



**COLORADO COOLING REPORT**  
**UPDATED MARCH 2024**

# **Merciless Heat:** **How State and Local Lawmakers** **Can Protect At-Risk Households**



**HEALTHY AIR &  
WATER COLORADO**



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# I. Introduction

2023 was the hottest year on record across the globe, and if trends continue, 2024 will likely be even hotter.<sup>1</sup> Colorado continues to break records for scorching temperatures which put many Coloradans' health at risk. By August of 2023, communities across Colorado had broken more than 350 local daily maximum temperature records, and another 165 local records were tied.<sup>2</sup> With summer soon approaching and with extreme heat events increasing in frequency and intensity, Colorado should start planning now to ensure the safety and comfort of all Coloradans, especially the lowest-income households.

The State of Colorado and its cities and counties must prepare for extreme heat by creating policies that increase equitable access to cooling. Cooling is a fundamental public health need that Colorado's state and local government agencies must secure for all communities. A right-to-cooling approach recognizes that cooling is essential for all Coloradans to lead healthy lives, and it provides a framework for state and local agencies to proactively adopt policies that protect Coloradans from extreme heat, especially communities that are already disproportionately impacted by climate change.

## II. Health Impacts of Extreme Heat

Extreme heat events occur when the summer temperature is much hotter than average.<sup>3</sup> In Colorado, temperatures of 90°F or higher qualify as extreme heat.<sup>4</sup> Over the last 37 years, the number of 100°F days in Denver has increased by nearly 400%.<sup>5</sup> Data from the Colorado Health Institute shows that Colorado's eastern plains are particularly at risk for extreme heat.<sup>6</sup> As asphalt surface areas increase in metropolitan areas and have limited shade, urban Coloradans are at risk too. For instance, in July of 2023, Grand Junction tied its all-time hottest temperature ever recorded, 107°F.<sup>7</sup>

Extreme heat can lead to harmful impacts on human health. Periods of extreme heat can lead to heat stroke and heat exhaustion, and individuals are more likely to experience complications associated with diabetes, pregnancy, asthma, heart disease, mental illness, and mental health.<sup>8,9</sup> People who are elderly, low-income, and/or from communities of color are particularly vulnerable to extreme heat because, in many cases, they are more likely to have chronic health conditions.<sup>10,11</sup> Children are also more susceptible to heat-related illnesses because, compared to adults, it takes longer for their bodies to adapt to hot weather.<sup>12</sup> As our planet warms and wildfires surge, poor air quality further increases health risks such as asthma, heart attacks, and strokes.<sup>13</sup>

As extreme heat events become more frequent, Coloradans who lack cooling are increasingly seeking emergency services for heat-related illnesses. In fact, between 2014 and 2022, the number of emergency room visits for illnesses from extreme heat more than doubled in Colorado, from 237 to 494.<sup>14</sup> In four counties — Pueblo, Fremont, Otero and Morgan — heat-related emergency department visits in 2022 were significantly higher than the statewide rate.<sup>15</sup> The Colorado Department of Public Health and Environment identifies all four counties as disproportionately impacted by environmental health issues.<sup>16</sup> Research shows that extreme heat is associated with higher death rates, especially for black residents and older adults. As periods of extreme heat increase, these disparities are likely to widen.<sup>17</sup>

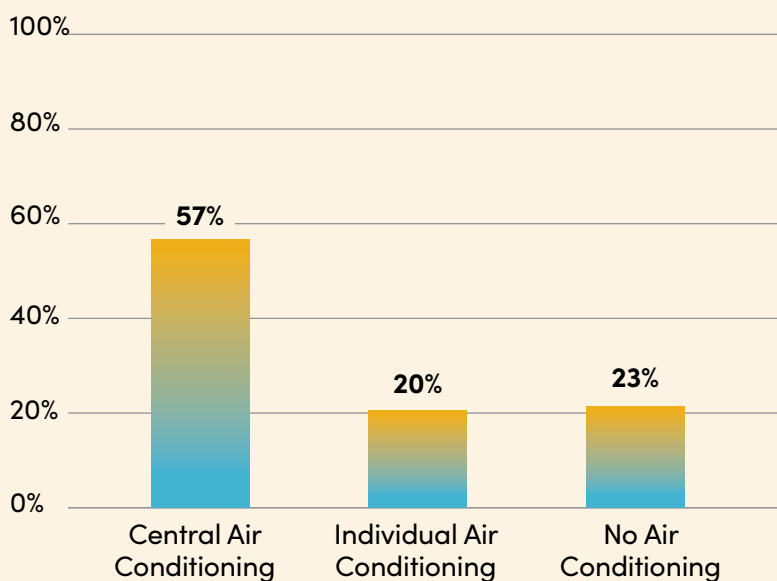
## Disparities in access to cooling

As our climate warms at an alarming rate, it is incumbent upon policymakers to ensure that Coloradans can stay cool to protect their health. Data from the Residential Energy Consumption Survey shows that 23% of Colorado households have neither central air conditioning (AC) nor individual air conditioning units (Figure 1).<sup>18</sup>

