A photograph of a residential neighborhood. In the foreground, there's a wooden picket fence. Behind it, a well-maintained lawn leads to several houses. One house on the left has solar panels on its roof. Another house in the middle has a skylight. On the right, a white house with blue window shutters and a flower box is visible. The background is filled with lush green trees under a clear blue sky with a few wispy clouds.

BEATING THE HEAT: Recommendations and Considerations for States to Support Cost-Effective Residential Cooling

NASEO

National Association of
State Energy Officials

Acknowledgements

This material is based on work supported by the Center for Energy Poverty and Climate and ClimateWorks. This resource was authored by Jasmine Xie, Senior Program Manager, National Association of State Energy Officials (NASEO) in June 2024. The author gratefully acknowledges the following reviewers: NASEO colleagues David Terry, Sandy Fazeli, Ed Carley, and Maddie Koewler; Mark Wolfe and Cassandra Lovejoy with the National Energy Assistance Directors Association and the Center for Energy Poverty and Climate; Karl Frost of the Alabama Department of Economic and Community Affairs; Maren Mahoney of the Arizona Governor’s Office of Resiliency; Andrew McAllister and Michael Sokol of the California Energy Commission; Will Toor and Amy Jiron of the Colorado Energy Office; Nick Burger of the District of Columbia Department of Energy and Environment; Brooks Rumenik of the Florida Department of Agriculture and Community Services; Parker Kushima, Gail Suzuki-Jones, and Howard Wiig of the Hawaii State Energy Office; Elizabeth Mahony of the Massachusetts Department of Energy Resources; Michelle Gransee of the Minnesota Department of Commerce; Sara Bluhm of the New Jersey Board of Public Utilities; John Williams of the New York State Energy Research and Development Authority; Alan Zelenka, Andy Cameron, and Pandian Krishnaswamy of the Oregon Department of Energy; and Eddy Trevino of the Texas State Energy Conservation Office. External review and support do not imply affiliation or endorsement.

Table of Contents

Acknowledgements.....	2
Table of Contents	3
Executive Summary.....	4
State Actions Highlighted in this Report	5
Introduction	6
The Role of State Energy Offices	6
Adopting an Efficiency-First Approach	8
Centering Consumer Protections and Affordability	9
Determining How to Prioritize Households	10
Strengthening the Workforce and Supply Chains	11
Fostering Interagency and Intergovernmental Partnerships	12
Conclusion.....	13
Appendix A.....	14

Executive Summary

As average annual temperatures rise and extreme heat events become more frequent, cooling has become as important as heating to maintain safe and comfortable living environments. Inadequate home cooling increases the incidence of heat-related illnesses, particularly among vulnerable populations and low-income households, and households in urban areas that experience the heat island effect. Such health risks, along with their economic development and resilience implications, warrant federal and state focus on strategies to help households invest in affordable energy-efficient cooling technologies.

Many State and Territory Energy Offices (hereafter referred to as “State Energy Offices”) and other state agencies that offer services for low-income communities work collaboratively to deliver heating and cooling assistance to households statewide, including through the Weatherization Assistance Program (WAP) and the Low-Income Home Energy Assistance Program (LIHEAP). State Energy Offices are well-positioned to lead cross-agency collaboration that helps deploy energy-efficient heating, ventilation, and air-conditioning (HVAC) solutions to high-need households and communities. State Energy Office involvement in these policies and programs can help ensure that they align with energy use and emissions reduction targets established by state energy and climate plans, as well as changing demands on the electric grid as a result of evolving electrification and renewable energy policies.

Several State Energy Offices have successfully leveraged federal and state funding to tackle the problem of extreme heat and household cooling, especially for households and communities with the greatest needs and vulnerabilities. Through the development of multi-year market transformation, workforce development, consumer engagement, and incentive programs, combined with historic levels of state and federal funding for energy efficiency, electrification, and cooling surfaces, states can accelerate investments and progress to alleviate hardships borne by lower-income households. Existing state initiatives, as highlighted throughout this report, offer the following framework for implementing comprehensive residential cooling assistance programs:

- Adopt an efficiency-first approach;
- Center consumer protections and affordability in program design;
- Prioritize households according to need, energy burden, and vulnerability;
- Strengthen supply chains and workforce; and
- Explore interagency/intergovernmental partnerships.

