAT. RES. & ENV'T 40, 43-44 (2018).

¹⁶² See *supra* notes 93-94 and accompanying text.

¹⁶³ Sarah Kaplan, *How America's Hottest City Will Survive Climate Change*, WASH. POST (Jul. 8, 2020), <https://www.washingtonpost.com/graphics/2020/climate-solutions/phoenix-climate-change-heat/>.

helpful to MH residents as MH construction is regulated at the federal level.¹⁶⁴

C. *Mobile Home Indoor Heat Problems from a Public Policy Perspective*

The existing regulatory structures governing indoor heat risks for MH residents fall short for a variety of reasons, many of which become clearer when framed within certain existing academic concepts. Among other things, MH heat risks are a climate justice issue perpetuated by path-dependent industry practices and sometimes by the subjectively high valuations MH residents place on their homes. Recognizing these challenges and viewing them through an appropriate lens is a valuable first step toward identifying legal and policy strategies capable of effectively addressing MH heat vulnerability.

1. *Path Dependence*

Scholars across many disciplines use the term “path dependency” to describe the difficulties associated with changing well-established courses of action.¹⁶⁵ In industries experiencing path dependence, each policy choice in a certain direction can create a positive feedback loop by simultaneously reinforcing the efficacy of decisions along the same path and increasing the costs of choosing an alternate path.¹⁶⁶ This “increasing returns” form of path dependence is typically characterized by (1) significant upfront or fixed costs, which precede falling unit costs as output increases; (2) “learning effects,” which also lower costs as output increases; (3) “coordination effects,” which provide benefits for taking synergistic actions; and (4) “self-reinforcing or adaptive expectations,” which cause reactions to current conditions in ways that further enhance the dominant path.¹⁶⁷

¹⁶⁴ See *supra* notes 70-77 and accompanying text.

¹⁶⁵ Amy L. Stein, *Breaking Energy Path Dependencies*, 82 BROOK. L. REV. 559, 560 (2017) (explaining that “[p]olitical scientists, sociologists, economists, and legal scholars have long examined path dependency.”).

¹⁶⁶ STAN J. LIEBOWITZ & STEPHEN E. MARGOLIS, 1 ENCYC. OF LAW & ECON.: THE HISTORY AND METHODOLOGY OF LAW AND ECONOMICS, 981, 981 (Boudewijn Bouckaert & Gerrit De Geest eds., 2000) (“[P]ath dependence means that where we go next depends not only on where we are now, but also upon where we have been.”).

¹⁶⁷ Oona A. Hathaway, *Path Dependence in the Law: The Course and Pattern of Legal Change in a Common Law System*, 86 IOWA L. REV. 601, 609 (2001). It is not necessary that all four characteristics be present to generate increasing returns. See W. BRIAN ARTHUR, INCREASING RETURNS AND PATH DEPENDENCE IN THE ECONOMY 112 (1994).

Path-dependent behavior has contributed to perpetuation and growth of MH heat risks in the United States. Unlike standard single-family homes built on site, MHs are usually manufactured by national companies in large, technologically advanced facilities.¹⁶⁸ Manufacturers have invested significant time and money developing this method of production, and because MHs need only meet HUD guidelines, manufacturers can produce homes that are much more affordable than site-built homes. Millions of Americans rely on this affordability, and the industry's reliance on this substantial cost difference only further deters investments in more heat-resilient designs.

Nationwide uniformities in MH manufacturing and the similarities of MHs across states are further evidence of the powerful coordination effects and self-reinforcing expectations affecting the industry. National companies manufacture MHs in all regions of the country and the federal government generally governs MH manufacturing standards, rather than individual states. Both producers and consumers possess a certainty about the quality and expectations of MHs. Just as a heat-resilient alternative to the MH would require investment (and/or subsidies) to break into the market, it would also need familiarity or reliability to win over consumers. Changing the course of an industry with such momentum is not easy. Scholars debate whether these types of improvements occur best through incremental, internal changes or as a result of external events.¹⁶⁹ Sadly, it's doubtful that the data cited in this article, coupled with a greater public awareness of the dangers of extreme heat, would ever be enough to cause an "exogenous shock" capable of changing the industry's course of action.¹⁷⁰ In short, these path dependence problems suggest that governments will likely have to be the primary drivers of changes in MH-related policies and that, if ignored, such changes may only become more difficult to implement over time.¹⁷¹

¹⁶⁸ See, e.g., Hannah Daly, *Where Are Clayton Built Homes Actually Built?*, CLAYTON (Aug. 20, 2019), <https://www.claytonhomes.com/studio/where-clayton-manufactured-homes-are-built/>. (describing the company's "40 climate-controlled building facilities across America.").

¹⁶⁹ Stein, *supra* note 165, at 582-83.

¹⁷⁰ Lily Kahng, *Path Dependence in Tax Subsidies for Home Sales*, 65 ALA. L. REV. 187, 237 (2013) (describing the global financial crisis as an example of an exogenous shock that "caused lawmakers and policymakers to question their basic assumptions about the desirability of homeownership and the role of the federal government in promoting" it).

¹⁷¹ J.B. Ruhl & James Salzman, *Climate Change Meets the Law of the Horse*, 62 DUKE L.J. 975, 982 (2013) ("If the stakes are high, as they are likely to be with climate change, it is worth thinking now about how to avoid going down the wrong path.").