There are also inequities in access to cooling based on ethnicity, housing type, and income. For example, in the US, Hispanic households are less likely to have access to cooling than non-Hispanic households.<sup>20</sup> In addition, the proportion of renters who do not have access to cooling is almost double that of homeowners.<sup>21</sup>

For households with limited incomes, the costs of cooling equipment and monthly energy bills represent a financial challenge. As shown in Figure 2, 34% of households in Colorado with incomes between 100 - 199% of the federal poverty level (FPL) have no air conditioning, compared to 15% of households with incomes at or above 200% of the FPL.

**Figure 1. Access to Cooling Among Colorado Households<sup>19</sup>**



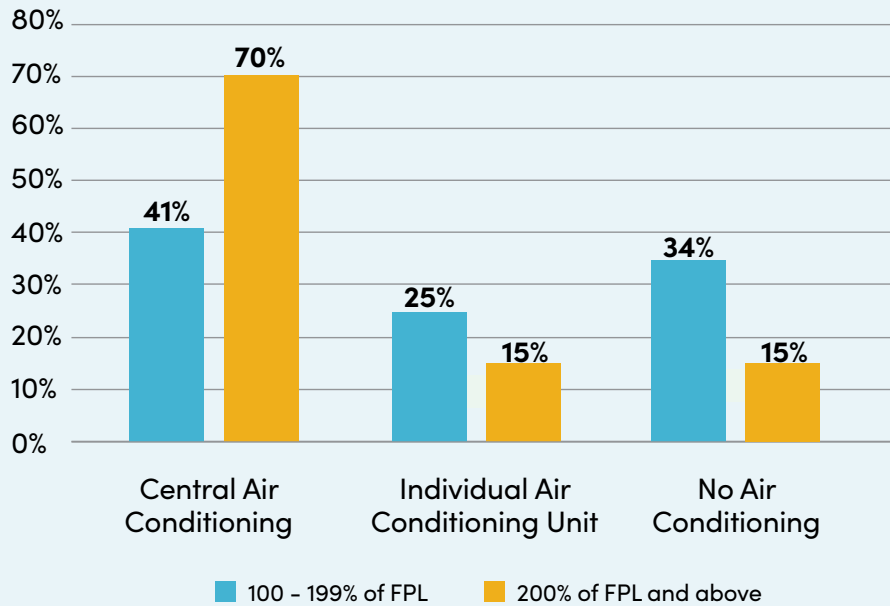
SOURCE: US Energy Information Administration, Residential Energy Consumption Survey, 2020.





**Figure 2.**  
**Access to Cooling**  
**in Colorado, by**  
**Household Income**

SOURCE: US Census Bureau, American Housing Survey, 2019



Statewide, 30% of Coloradans experience financial difficulty paying for their household energy expenses.<sup>22</sup> Even though low-income Coloradans are least likely to have access to cooling, they are more likely to bear the highest energy burden, compared to more affluent individuals.<sup>23</sup> Coloradans with incomes at or below 30% of the area median income (AMI) spend seven times more on electricity as a proportion of their income than households with incomes at or above AMI.<sup>24</sup>

These disparities make already underserved communities more vulnerable to the health impacts of extreme heat. Coloradans need a right-to-cooling framework that ensures equitable access to affordable and energy-saving cooling for all residents, regardless of the type of housing in which they live. Establishing cooling as a fundamental right of all Coloradans is an important step towards expanding cooling access to the most disproportionately burdened communities while increasing energy efficiency and affordability and avoiding displacement or other unintended consequences. Colorado policymakers can ensure that everyone has access to energy-saving cooling that protects public health and safety, ensures habitable housing, and decreases energy burdens. This report will focus on a right-to-cooling framework in the home but is critical to acknowledge that extreme heat also impacts outdoor workers and unhoused individuals, which requires urgent policy solutions.



# III. Policy Solutions for Equitable and Efficient Cooling

States, cities, and counties throughout the United States have enacted a variety of policies to ensure equitable access to cooling. General policy levers include codes and standards, utility mechanisms, and funding and financing, with different options available to states and local governments. Successful implementation will likely necessitate a suite of complementary tools from across these categories. The following section examines policy levers for states and local governments to expand equitable access to energy-efficient cooling, like energy-saving heat pumps that are capable of both cooling and heating; provides examples of programs already in place; discusses funding options; and lays out important design considerations.

## A. State policy levers

Policy options for states to expand equitable access to efficient cooling include codes and standards, tenant rights and utility mechanisms.