The focus of this report is on technology solutions, such as energy-efficient air-conditioners and heat pumps, that enable households to cool affordably and comfortably as extreme heat becomes more prevalent. The report draws from varied responses across the country that demonstrate state leadership. Appendix A includes examples of State Energy Offices offering comprehensive program portfolios to support the deployment of advanced household cooling technologies, including air- and ground-source heat pumps through broader electrification efforts.

California (CEC)

- Advancing residential demand flexibility and grid reliability during extreme heat events
- Establishing industry partnerships to accelerate heat pump deployment
- Identifying vulnerable households to target for heat mitigation efforts

Minnesota (Commerce)

- Legislation enabled heat pump rebates, electric panel upgrade funding, and weatherization funding
- State university research on extreme weather adaptation for publicly-owned buildings

Massachusetts (DOER)

- Prioritizing insulation and envelope improvements when replacing fossil fuel-reliant heating and cooling systems with heat pumps and rooftop solar in low- and moderate-income housing

Oregon (ODOE)

- Conducted a statewide cooling needs study across underrepresented residential building types

Colorado (CEO)

- Operating a community-level electrification pilot to mitigate climate-driven heat impacts on vulnerable populations
- Legislation supporting the deployment of geothermal heating and cooling technology

New York (NYSERDA)

- Piloting window-unit heat pump installations for a technology-to-market demonstration
- Offering free home energy assessments for LMI households prior to electrification measures
- Advanced DAC identification methodology
- Energy Affordability Guarantee to limit energy burden for electrification program participants

New Jersey (BPU)

- Lowered temperature for utility disconnection moratorium

Washington DC (DOEE)

- Offers an Emergency HVAC system for AC repairs and replacements for eligible households

Arizona Governor's Office

- Executive Order to coordinate statewide heat response through cooling centers and grid resilience

Alabama (ADECA)

- Operates state weatherization assistance program (WAP), with a wide range of eligible make-ready measures that support residential cooling

Florida

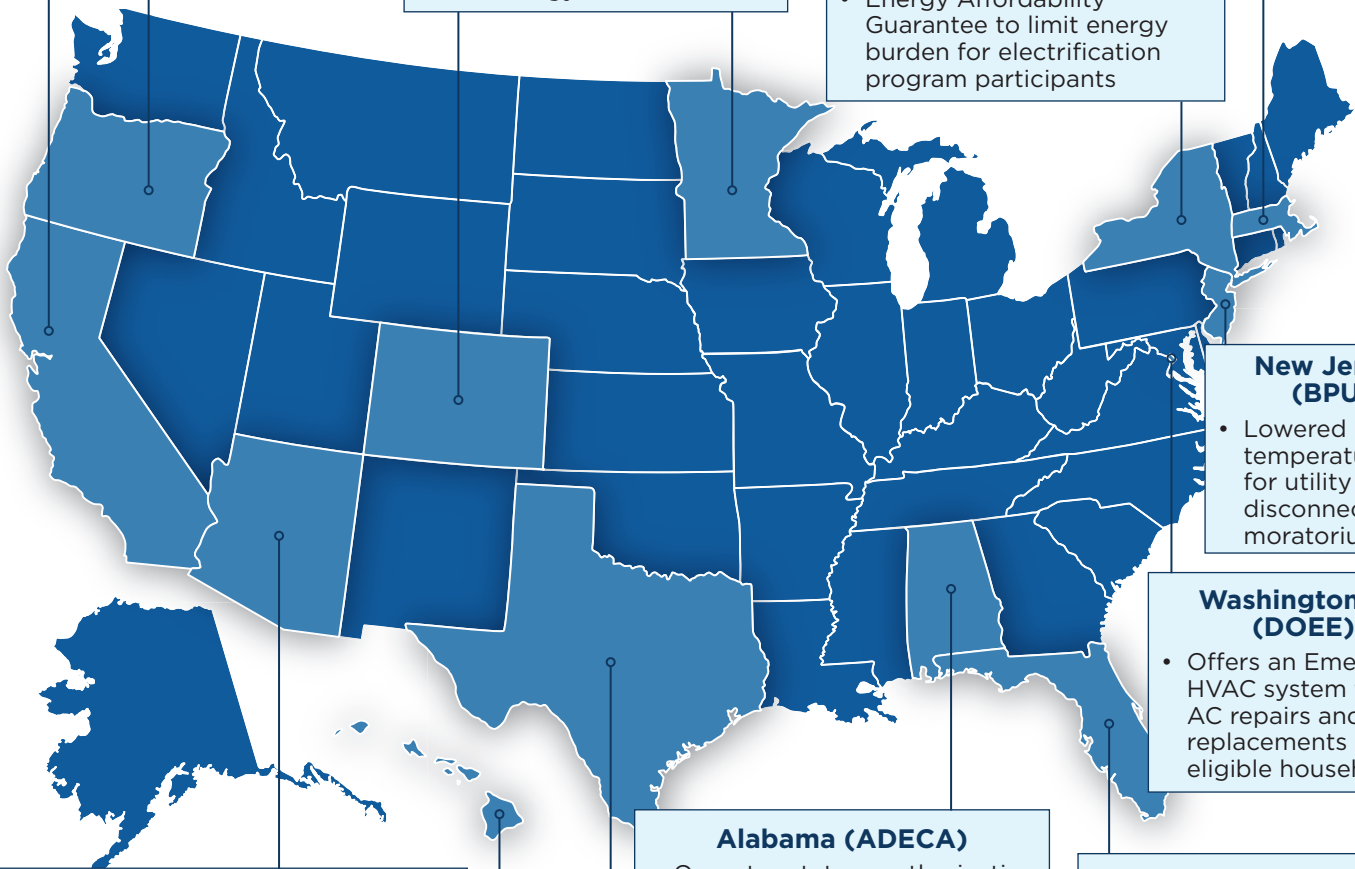
- Operates state weatherization assistance program (WAP) through community action agencies and includes eligible measures to mitigate extreme heat impacts
- Makes LIHEAP crisis funds available for cooling equipment replacement or repair