2. *Subjective Valuation*

Another obstacle to rapidly addressing MH heat risks through policy change is the high subjective valuation many MH residents place on their homes. The term “subjective valuation” describes what many individuals inherently know to be true: humans tend to place an enhanced value on their own property that exceeds its objective market value.¹⁷² This additional subjective value is difficult to measure but can be quite significant, especially for an individual’s home.¹⁷³

The high subjective value that many MH residents understandably but irrationally place on their homes can interfere with efforts to relocate these residents to more heat-resilient structures. Although “[t]he underlying legal reality of mobile home park living is that you are a renter,” MH residents do not consider their homes to be mere leased spaces.¹⁷⁴ And as the U.S. Department of Energy acknowledges, “inefficient and poorly insulated units often fall into the hands of low- and fixed-income folks who can least afford the high fuel bills associated with heating and cooling.”¹⁷⁵ In other words, the subjective premium homeowners place on their homes is perhaps greatest in the case of MHs. Older homes with severe structural deficiencies may be worth pennies on the dollar, yet they are still home to someone. Many MH owners would not be able to afford a site-built home, so they elect to buy a MH in hopes of achieving similar financial independence.¹⁷⁶ Immigrants, too, may see purchasing a MH as the first step in achieving the American Dream.¹⁷⁷ In some cases, families may choose to buy a MH and rent space in a park because it affords them more space and privacy than a

¹⁷² Thomas W. Merrill, *The Economics of Public Use*, 72 CORNELL L. REV. 61, 83 (1986) (observing that owners may place on their properties “subjective ‘premium[s]’ that are above fair market value”).

¹⁷³ See, e.g., Maria M. Maciá, *Pinning Down Subjective Valuations: A Well-Being-Analysis Approach to Eminent Domain*, 83 U. CHI. L. REV. 945, 967-71 (2016).

¹⁷⁴ Allison Formanack, *Property Without Prosperity: Subjective Valuation, Financial Citizenship, and Negotiating Moral Personhood Among Manufactured Homeowners*, 43 POLAR: POL. & LEGAL ANTHROPOLOGY REV. 54, 59 (2020) (describing how and why MH residents “rationalize their decisions to own and occupy depreciating, risky, and stigmatized trailer homes”).

¹⁷⁵ Dep’t. of Energy, Introduction to Mobile Homes: Speaker Notes, 2010, at 4.

¹⁷⁶ See Sullivan, *supra* note 84, at 244 (“Manufactured housing is the primary route through which the poor access the American Dream of homeownership.”).

¹⁷⁷ Patrick Sisson, *Mobile-Home Parks Represent Changing Face of Affordable Housing Challenge*, CURBED (Nov. 10, 2017), <https://archive.curbed.com/2017/11/10/16633964/mobile-home-parks-represent-changing-face-of-affordable-housing-challenge>.

multifamily building.¹⁷⁸ Even though MH owners with any of the aforementioned goals may achieve equal (or even better) financial success by pursuing other housing, they place subjective premiums on their homes that tip the scale in favor of MHs.

In short, any major policy changes affecting MH residents, even policies aimed at improving heat resilience, are unlikely to succeed if they ignore the subjective feelings of the citizens involved. Government programs that push low-income families out of MH parks and into equally affordable but more sustainable housing may not be welcomed by many MH residents who place tremendous subjective value on their current living arrangements. Thus, governments should consider the subjective value MH residents receive from their homes (even if said value is difficult to quantify), and they should, in turn, try to incorporate some of these valuable elements into heat resiliency solutions.

3. *Environmental Justice*

The increasingly influential framework of environmental justice offers a valuable lens through which to consider potential solutions to MH heat risks.¹⁷⁹ After all, the highest levels of the U.S. government have received directives to address the racial inequity often present in environmental policy.¹⁸⁰ Rooted in the concept of environmental justice, the climate justice movement focuses on the disproportionate burdens of climate change facing vulnerable communities and the need for organizing around a multitude of considerations encompassing race, class, and gender.¹⁸¹ For example, African Americans are exposed to higher concentrations of air pollution than Caucasian Americans and are

¹⁷⁸ *Id.* (quoting sociologist Esther Sullivan, who describes Americans' yearning for a house and a yard rather than an apartment as "a clear cultural value").

¹⁷⁹ Kary L. Moss, *Environmental Justice at the Crossroads*, 24 WM. & MARY ENVTL. L. & POL'Y REV. 35, 39–40 (2000) ("The influence of the environmental justice movement has been substantial. The call for more privileged communities to assume their fair share of the burdens of industrialization has permeated the Executive Branch of government, federal agencies, federal and state legislatures, and the courts . . .").

¹⁸⁰ See Exec. Order No. 12,898, 59 Fed. Reg. 7,629 (Feb. 11, 1994) (requiring federal agencies to identify and address disproportionate environmental harms of their actions on minority and low-income populations). There remain doubts, however, about the efficacy of the executive order. See, e.g., Sandra G. O'Neil, *Superfund: Evaluating the Impact of Executive Order 12898*, 115 Env't Health Perspectives 1087, 1092 (2007) ("It appears that the U.S. EPA has failed to consistently implement the executive order regarding the Superfund program.").

¹⁸¹ See Daisy Simmons, *What Is 'Climate Justice'?*, YALE CLIMATE CONNECTIONS (Jul. 29, 2020), <https://yaleclimateconnections.org/2020/07/what-is-climate-justice/>.

also more likely to die during extreme heat events.¹⁸² Though they disproportionately experience the negative effects of the climate crisis, African Americans are responsible for 20% less carbon dioxide emissions than Caucasians.¹⁸³ The need for equitable solutions in the face of climate change are of vital importance to these already vulnerable communities. We know that certain people are at greater risk of climate change and other environmental problems. Because of the injustices inherent to environmental issues, it stands to reason that those same groups discussed above will suffer more from heat than wealthy and white people.

While heat resilience fails to be addressed at large as an issue of climate injustice and inequity, some federal agencies such as HUD, the U.S. Department of Defense (DOD), and OSHA have identified heat as a severe health risk. HUD recognizes excess heat as a hazard that can threaten the health and safety of occupants.¹⁸⁴ The DOD has implemented a color-coded system to identify varying levels of hazardous heat conditions which limits work schedules with high potential threat of hazardous heat to prevent excess heat exposure.¹⁸⁵ Although OSHA does not have regulations stipulating maximum temperatures within working environments, employers are required by law to provide a place of employment “free from recognized hazards.”¹⁸⁶ OSHA has identified heat exposure as a hazard.¹⁸⁷ It has been shown that workers exposed to the greatest heat risks are of lower socioeconomic status.¹⁸⁸ Such individuals are unlikely to have A/C at home to adequately cool their bodies at night, “which is critical for preventing [heat related illness].”¹⁸⁹

¹⁸² MATTHEW ELLIOTT, MAGGIE WINSLOW & ANDREW HOERNER, *REDEFINING PROGRESS, AFRICAN AMERICANS AND CLIMATE CHANGE: AN UNEQUAL BURDEN 3* (2004), <http://sustainablecommunitydevelopmentgroup.org/wordpress/wpcontent/uploads/2013/06/African-Americans-Climate-Report-1.pdf>.