- 1. Codes and Standards.** Many states have used codes and standards to establish rights to basic amenities for their residents. The most common examples are space heating and water quality, with codes across the United States that include adequate heating and plumbing as minimum requirements for habitability.<sup>25</sup> As hot days and warm nights become more frequent and intense in Colorado, the State can recognize the vital importance of sufficient cooling by using codes and standards to establish a right to cooling for all residents, parallel to the rights to adequate heating and clean water.
- 2. Landlord Obligations.** For right-to-cooling approaches focused on rental housing, landlord obligations are common state-level mechanisms. For instance, Title 33, Chapter 10, Article 2 (Landlord Obligations) of the Arizona Revised Statutes defines AC as an essential service that landlords must maintain, if it is already provided; the law does not mandate that all dwelling units include AC.<sup>26</sup> Tenants have the right to recover damages if landlords fail to maintain adequate cooling.<sup>27</sup> Nevada takes a similar approach. Title 10, Chapter 118A, Article 290 (Habitability of dwelling unit) of the Nevada Revised Statutes defines AC as an essential part of a habitable dwelling unit that landlords must maintain if it is provided or required by the lease agreement.<sup>28</sup>

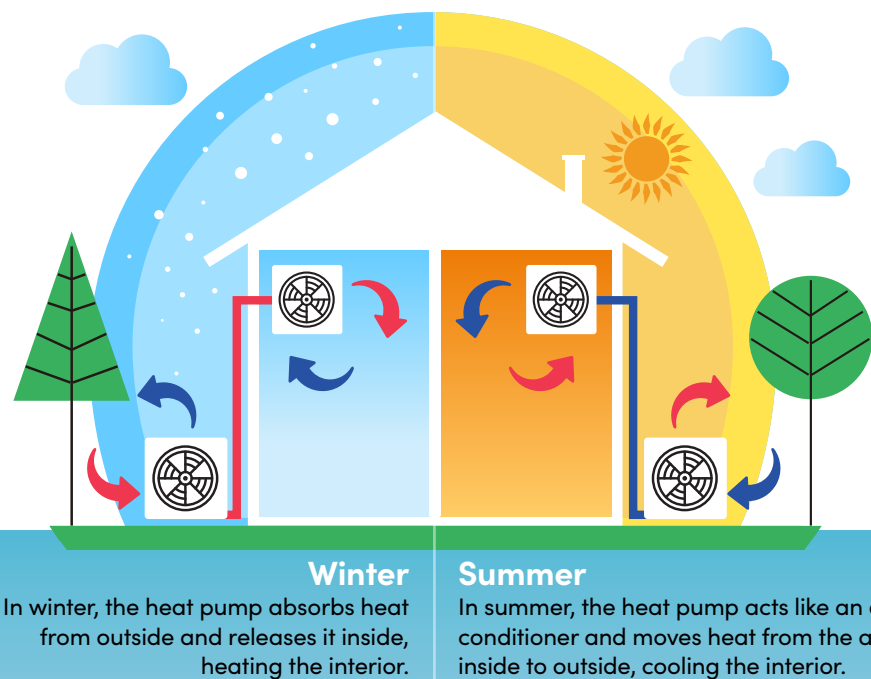
Similar policies can go further by incentivizing or requiring landlords to install efficient cooling for rental units, rather than solely mandating the maintenance of existing cooling systems. Additionally, future policies can add proactive enforcement mechanisms to shift the onus to promptly address cooling system failures to landlords. Similarly, accessible systems must be put in place for tenants to seek damages. However, access to damages after the fact does not protect tenants from life-threatening extreme heat in the moment, and recovering damages may be challenging for tenants with lower incomes, language barriers, or legal concerns.

- 3. Tenants' Right to Purchase Cooling Systems.** Colorado policymakers can also directly focus on tenant rights. Oregon's Senate Bill (SB) 1536 (2022) codifies the right of tenants to procure their own cooling systems by barring landlords from disallowing portable cooling device installations, with limited exceptions.<sup>29</sup> Although SB 1536 removes an important barrier to cooling, complementary policies are needed to ensure that tenants can safely exercise their rights. For example, the law allows landlords to prohibit installations that damage buildings or violate codes or safety provisions. Since SB 1536 passed in 2022, tenants who

installed window AC units have reported receiving eviction notices because the installations violated codes or safety provisions.<sup>30</sup> Thus, fire code or other health and safety standard updates (including federal standards for housing developments receiving federal funding) may be needed to avoid overly broad preemptions.

In addition, cooling would still be out of reach for low-income households who lack the means to purchase and install their own cooling devices. SB 1536 addresses this challenge by requiring the Oregon Department of Energy to provide loans and rebates for cooling installation in rental and manufactured housing.<sup>31</sup> Nonetheless, additional funding and low- or zero-interest financing is likely needed for broader uptake.

## WHAT IS A TWO-WAY HEAT PUMP?



*A two-way heat pump is a cost-saving, highly efficient unit that can both heat and cool a home. This is because heat pumps move heat, instead of making heat.*

### Pros of heat pumps:

- Substantial efficiency gains over traditional AC systems and gas furnaces: they operate two to four times more efficiently than the most efficient gas furnaces and reduce peak electricity usage by more than 10% compared to central AC units.<sup>80,81</sup>
- For a typical Colorado single-family home, replacing a central AC with a heat pump at the end of its useful life would cut home carbon emissions by approximately one third.<sup>82</sup>

### How can policy makers make two way heat pumps more available?

In recognition of the benefits to both household utility bills and carbon emissions from heating and cooling, the California Energy Commission is considering a two-way AC requirement for the state's 2025 building code update. This provision would strongly incentivize all new AC units to be two-way heat pumps by 2026. **Colorado lawmakers could adopt a similar standard, requiring that all air conditioner units that are sold be cost saving two-way heat pumps.**



**4. Utility Disconnection Bans.** Colorado HB 22-1018 prohibits regulated electric utilities from disconnecting customers for nonpayment during periods of severe weather, including extreme heat.<sup>32</sup> However, the ban applies when temperatures exceed 95°F, whereas extreme heat occurs when temperatures are 90°F or higher.<sup>33</sup> Further, HB 22-1018 does not provide a lasting solution for households facing ongoing energy affordability challenges or for customers of Colorado's 22 rural electric cooperatives and 29 municipal electric utilities, which are not covered by HB 22-1018.<sup>34</sup>

## B. Local policy levers

Codes and standards present multiple opportunities for cities and counties to ensure equitable access to efficient cooling.

**1. Maximum Indoor Temperature Standards.** For cities and counties, the most common approach to a right to cooling is via a maximum indoor air temperature standard. Numerous cities and counties have adopted some form of this policy, including Phoenix, Tempe, and Tucson, Arizona; Palm Springs, California; Montgomery County, Maryland; Clark County, Nevada; and Dallas, Texas.<sup>35, 36, 37, 38, 39, 40</sup> In each of these jurisdictions, rental units must have cooling equipment capable of keeping the temperature at an established safe maximum indoor temperature (typically between 80°F to 88°F, depending on location and equipment type) when the outdoor temperature exceeds a certain threshold. Montgomery County adopted a variation in which June 1 to September 30 is the annual “cooling season,” when all rental units must have equipment capable of maintaining indoor temperatures below 80°F.<sup>41</sup>

These requirements can fall under different codes and standards. For example, Dallas' maximum indoor temperature falls under the Utility and Appliance Standards section of the City's Housing Standards Manual, while Clark County's cooling requirement is part of the Building Administrative Code.<sup>42,43</sup> Importantly, this mechanism can be used to address different building types. For instance, Clark County's cooling requirement only applies to buildings constructed or altered after February 2019.<sup>44</sup> On the other hand, Phoenix's code addresses all rental housing with existing cooling appliances.<sup>45</sup>



**2. Minimum Rental Standards.** A more comprehensive approach for Colorado's city and county policymakers to consider is establishing cooling as a minimum standard for rental housing or other building types. New York City, for instance, committed to requiring all new construction to include cooling systems by 2025.<sup>46</sup> A similar building code approach can apply to substantial renovations, too.

To address existing housing, states and municipalities can adjust the definition of habitability in civil or health codes to name cooling as an essential service that all rental units must contain to be considered habitable. Pairing such standards with a maximum indoor temperature would provide a legal framework to implement a right to cooling. In Colorado, the City of Boulder requires all rental housing to meet a minimum energy efficiency standard.<sup>47</sup> Cities and counties can use similar rental licensing requirements to enforce a right to cooling.

# IV. Funding and Financing Options

States and localities can also implement funding and financing policies to support a right to efficient cooling. Different mechanisms are necessary to serve distinct populations.

## A. Inflation Reduction Act

The federal Inflation Reduction Act (IRA)<sup>48</sup> presents many funding opportunities, including \$8.8 billion in rebates nationwide to help households increase the energy efficiency of their homes and appliances. RMI estimates that the IRA, the largest investment in clean energy and climate solutions in US history, will result in \$19 billion of new funding to support Colorado's transition to more efficient and clean energy and technology.<sup>49</sup>

The IRA includes multiple incentive types that are accessible to different household types. For instance, low-income households largely lack the tax liability to take advantage of the IRA tax credits. These tax incentives mainly benefit higher-income homeowners, who can receive up to \$2,000 for installing a heat pump system plus \$1,200 for weatherization and electrical panel upgrades, totalling \$3,200 in tax credits in one year.<sup>50</sup> By contrast, the Home Energy Rebates are potentially the only IRA funding that will be accessible to low-income renters in Colorado for home upgrades.<sup>51</sup> Colorado is allocated \$140 million in rebates for energy efficiency and electric appliances, including highly efficient heat pump space heaters and coolers.<sup>52</sup> To ensure that low-income households and renters can also access IRA funding, Colorado policymakers can earmark all or a significant portion of the Home Energy Rebates for low-income and disadvantaged communities. Federal guidance allows states to exceed the minimum requirements for 40% of the Home Energy Rebates to benefit disadvantaged communities and 10% to benefit multifamily housing.<sup>53</sup> The US Department of Energy also encourages states to cover up to 100% of retrofit costs for low-income households.