¹⁸³ *Id.* at 64.

¹⁸⁴ DEPT. OF HOUSING & URBAN DEV., *HOUSING-RELATED HEALTH AND SAFETY HAZARD ASSESSMENT 75* (2012), https://www.hud.gov/sites/documents/HHPGM_final_ch4.pdf.

¹⁸⁵ Gerrard, *supra* note 1, at 539.

¹⁸⁶ Ashley M. Gregor, *Toward A Legal Standard of Tolerable Heat*, 44 COLUM. J. ENVTL. L. 479, 493 (2019).

¹⁸⁷ OCCUPATIONAL HEALTH & SAFETY ADMIN, *Overview: Working in Outdoor and Indoor Heat Environments.*, <https://www.osha.gov/heat-exposure> (last visited Mar. 26, 2021).

¹⁸⁸ See Diane M. Gubernot, *The Epidemiology of Occupational Heat-Related Morbidity and Mortality in the United States: A Review of the Literature and Assessment of Research Needs in a Changing Climate*, INT’L J. OF BIOMETEOROLOGY (2013), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4145032/>.

¹⁸⁹ *Id.*

As Americans brace for deadly conditions each summer, only a handful of cities that see excessive summer temperatures have implemented heat wave emergency plans or other emergency responses to heat.¹⁹⁰ Most states mandate that heat must be provided to tenants; however, few states require landlords to provide A/C.¹⁹¹ Phoenix, Arizona is an exception to the standard practice, as Phoenix City Code mandates tenants have a right to cool air and landlords must provide reasonable cooling methods.¹⁹²

III. REFORMING LAWS TO ADDRESS THE MOBILE HOME HEAT PROBLEM

When addressing a challenge as complex as MH heat vulnerability, no single policy strategy is capable of both appeasing all stakeholders and perfectly addressing the problem. While the physical characteristics of MHs and MH parks clearly contribute to heat morbidity and mortality, simply requiring more heat-resilient structures and environments will not necessarily lead to satisfactory policy outcomes. For instance, if HUD were to raise MH manufacturing standards to mirror those of site-built homes MH prices would greatly increase, and many low-income citizens would be priced out of the market. Accordingly, a more nuanced policy approach is needed to effectively address these complicated challenges. Governments should consider dividing their policy strategies for confronting MH indoor heat risks into two categories: short-term approaches aimed at quickly mitigating these risks and longer-term approaches designed to phase out and wholly replace hazardous types of MH housing with alternative housing designed to withstand ever-warming temperatures for generations to come.

A. *Short-Term Strategies*

The growing problem of indoor heat risks in MHs is complex, delicate, and urgent as it claims hundreds of American lives each year. Fortunately, there is much the federal government and state governments can do in the short run to help mitigate this crisis until the deeper structural contributors to it can be fully addressed. Many of these short-term policy approaches will require substantial increases in government financial support and greater public awareness of said funding. A few short-term policy strategies would not require major government

¹⁹⁰ *Id.*

¹⁹¹ Gerrard, *supra* note 1, at 538–39.

¹⁹² *Id.*

expenditures and could also greatly reduce indoor heat deaths in MHs by simply making existing aid programs more accessible to all MH residents.

1. Increasing Funding for Heat Resilience

One of the most straightforward ways to reduce heat morbidity and mortality would be to reform the federal LIHEAP and WAP funding allocation approaches such that warm-weather citizens get greater access to these aid programs. Federal government officials implementing these programs have historically underfunded warm-weather states, and this underfunding is increasingly problematic as temperatures rise in the fast-growing Sun Belt region.¹⁹³ Although Congress has relatively recently adjusted WAP's formula to deliver funding more equitably, they have not done so for LIHEAP.¹⁹⁴ Even with an adjustment to the LIHEAP formula to better address the climate change realities facing millions of Americans, LIHEAP would almost certainly be insufficient to help every vulnerable MH household.¹⁹⁵

In light of these limitations and the growing heat risks of MHs, federal policymakers should consider tilting LIHEAP's funding more toward Sun Belt states and increasing the total funding allocated to the program—a portion of which is already used for weatherization programs. While the existing LIHEAP statute simply authorizes HHS to help low-income Americans with their immediate energy needs, increasing energy affordability for more MH residents will better allow them to adequately cool their homes, which in turn will reduce their heat risks.¹⁹⁶ In addition to increasing LIHEAP funding, policymakers should consider increasing separate WAP funding.¹⁹⁷ Doing so would shift more federal aid to weatherization rather than simply subsidizing utility bills. Although these subsidies are important to allow low-income MH residents to run A/C they otherwise couldn't afford, making MHs more energy efficient through weatherization may prove even more important. Such weatherization, which is relatively easy to perform on MHs

¹⁹³ Press Release, U.S. Census Bureau, Most of the Counties with the Largest Population Gains Since 2010 are in Texas, (Mar. 26 2020), <https://www.census.gov/newsroom/press-releases/2020/pop-estimates-county-metro.html>.

¹⁹⁴ See *supra* notes 113, 120-24 and accompanying text.

¹⁹⁵ See *supra* notes 116-117 and accompanying text.

¹⁹⁶ See *supra* notes 34-35 and accompanying text.