However, even with this significant investment, the Home Energy Rebates will only reach an estimated 2% of the 740,000 households in Colorado earning less than 80% AMI.<sup>54</sup> Therefore, state agencies and utilities must commit additional resources beyond the Home Energy Rebates to ensure that low-income Coloradans can transition to healthier, more energy-efficient homes. Several studies have pointed to the gap in utility investment with one noting that at the current level of utility investment, it may take over 59 years to serve all low-income households in the US with basic efficiency improvements.<sup>55</sup>

Beyond the Home Energy Rebates and federal tax credits, IRA programs like the Climate Pollution Reduction Grants can help state, regional, and local agencies mitigate pollution.<sup>56</sup> Air pollution control districts and environmental agencies across the country are exploring and adopting zero-emission standards to reduce nitrogen oxide emissions and other harmful pollutants from newly purchased appliances, such as furnaces. These standards will help drive the market toward efficient, zero-emission heating and cooling equipment. States can pursue Climate Pollution Reduction Grant funding to implement zero-emission furnace standards that promote two-way heat pumps for efficient heating and cooling. States can also leverage other IRA programs, like the Greenhouse Gas Reduction Fund and the Green and Resilient Retrofit Program, to provide financing and funding for efficient cooling for low-income households, respectively.<sup>57, 58</sup> Financing and funding from several IRA programs can stack with state, utility, and local resources to enable holistic home upgrades.

## **B. Low Income Home Emergency Assistance Program**

The Low Income Home Emergency Assistance Program (LIHEAP) offers emergency bill assistance and minor home upgrades to low-income households.<sup>59</sup> Recently, Pennsylvania launched a pilot project through LIHEAP to offer free installation or repair of cooling equipment, such as fans, ENERGY STAR window AC units, heat pumps, or central AC systems.<sup>60</sup> Colorado could offer a similar pilot through LIHEAP. While Colorado's Crisis Intervention Program offers repair and replacement of heating systems, lack of cooling is not recognized as a crisis situation.<sup>61, 62</sup> Given the increase in extreme heat events in Colorado, policymakers should explore a LIHEAP pilot and other policy options to expand funding for cooling and urgently address extreme heat as a crisis.

## **C. Federal Emergency Management Agency**

The Federal Emergency Management Agency (FEMA) offers financial resources to mitigate extreme heat. Through programs including the Building Resilient Infrastructure and Communities, Hazard Mitigation Grant Program (HMGP), and HMGP Post-Fire grant program, FEMA can fund heating and cooling systems and resiliency centers.<sup>63</sup> However, communities of color typically receive less government support for disaster prevention and mitigation due to discriminatory housing policies, lack of capital to match federal aid, and cumbersome administrative procedures, many of which add to the costs of claiming FEMA assistance. Even following disasters, communities of color receive less government investment than white communities to recover from commensurate amounts of damage.<sup>64, 65</sup> Hence, Colorado policymakers should use state FEMA authority to direct FEMA dollars specifically to communities that face overlapping burdens, like pollution, unemployment, and substandard housing, which make them more vulnerable to extreme weather and disasters.

## **D. Medicare/Medicaid**

Several provisions allow Medicare Advantage Plans and Medicaid state plans (through waivers) to fund home improvements and preventative care, especially around mitigating asthma and lead paint. Measures may include home health and safety upgrades. States like Massachusetts and Oregon deliver services and appliances through Medicaid waivers that address health-related social needs (HRSN).<sup>66</sup> Medically necessary air conditioners, ventilation, and air filtration devices are allowable HRSN services in these states.<sup>67</sup> Colorado policymakers can apply for Medicaid waivers to help fund similar extreme heat mitigation measures.<sup>68</sup>

## **E. State, Local and Utility Funding**

State, local, and utility funding can improve cooling access. Colorado SB 22-051 created a 10% State tax credit and sales tax exemption for heat pumps and complementary equipment, and HB 23-1272 established a State tax credit of \$1,500 for air source heat pumps and \$3,000 for ground source heat pumps.<sup>69</sup> While low-income households and small businesses may lack the tax liability and cash flow to take advantage of tax credits, the two bills contain provisions to improve access. The HB 23-1272 tax credit is fully refundable, allowing contractors with limited state income tax liability to benefit. Contractors must pass through at least one third of the tax credit as a discount to customers, making purchase prices more accessible to low-income households. Similarly, the point-of-sale sales tax exemption established by SB 22-051 reduces up-front costs.