¹⁹⁷ Alternatively, policymakers could amend 42 U.S.C. § 8624 to allow states to use more than 25% of their allotted LIHEAP funds for weatherization.

compared to site-built homes,¹⁹⁸ will decrease the overall need for federal subsidies while still helping to keep homes cool.¹⁹⁹

2. *Promoting Heat Resilience Awareness*

Reforms aimed at reducing MH heat risks are also more likely to be successful if they include programs aimed at increasing public awareness of MH heat risks and the government assistance available to help address them. According to one survey from Mesa, Arizona, more than 75% of MH residents have never participated in utility assistance programs.²⁰⁰ This high percentage is troubling given that most of these residents would likely qualify for LIHEAP's income requirements.²⁰¹ Among other things, this large program utilization gap suggests there is inadequate awareness of eligibility among MH park residents who are not utility customers but pay for power through monthly site rent. Requiring MH Park owners to post signage, distribute fliers, and promote LIHEAP participation could do much to raise awareness and thereby reduce this gap. Also, the requirement that MH residents pay for energy "in the form of rent"²⁰² applies only to their eligibility for utility payment assistance. Thus, even in MH parks without sub-metering, residents who meet income requirements can and should apply for weatherization assistance to make their homes cooler and more energy efficient.

Governments could also develop better ways of informing MH residents in advance of potential extreme heat events each summer, so these residents can prepare accordingly. Such improved communication could be particularly impactful in MH parks, where residents are often effectively isolated from the surrounding communities.²⁰³ Conscious efforts to improve social connectivity with MH parks and park owners could aid these communication efforts and help social workers more easily identify vulnerable MH residents before heat waves hit.

¹⁹⁸ JOHN KRIGGER & CHRIS DORSI, TEX. DEP'T OF HOUS. & CMTY AFFS., TEXAS WEATHERIZATION FIELD GUIDE 111 (2010), <https://www.tdha.state.tx.us/community-affairs/wap/docs/TXWFG.pdf> ("[MHs'] consistent construction makes them more straightforward to weatherize."); Bob Scott & Lyn M. Bartges, *Weatherizing Mobile Homes*, HOME ENERGY, July/August 2004, at 32 ("[M]ost mobile homes are very similar to each other, which can make the establishment of efficiency measures and standards fairly consistent and straightforward.")

¹⁹⁹ See *supra* notes 122-123 and accompanying text.

²⁰⁰ *Deadliest Hazard*, *supra* note 10.

²⁰¹ *Id.* (stating that the median income for MH residents nationwide is below the poverty line).

²⁰² 42 U.S.C. 8622.

²⁰³ See *supra* notes 92-93 and accompanying text.

Additionally, communication within parks could help educate the more vulnerable and less socially connected residents of resources for heat relief.

3. *Expanding Access to Utility Assistance Programs*

State governments could also help better protect MH residents from heat events by promoting the use of sub-metering systems in MH parks and taking other steps to increase MH residents' access to assistance programs. Converting MH parks from centralized, master-meter systems to sub-metered systems gives MH residents greater autonomy over their interactions with electric utilities, which would make it easier to participate in load management programs and choose among multiple utility rate structures. Such autonomy could improve some MH residents' access to greater utility cost savings, thereby making it easier for them to afford cooling when it is needed most. Converting all MH parks to sub-metered systems could also afford many MH residents better access to some utility assistance programs. Ideally, some of these programs could even be designed to specifically target aging MH households.

Converting MH parks from master metering to sub-metering would not only help MH residents gain access to additional electric utility programs; it could also generate major benefits for the larger electricity grid. Master metered utility connections tend to be comprised of aging infrastructure and could create potential safety hazards ranging from power outages or surges to fires and other forms of structural damage. Furthermore, such conversions will have beneficial effects for load management and grid balancing efforts. Master-metered systems offer minimal incentives for users to monitor their energy use because rates are often fixed in one form or another.²⁰⁴ By contrast, sub-metered utility customers on time-of-use retail pricing plans tend to internalize more of the costs of their electricity use and are thus more likely to conserve power and limit electricity use during peak load periods when retail rates are highest.

Efforts in California to convert MH parks to submetering in recent years have proven largely successful. The projected retail rate changes for this type of conversion were very low relative to the benefits the consumer would see, ranging from a projected 0.002 cents per kWh to 0.063 cents per kWh.²⁰⁵ Prior to the conversion, the California Public

²⁰⁴ Jay Romero, *YOUR HOME; The Case for Electric Submetering*, N.Y. TIMES (July 8, 2001), <https://www.nytimes.com/2001/07/08/realestate/your-home-the-case-for-electric-submetering.html>.

²⁰⁵ CAL. PUB. UTILS. COMM'N, *supra* note 109, at 36.

Utility Commission (CPUC) found that MH residents on master-meter systems were paying roughly similar prices on electricity as compared to residents who were direct customers of the utilities.²⁰⁶ As part of its rationale for this transition, the CPUC noted that although they pay similar rates many MH residents in the state were “ineligible to participate in established public purpose and load management programs” otherwise available.²⁰⁷ Programs utilizing advanced metering technologies can allow low-income households to make more energy-efficient decisions.

Sub-metering can likewise provide numerous additional opportunities for homeowners to run more energy-efficient households. Not only do advanced rate structuring, utility rebates, and assistance programs require sub-metering; many solar initiatives require advanced metering technologies. While most MHs are not structurally sound enough to support substantial solar panel arrays,²⁰⁸ opportunities for small community solar arrays within a park may be enhanced for those parks that have converted to advanced sub-metering systems.²⁰⁹

4. *Design Solutions*

Yet another way of mitigating indoor heat risks at MH parks is to encourage or require MH parks to use landscaping techniques and designs that better combat the urban heat island (UHI) effect. New laws that required more trees and other shading features in MH parks could do much to reduce ambient temperatures at these parks, thereby better protecting residents.²¹⁰ Shade sails can provide inexpensive relief from direct sun exposure, and trees can further lower peak temperatures by as much as 9 degrees Fahrenheit through evapotranspiration.²¹¹ Some cities and states already have tree planting initiatives in place, incentivizing these efforts by providing resources for free or offering rebates or tax credits for trees planted.²¹² Such programs could be expanded or

²⁰⁶ *Id.* at 35.

²⁰⁷ *Id.*

²⁰⁸ Varfalameyeva, *supra* note 2, at 35-36 (“The installation of . . . solar panels also can be a challenge due to the poor . . . construction of . . . mobile home roofs.”).

²⁰⁹ CAL. PUB. UTILS. COMM’N *supra* note 109, at 35.

²¹⁰ Gerrard, *supra* note 1, at 530.

²¹¹ *Id.*

²¹² See, e.g., PUB. L. RSCH. INST., UC HASTINGS COLL. OF THE L., ENVIRONMENTAL JUSTICE FOR ALL: A FIFTY STATE SURVEY OF LEGISLATION, POLICIES AND CASES 65 (Steven Bonorris Ed. 3d ed. 2007), <https://www.issueab.org/resources/3124/3124.pdf> (describing New Jersey’s urban tree planting program).

modified to create even greater incentives for MH parks to add shading or increase vegetation.

Requiring or incentivizing temperature-reducing design strategies can further help MH parks combat extreme heat. For instance, a “cool roof” that is light in color or painted with a highly reflective material can direct much more of the sun’s heat energy away from a building.²¹³ A cool roof may be up to 60 degrees Fahrenheit cooler than a roof of traditional materials, allowing a building with a cool roof to achieve indoor temperature reductions of as much as five degrees Fahrenheit.²¹⁴ Accordingly, adding a cool roof could reduce utility bills by 10-70% for some MH residents.²¹⁵ Providing incentives or mandates for cool roofs within MH parks could thus provide significant benefits in some settings and would be relatively inexpensive to implement.

Replacing asphalt and pavement in MH parks with a reflective or cool coating can further help to reduce ambient temperatures. Reflective and cool pavement coatings combat UHI effects by reflecting solar heat energy away.²¹⁶ Reflective coatings have been found to result in reductions in surface temperatures of up to 8 degrees Celsius (roughly 46 degrees Fahrenheit) in some settings.²¹⁷ The city of Los Angeles, California, has already implemented this strategy in some neighborhoods and reported that streets painted with a reflective coating are up to 10-15 degrees Fahrenheit cooler than unpainted streets.²¹⁸ Requiring or subsidizing these coatings could be a simple way to promote renovations that could reduce the warming effects of traditional asphalt and better protect MH park residents without altering park layouts or individual structures.

B. *Long-Term Strategies and Structural Change*

Although many of the policy strategies highlighted above could help to mitigate near-term MH heat risks, broader structural changes will be needed to ultimately eliminate such risks over the long run. Because

²¹³ See *Cool Roofs*, ENERGY SAVER, <https://www.energy.gov/energysaver/design/energy-efficient-home-design/cool-roofs> (last visited Mar. 28, 2021).

²¹⁴ Gerrard, *supra* note 1, at 532.

²¹⁵ KRIGGER & DORSI, *supra* note 198, at 129.

²¹⁶ See *Cool Pavement Pilot Program*, CITY OF PHX., <https://www.phoenix.gov/streets/coolpavement> (last visited Mar. 28, 2021).

²¹⁷ Zeng Chen & Dengheng Ma, *Effectiveness of Solar Heat Reflective Coatings in Reducing Asphalt Concrete Temperature*, 40 J. TESTING & EVALUATION 740, 744 (2012).

²¹⁸ Christina Capatides, *Los Angeles Is Painting Some of its Streets White and the Reasons Why Are Pretty Cool*, CBS NEWS (Apr. 9, 2018), <https://www.cbsnews.com/los-angeles-is-painting-some-of-its-streets-white-and-the-reasons-why-are-pretty-cool/>.

MHs are almost never relocated once affixed to a particular lot,²¹⁹ the primary appeal of MHs for the many Americans who live in them is not their mobility but their very low cost. Providing attractive, affordable alternative housing options for MH residents to coax them into more heat-resilient housing types may be the only way to eradicate MH heat risks as climate change drives temperatures higher in the coming decades.

1. *Reforming MH Manufacturing Standards*

Although federal MH manufacturing standards are better than they were a few decades ago, there is room for regulators to improve them further to protect against indoor heat risks in this new climate change era. When HUD first promulgated its federal MH manufacturing standards, regulators seemed primarily concerned with more tangible risks like fire prevention and structural integrity.²²⁰ Thanks to the standards' specific requirements, some of the acute dangers of older MHs have been reduced.²²¹ However, in today's warming climate, heat waves have become just as dangerous for MHs as any previous concerns. Despite this increased danger, the HUD codes still allow MHs in warmer climates to be less energy efficient than those in cooler climates.²²² In other words, if a MH is properly insulated for installation in Alaska, it can be installed anywhere in the country. Conversely, a MH that meets the minimum threshold to be installed in one of seven southern states would violate HUD regulations if installed in any other state.²²³

In light of this discrepancy, HUD should further reform MH manufacturing standards to more aggressively reduce indoor heat vulnerability. Heat risks notwithstanding, HUD should consider updating its overall energy efficiency standards more frequently.²²⁴ But at the very

²¹⁹ Rolfe, *supra* note 66.

²²⁰ See Mobile Home Construction and Safety Standards, 40 Fed. Reg. 58,752, 58,752-53 (Dec. 18, 1975) (codified at 24 C.F.R. pt. 3280) (discussing in detail the concerns of public commenters and the National Mobile Home Advisory Council, including the precise placement of smoke detectors).

²²¹ JOHN R. HALL, NAT'L FIRE PROTECTION ASSOC., MANUFACTURED HOME FIRES (2013), <https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/Building-and-life-safety/osmanhome.ashx> ("The introduction of the HUD standards was associated with a drop in the rate of fires . . .").

²²² 24 C.F.R. § 3280.506 (showing a map of the United States broken into three thermal zones). The U-value of a home measures its rate of heat transfer—the lower a MH's U-value, the better it insulates.