Rebates (such as those offered by investor-owned, municipal, and co-op utilities) can be more accessible than tax credits because they reduce up-front costs. However, utility incentive programs have often excluded low-income households. Many utility programs also require that any issues with lead, asbestos and mold be addressed in homes before weatherization services. Yet many low-income homes, especially low-income rental homes, tend to be older and in disrepair. Recent



legislation requiring carbon emission reductions from buildings, such as Colorado’s Clean Heat Standard, can help address these concerns by encouraging additional utility investments in heat pumps and energy efficiency measures.<sup>70</sup> It is important that utility Clean Heat, Demand-Side Management, and Beneficial Electrification Plans prioritize whole-home efficiency and electrification projects that expand low-income households’ access to cooling and maximize their energy savings.

Cities and counties can also adopt policies to make it easier for residents to afford cooling. The City and County of Denver, for example, offer rebates of up to \$3,500 for new heat pump installations.<sup>71</sup> Such rebates offered by municipalities can be integrated with other federal, state, and utility incentives to make cooling equipment accessible to residents.

## F. Equitable Financing

Financing options are often critical to filling gaps in funding and creating long-term scalability and marketability for efficient cooling appliances.

**1. Tariff on-bill financing (TOBF).** TOBF presents an alternative that states can pursue via public utility regulators. Through TOBF, utilities finance energy efficient building upgrades (such as installing a heat pump to replace a central AC or furnace at end of useful life) and recover the costs through tariffs on electric bills.<sup>72</sup> Households benefit from improved equipment performance (such as efficient cooling), while the utility recovers the cost through a monthly tariff that is smaller than the bill reductions from energy efficiency.<sup>73</sup> If a tenant moves, the equipment stays with the dwelling unit and the tariff applies to the new occupant’s bills.<sup>74</sup> TOBF is not only a solution for renters; it can support low- and moderate-income (LMI) homeowners who may not be able to afford efficient cooling systems due to high up-front costs and inadequate credit to secure financing. Through TOBF, utilities can finance equipment upgrades for both LMI homeowners and renters, improving access to efficient and affordable cooling.

**2. Residential Energy Upgrade (RENU).** Colorado’s RENU Loan program, provided via the Colorado Clean Energy Fund, offers low-cost financing for energy efficiency and renewable energy improvements.<sup>75</sup> However, RENU cannot be used for health and safety upgrades that are prerequisites for weatherization upgrades and transitioning to electrified appliances. In addition, RENU is only available to homeowners and not renters. To help lower-income homeowners and renters cool their homes, Colorado policymakers could make RENU available for renters and allow RENU funds to be used for health and safety upgrades so that energy-efficient equipment can be installed. Further, RENU could also provide funding for localities and municipalities that want to convert some public spaces into community resiliency centers.



# V. Policy Design Recommendations

Policy design considerations for successful cooling initiatives include providing tenant protections and avoiding utility bill increases; addressing grid impacts; offering technical assistance; ensuring compliance and enforceability; and integrating local context.

## A. Ensure Tenant Protections and Mitigate Utility Bill Increases

Cooling programs and associated funding should include strong tenant protections to avoid displacement and ensure affordable utility bills.<sup>76</sup> For instance, funding programs can require property owners who receive incentives to sign binding affordability covenants that restrict rent increases for several years after upgrades are made. States and localities can also create rental registries to monitor rent increases following upgrades. Further, the Colorado Public Utilities Commission could track and report on utility disconnections to help ensure that critical energy assistance and weatherization programs reach the customers with the greatest need.

## B. Ease Grid Impacts Through Efficiency, Solar, and Weatherization

Cooling accounts for approximately 8% of energy use in single-family homes.<sup>77</sup> However, increasing the proportion of Colorado homes that have cooling without making that cooling more energy efficient would strain Colorado's electric grid. Solutions for policymakers include promoting efficient cooling via heat pumps, incentivizing grid interactive and load shifting technologies, and pairing cooling systems with weatherization upgrades, such as air sealing and insulation, and/or solar and storage.

## C. Provide Technical Assistance

Navigating the wide array of federal, state, utility, and local incentives for energy upgrades can be challenging for Coloradans.<sup>78</sup> To simplify incentive applications and compliance for households, contractors, and manufacturers, Colorado policymakers could direct the Colorado Energy Office, local utilities, and the Colorado Public Utilities Commission to publish streamlined guidance on which financial incentives can be stacked, how to fill out various applications, and which purchases or projects are eligible for rebates and tax credits. Further, state agencies, cities, and counties can partner with community-based organizations to form navigator or community ambassador programs that conduct multilingual, targeted outreach to disproportionately impacted communities and provide technical assistance covering how to access incentives, read energy bills, conserve energy, use newer appliances, and navigate utility shut-offs and bill assistance.

## E. Plan for Compliance and Enforceability

Different types of cooling policies require enforcement by different agencies, from a city building department (for minimum rental standards) to the Colorado Public Utilities Commission (for utility disconnection bans). Staffing for enforcement should be carefully evaluated early in the policy design process. Additionally, funding and technical assistance may be necessary to enable successful compliance. For example, a municipality considering a cooling mandate for existing rental units may need to phase its implementation ramp-up to correspond with incentives that can lower the cost of compliance for landlords.

## F. Consider Local Context

Colorado contains four different climate zones, ranging from "mixed-dry" to "very cold."<sup>79</sup> Heating and cooling needs vary substantially across these regions. Thus, tying cooling policies to a statewide temperature threshold is not appropriate. For instance, a maximum indoor temperature for rental housing or a temperature threshold for a utility disconnection ban should be set by climate zone.



## VI. Conclusion

As Colorado continues to experience hotter summers, heat-related illnesses and deaths are expected to increase. A variety of policy solutions at both the state and local levels can facilitate broader access to energy-efficient cooling that protects Coloradans' health while maintaining affordability and minimizing strain on the electric grid. At the state level, these options include codes and standards, landlord obligations, utility disconnection bans, and protections for tenants' rights to install cooling. Policy mechanisms for cities and counties include establishing a maximum safe indoor temperature or adopting minimum rental standards. Further, both the State and municipalities can enhance neighborhood safety in the face of extreme heat by investing in community resiliency centers.

There is no single policy to ensure access to efficient and affordable cooling for all Coloradans. Rather, a suite of complementary tools at both the state and local levels will be necessary, including financing as well as policies that address tenant protections, affordability, grid impacts, and technical assistance. By adopting complementary state and local cooling policies and leveraging the historic investment of the Inflation Reduction Act, Colorado policymakers can protect public health while advancing Colorado's energy goals and improving energy affordability and resiliency.

<sup>1</sup> Andrew Freedman, "[The World's Hottest Year May Soon be an Average One](#)," *Axios*, January 2, 2024.

<sup>2</sup> Chase Woodruff, "[Tracking Extreme Heat in Colorado in 2023 as More Record Highs Are Forecast](#)," *Colorado Newswire*, August 21, 2023.

<sup>3</sup> "[About Extreme Heat](#)," *Centers for Disease Control and Prevention*, accessed December 9, 2023.

<sup>4</sup> "[Heat and Health](#)," *Colorado Department of Public Health and Environment*, accessed December 9, 2023.

<sup>5</sup> Cory Reppenhagen, "[100-degree Days Becoming More Common in Colorado](#)," *9News*, July 18, 2023.

<sup>6</sup> "[Global Issue, Local Risk](#)," *Colorado Health Institute*, March 10, 2023.

<sup>7</sup> Cory Reppenhagen, "[100-degree Days Becoming More Common in Colorado](#)," *9News*, July 18, 2023.

<sup>8</sup> "[About Extreme Heat](#)," *Centers for Disease Control and Prevention*, accessed December 7, 2023.

<sup>9</sup> "[Extreme Heat: Staying Safe if you have Health Issues](#)," *Harvard Health Publishing, Harvard Medical School*, July 13, 2023.

<sup>10</sup> "[Behavioral Risk Factor and Surveillance System, Colorado](#)," *Colorado Department of Public Health and Environment*, 2021.

<sup>11</sup> In addition, research shows that neighborhoods that were historically "redlined" have less tree canopy compared to those neighborhoods that were not. Greater tree canopy can mitigate heat, especially in urban areas. Redlining policies intentionally limited access to homeownership and wealth creation among racial minorities in particular neighborhoods. For more information, see NPJ Urban Sustainability, "[Residential Housing Segregation and Urban Tree Canopy in 37 US Cities](#)," 2021.

<sup>12</sup> Emmarie Huetteman, "[Heat Waves Affect Children More Severely](#)," *Scientific American*, published by KFF Health News on August 2, 2022.

<sup>13</sup> "[How Wildfires Affect Our Health](#)," *American Lung Association*, January 1, 2016.