²²³ Texas, Louisiana, Mississippi, Alabama, Georgia, South Carolina, and Florida comprise the lowest tier of energy efficiency requirements. *Id.*

²²⁴ TALBOT, *supra* note 75.

least, regulators should contemplate raising the minimum energy efficiency requirements for MHs in the Sun Belt. With public acceptance of the realities of global warming expanding, policymakers may now have an adequate “window of opportunity”²²⁵ to draw attention to indoor heat vulnerability risks and take specific steps to address them.

2. *Holding MH Park Industry Stakeholders More Accountable*

Over the long run, policy changes are needed to ensure that MH park owners and investors bear more of the costs of the nation’s shift towards more heat-resilient housing. Some state governments already seem to recognize the unique and often unbalanced relationship between MH park owners and MH park tenants by assisting tenants facing forced relocations.²²⁶ These states have begun levying special fees on the MH industry and earmarking revenues raised through those fees to assist the most vulnerable MH residents. To help address the MH heat risk problem, state governments could modify these existing programs to create new “MH Weatherization Funds” aimed at funding the weatherization of MHs across the country.

Collecting special annual surcharges from MH park owners based on the number of lots owned, the assessed value of their properties, or some other metric, could generate funds capable of doing much to advance MH-specific weatherization efforts. MH park layouts and designs in the Sun Belt often contribute to MH residents’ vulnerability during extreme heat events and re-design projects or other improvements could help alleviate these problems.²²⁷ With energy bill assistance and weatherization funding already in short supply, generating additional funding sources through such surcharges could be a valuable way of accelerating efforts to improve heat resilience in MH parks. This policy would also spread the cost of improving the most heat-vulnerable MHs among industry stakeholders who largely have the means to provide such assistance.²²⁸

²²⁵ Hathaway, *supra* note 167, at 642 (describing the importance of “punctuations that open up windows of opportunity for sweeping change” as a means of breaking path dependence).

²²⁶ See *supra* notes 156-160 and accompanying text; see, e.g., FLA. STAT. § 723.004 (2019) (recognizing “factors unique to the relationship” between MH park owners and tenants, which “can affect the bargaining position of the parties”).

²²⁷ See *supra* notes 211-218 and accompanying text.

²²⁸ See *supra* notes 85-89 and accompanying text.

3. *Phasing Out Mobile Homes*

Although expanding assistance programs for weatherization and MH park redesign would help improve MH heat resilience in the United States, it would not help the millions of MH residents in homes that are too old to cost-effectively weatherize. For these residents, replacing their MH would often be less expensive than converting it into a heat-resilient one.²²⁹ Relying solely on a strategy of weatherizing existing MHs would also reinforce the current use of subpar housing in the name of affordability.²³⁰ Accordingly, more aggressive policy approaches may be necessary to remove the least heat-resilient MHs from the housing stock over the long run.

Just as the Environmental Protection Agency presently imposes and enforces vehicle emissions standards,²³¹ HUD could impose “MH Heat Resiliency Standards” aimed at ultimately phasing out the nation’s least heat-resilient MH stock. HUD already promulgates nationwide MH manufacturing standards for the safety of MH residents.²³² It also sets Housing Quality Standards, which all housing units must meet to be included in the Housing Choice Voucher (HCV) program.²³³ Accordingly, HUD has both the authority and expertise necessary to determine and ensure safe living conditions for MHs in extreme heat.

Effective and equitable enforcement mechanisms will be critical for any plan to phase out old MHs to be successful. To enforce MH manufacturing standards, HUD presently relies on local technicians that may not always reliably certify homes.²³⁴ To root noncompliant MHs out of the nation’s housing stock, HUD agents would need to regularly inspect parks using temperature measurements or other reliable data. HUD, or some other federal agency, would also need to provide alternative housing options for those whose MHs are deemed irretrievably heat-inefficient. One potential option for such replacement housing is the HCV (commonly called “Section 8”) housing program, which is already under HUD’s purview. If HUD were to offer MH owners whose homes are noncompliant an automatic Section 8 voucher, the voucher might provide recipients a smoother transition into more

²²⁹ See *Manufactured Housing Resource Guide*, *supra* note 146.

²³⁰ See *supra* notes 164-67 and accompanying text.

²³¹ *Regulations for Emissions from Vehicles and Engines*, EPA, <https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-onroad-vehicles-and-engines> (last visited Mar. 5, 2021).

²³² 24 C.F.R. §§ 3280.1-.904.

²³³ 24 C.F.R. §§ 982.401-.407.

²³⁴ Galeucia, *supra* note 58, at 132.

heat-resilient housing. On the other hand, ordering such MH residents to vacate their existing homes could be a source of controversy that raises its own social justice problems.

A heavily discounted, new, and more heat-resilient MH could be a more appealing replacement housing option for some owners of very old MHs. HUD already administers Community Development Block Grants (CDBGs) to localities, and such funds can be used to replace outdated MHs.²³⁵ Given the subjectively high valuations some MH residents place on their existing homes, expanding these programs might be a more just home-replacement option in some cases. On the other hand, this approach would arguably reinforce the path dependency problems that have led to the nation's current MH indoor heat challenges, perpetuating a model that houses millions of low-income Americans in above-ground, semi-temporary structures.

4. *Promoting and Expanding Alternatives to MH Housing*

Given that MHs are the country's largest source of unsubsidized affordable housing²³⁶ and have grown in popularity as federal support for low-income housing has declined, one other critical aspect of any policy plan to reduce MH heat risks is greater investment in programs that help MH owners transition into safer housing. Highlighting this urgency is the increase in MH investment in the United States in recent decades running parallel to the nation's expanding affordable housing crisis.²³⁷ It is therefore difficult to propose long-term solutions to MH heat risks without addressing housing policy more generally. Some politicians and legal scholars have argued in favor of encouraging MH development as a means of addressing the nation's affordable housing deficit.²³⁸ However,

²³⁵ See NAT'L CONSUMER L. CENTER, *supra* note 146, at 4 (“[U]nder the [CDBG] program’s reconstruction guidelines funds can be used to replace existing substandard manufactured homes with new units.”).