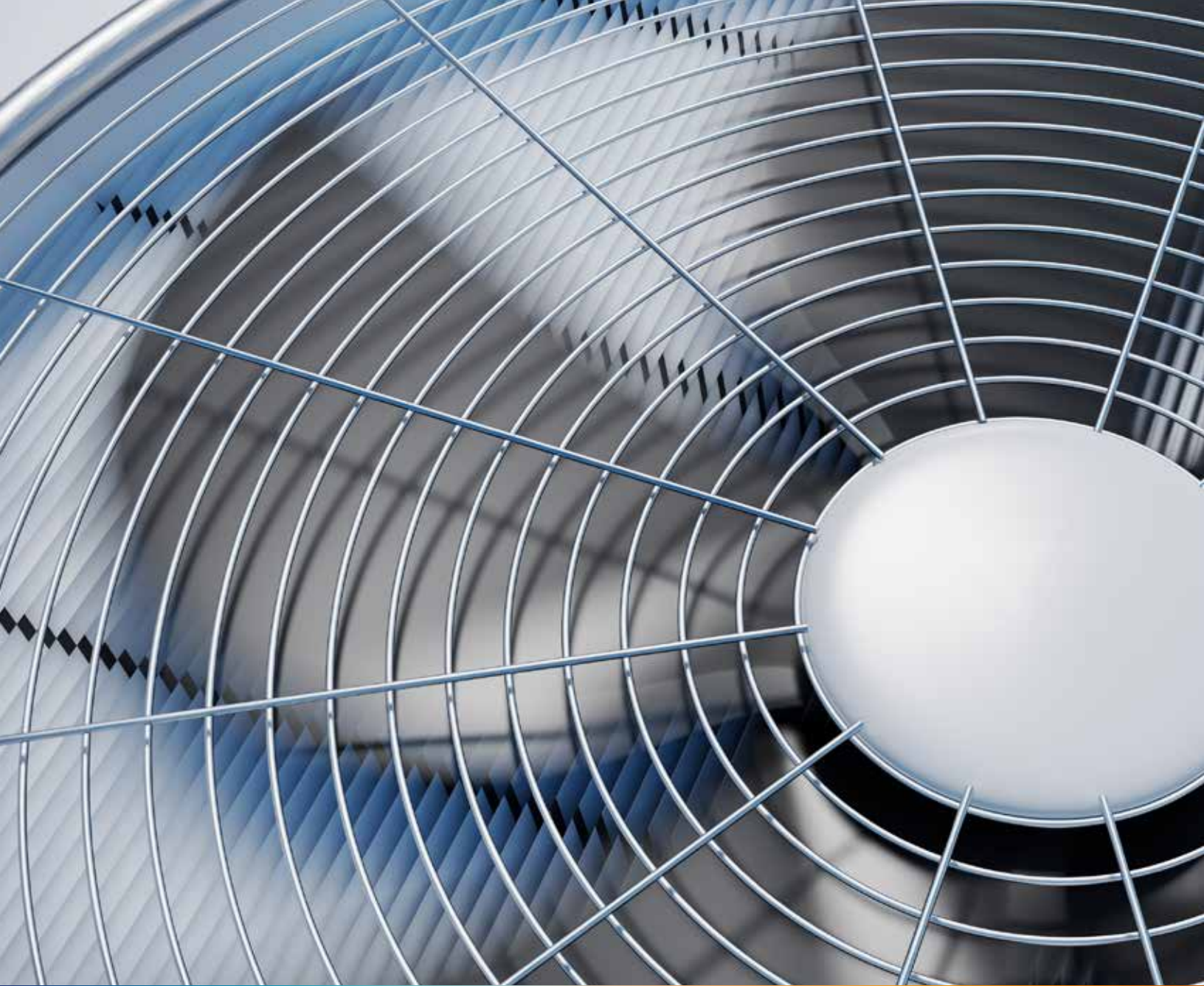
<sup>14</sup> "[Heat-related Illness Data](#)," *Colorado Department of Public Health and Environment*, accessed October 16, 2023.

<sup>15</sup> "[Heat-related Illness Data](#)," *Colorado Department of Public Health and Environment*, accessed October 16, 2023.

<sup>16</sup> "[Colorado Enviroscreen](#)," *Colorado Department of Public Health and Environment*, May 2023.



- <sup>17</sup> Sameed Ahmed M. Khatana et al., “[Association of Extreme Heat with All-Cause Mortality in the Contiguous US, 2008 –2017](#)” *JAMA*, May 19, 2022.
- <sup>18</sup> Individual air conditioning units are appropriate to cool only around 400 square feet and strain the power grid when residents try to cool their entire home with one unit.
- <sup>19</sup> Central air conditioning includes central heat pumps. Individual air conditioning includes ductless heat pumps, window or wall units and portable air conditioning units.
- <sup>20</sup> US Census Bureau, American Housing Survey, 2021.
- <sup>21</sup> US Energy Information Administration, Residential Energy Consumption Survey, 2020.
- <sup>22</sup> “[Low Income Services](#),” *Colorado Energy Office*, 2023, accessed October 16, 2023.
- <sup>23</sup> Energy burden refers to energy costs as a proportion of total household income.
- <sup>24</sup> US Department of Energy, [Low Income Affordability Data \(LEAD\) Tool](#), accessed October 19, 2023.
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