²³⁶ See Sullivan, *supra* note 84, at 244.

²³⁷ See *id.* at 246 (“The proliferation of manufactured housing in the United States grew precisely in tandem with the decline in direct federal support for affordable housing and the devolution of low-income housing provision to private developers.”); see also Patrick Sisson, et. al., *The Affordable Housing Crisis, Explained*, CURBED (Mar. 2, 2020), <https://archive.curbed.com/2019/5/15/18617763/affordable-housing-policy-rent-real-estate-apartment> (highlighting the challenges of building affordable housing, including the high cost of materials); *supra* notes 85-89 and accompanying text.

²³⁸ See, e.g., Anika Singh Lemar, *The Role of States in Liberalizing Land Use Regulations*, 97 N.C. L. REV. 293, 318 (2019); Schmitz, *supra* note 92; Mar. 24, 1999 Minutes: Hearing on S.B. 323 Before the S. Comm. on Gov’t Affairs, 1999 Leg., 70th Sess. 5-6 (Nev. 1999) (statement of Sen. Amodei, Guest Legislator) (advocating for eliminating local zoning restrictions on MH parks so they can compete with stick-built

such an approach ignores the growing health and safety risks of MHs highlighted in this Article.²³⁹ As global temperatures continue to rise, policies that lean more heavily on heat-vulnerable housing strategies are arguably a step in the wrong direction. Instead, policymakers should face the challenge of developing and expanding safer and more heat-resilient MH alternatives.

The recent boom in “build-to-rent” (BTR) communities²⁴⁰ across the United States presents one potentially compelling alternative for MH park residents. Unlike traditional apartments, BTRs consist of small single-family residential structures, often with community space and amenities—basically MH parks but with foundation-built structures rather than MHs.²⁴¹ Presumably, some MH park residents choose MHs over renting apartments because they want more privacy, personal space, and autonomy than apartments can provide.²⁴² To the extent these residents could afford rents in a BTR community, they may be open to relocating to such a community and benefiting from superior energy efficiency and safety against the elements. Moreover, BTR owners likely will not be able to raise rents as drastically as MH park owners because renters are not “chained” to their homes.²⁴³ Unfortunately, BTR homes are not cheaper to build than comparably sized apartment

housing); David Schleicher, *Stuck! The Law and Economics of Residential Stagnation*, 127 YALE L.J. 78, 136 (2017) (arguing that cities should rely more on MHs, rather than more durable forms of housing, to better respond to market changes).

²³⁹ See *supra* notes 47-48 and accompanying text.

²⁴⁰ Angela Gonzales, ‘Ground zero’ for Build-to-Rent Homes, PHX. BUS. J. (Oct. 13, 2020), <https://www.bizjournals.com/phoenix/news/2020/10/13/big-name-developers-enter-phoenix-build-to-rent.html>; Christina Hughes Babb, *Institutional Investment in Build-to-Rent Booming*, DS NEWS (Jul. 28, 2021), <https://dsnews.com/daily-dose/07-28-2021/institutional-investment-in-build-to-rent-booming>.

²⁴¹ See Bruce McNeilage, Opinion, *Why Build-To-Rent Is Garnering Multifamily Investors’ Attention*, FORBES (Feb. 12, 2020, 8:45 AM), <https://www.forbes.com/sites/forbesrealestatecouncil/2020/02/12/why-build-to-rent-is-garnering-multifamily-investors-attention/?sh=25bed9cd1b39> (describing the layout of a BTR community). Compare *Largest Build to Rent Housing Community in Nation Sells in Phoenix*, AZ BIG MEDIA (Nov. 26, 2020), <https://azbigmedia.com/real-estate/largest-build-to-rent-housing-community-sells-in-phoenix/> (showing image of BTR community), with *Mobile Home Parks Owned by KSPG Companies*, MHPHOA, <https://mhphoa.com/ca/> (last visited Mar. 28, 2021) (showing images of MH parks).

²⁴² Galeucia, *supra* note 58, at 90, 184-86; Sisson, *supra* note 177 (quoting sociologist Esther Sullivan, who describes Americans’ yearning for a house and a yard rather than an apartment as “a clear cultural value”).

²⁴³ Rolfé, *supra* note 66. MH park residents who own their home but rent the land underneath must either sell the home and buy a new one or pay to move the home. Renters, on the other hand, need only move their belongings to a new rental unit.

communities.²⁴⁴ This means that rents in BTR communities are out of reach for the lowest-income MH residents.²⁴⁵ Still, the general concepts associated with BTRs may be helpful in designing new, more viable MH park alternatives.

One possible approach would be for state governments to convert some BTR units within their states into income-qualified housing or to build new affordable housing projects based on a BTR model. The Sun Belt has been the epicenter of BTR growth in recent years,²⁴⁶ so with industry momentum behind these communities there is an opportunity to extend this concept into the affordable housing arena.²⁴⁷ If state programs were to make such BTR units available, some MH park residents might be open to renting in an affordable BTR community with comparable amenities and higher quality housing. Although it is true that MH *owners* who make such a move would become foundation home *renters*, unlike stick-built homes, most MHs depreciate in value over time. Thus, such a move would not materially change these Americans' capacity to build wealth through home ownership.²⁴⁸ MH owners also often face purchase loan interest rates much higher than those of real property mortgages, making a switch to BTR potentially more tolerable.²⁴⁹ But still, some MH owners likely place high subjective valuations on their homes above their market value, meaning they may not be enticed by options to move to BTR units or other affordable housing.²⁵⁰

²⁴⁴ See Gonzales, *supra* note 240 (“[BTRs are] not less expensive to build than traditional garden-style apartments — more land is needed for these single-story units.”).

²⁴⁵ Compare *id.* (“Rents will range from \$1,200 to \$2,200 [per month] depending on the market and location.”), with Crystal Adkins, *Mobile Home Lot Rent Across the Nation*, MOBILE HOME LIVING (Dec. 3, 2019) (surveying MH residents nationwide and finding no lot rents that exceed \$1,000 per month).

²⁴⁶ Gonzales, *supra* note 240.

²⁴⁷ See, e.g., Bruce McNeilage, *Mitigate Risk with Build-for-Rent*, THINK REALTY (June 6, 2020), <https://thinkrealty.com/mitigate-risk-with-build-for-rent/> (predicting “the rental home market is highly likely to stay hot”).

²⁴⁸ See *supra* note 83 and accompanying text.

²⁴⁹ *Manufactured-housing consumer finance in the United States*, CONSUMER FINANCIAL PROTECTION BUREAU (Sep. 2014), https://files.consumerfinance.gov/f/201409_cfpb_report_manufactured-housing.pdf (“[Sixty-eight] percent of all manufactured-housing purchase loans (chattel as well as real property loans) reported under the Home Mortgage Disclosure Act in 2012 met the definition of a “higher-priced mortgage loan” (HPML), a definition developed to identify a set of loans that might be considered subprime. By comparison, only three percent of loans for site-built homes were HPMLs. Even within the set of HPMLs, manufactured-home loans tend to have higher rates.”). Chattel mortgages in general carry much higher interest rates than mortgages on real property. Carol M. Kopp, *Chattel Mortgage*, INVESTOPEDIA (Aug. 21, 2020), <https://www.investopedia.com/terms/c/chattelmortgage.asp>.

²⁵⁰ See *supra* notes 174-178 and accompanying text.

Another plausible strategy might be to subsidize affordable build-to-buy housing communities—subdivisions of small, inexpensive homes that nonetheless protect their occupants from heat far better than MHs. Such housing would be even more attractive for many MH residents, providing them the practical and financial benefits of home and land ownership but on spaces that are comparable in size to those in existing MH parks.

Providing enough units of this type of affordable housing would require significant government expenditures and thus may not be practical without a substantial new funding source. MHs are mass-produced in factories, benefiting from economies of scale and thus far less expensive to construct than their stick-built counterparts.²⁵¹ According to one recent estimate, the average MH costs at least \$292,600 less than a site-built home.²⁵²

On the other hand, the long-term benefits of state- and federal-subsidized single-family communities may justify investment in them in some settings. MH communities are largely disfavored by local zoning authorities because they generate lower property tax revenues than stick-built home communities and depress surrounding property values.²⁵³ Although a majority of states have enacted some form of zoning preemption to prevent local governments from discriminating against MH communities,²⁵⁴ MHs are still viewed as undesirable, so replacing them with better alternatives could be appealing in some localities.²⁵⁵

The federal government and state governments could encourage the development of affordable residential communities with very small, single-family homes through tax credits, grants and other incentive programs. Such incentives would have to be substantial enough to motivate developers to price these homes in ranges that average MH residents could afford.²⁵⁶

²⁵¹ Lemar, *supra* note 238, at 318.

²⁵² Baird, *supra* note 57.

²⁵³ Lemar, *supra* note 238, at 318-19.

²⁵⁴ *Id.* at 320.

²⁵⁵ Schmitz, *supra* note 92, at 395.

²⁵⁶ Corresponding losses in tax revenue can be offset by reducing from related expenditures on affordable housing. In 2019, the federal government spent \$51 billion on affordable housing. *How Does the Federal Government Support Housing for Low-Income Households?*, PETER G. PETERSON FOUND. (July 29, 2020), <https://www.pgpf.org/blog/2020/07/how-does-the-federal-government-support-housing-for-low-income-households>. Were build-to-buy communities for low-income individuals made available as MH park alternatives, presumably other public-housing-eligible individuals might also partake in the program. This might reduce the need for rent assistance or additional multifamily public housing development.

To further support development incentives for owner-occupied housing alternatives aimed at MH residents, the federal government could also extend its FHA loan insurance program²⁵⁷ to cover mortgages for MHs. MH residents who opted to sell their MH and purchase a home within such communities would not only enjoy greater energy efficiency and heat resiliency benefits; they would also be able to begin building wealth through real estate ownership.²⁵⁸ Greater social integration of these citizens and the elimination of unsightly MH parks from neighborhoods could follow. Countering the path-dependent nature of existing affordable housing laws and the nation's under-regulated MH industry, implementing these changes will be challenging. However, the warming climate and growing heat risks borne by MH residents should be a powerful motivation to diverge from existing policy approaches to MH parks and begin work toward more tenable long-term solutions. As temperatures continue to climb, future generations of low-income Americans seeking the benefits home ownership stand to benefit from these efforts.

IV. CONCLUSION

For the millions of citizens across the United States who currently reside in MHs, these mass-produced structures are an indispensable piece of their American Dream. Unfortunately, as the climate warms, the indoor heat risks associated with MHs are making them an increasingly hazardous and unsustainable housing option. Because most MH residents have neither the financial means to move their homes to cooler climates nor the ability to upgrade to more heat-resilient structures, federal and state governments are bearing much of the growing burden associated with MH heat-related illnesses and death. Fortunately, there are numerous policy strategies capable of reducing MH heat risks and the climate injustices and social costs associated with them. In the short run, increasing funding for and improving access to weatherization and energy assistance programs could help many more MH residents survive summer heat waves. Over the long run, however, governments will need

²⁵⁷ *Let FHA Loans Help You*, HUD, <https://www.hud.gov/buying/loans> (last visited Mar. 25, 2021). Currently the maximum dollar amount for the FHA's MH purchase loan insurance is \$64,800. *Manufactured Home Loan Insurance*, BENEFITS.GOV, <https://www.benefits.gov/benefit/501> (last visited Mar. 25, 2021). If affordable build-to-buy communities are appropriately capped, this limit need not change.

²⁵⁸ This still presents the issue of local governments attempting to levy ad valorem property taxes on residents who lack the means to pay them. Any states participating in such a program would need to restrict localities with respect to such communities.

to face up to the expensive challenge of spurring the replacement of the nation's MH parks with more heat-resilient affordable housing. Investing in this important goal now will help to ensure that as global temperatures rise many of the country's most vulnerable citizens have a safer refuge to call home.