Hawaii (HSEO)

- Clean Energy Wayfinders Program employing energy navigators to help households access incentive and utility bill assistance programs

Texas (TDHCA)

- LIHEAP offers cooling assistance year-round with financial assistance to repair existing cooling units or purchasing new portable units



Introduction

Extreme weather events and rising global temperatures threaten health and infrastructure across the country.¹ States in climate zones that require large energy loads to operate air-conditioning (AC) systems during persistent summer heat waves may experience significant strain on the electric grid and run the risk of life-threatening outages. In coastal and northern states, residents who have historically experienced mild summers without the need for AC are now confronting annual spells of record high temperatures that require the installation of new cooling systems for the first time.

AC is pervasive across the United States. Nearly 90 percent of U.S. households use some type of AC equipment, accounting for 19 percent of all residential end-use electricity consumption in 2020.¹ Yet, a sizeable portion (12 percent) of households in the lowest income quartile have no AC equipment, and those with AC are more likely than higher-income households to have window units.² These cooling systems generally perform less efficiently and effectively than central air conditioning systems, high-efficiency heat pumps, or energy efficient window unit heat pumps,³ resulting in higher monthly energy bills and lower levels of comfort. Households under financial pressure sometimes resort to behavioral changes, such as conserving AC use, leading to uncomfortable and unhealthy indoor air temperatures. Others may face utility shut-offs due to their inability to pay the energy bills to support adequate summer cooling. In either case, the risk of heat-related illnesses and fatalities disproportionately affects those who lack access to efficient, cost-effective cooling solutions or live in areas with inadequate infrastructure to mitigate extreme temperatures.

The focus of this report is on technology solutions, such as energy-efficient air-conditioners and heat pumps, that enable households to cool affordably and comfortably as extreme heat becomes more prevalent. Equitable and effective cooling, however, goes beyond appliance-oriented solutions. States can complement and maximize the impact of newly installed AC or heat pump equipment through the lenses of resilience, energy efficiency, passive survivability,⁴ and community-level deployment. By working with state emergency management, community affairs, housing agencies, and legislators, State Energy Offices can develop integrated emergency response plans and tools, support mitigation strategies for urban areas experiencing the heat island effect such as by deploying smart surfaces and planting shade trees; bolster the construction of community cooling shelters and common spaces; and assess the feasibility of district and community geothermal energy systems as a scalable heating and cooling technology option for metropolitan areas. Deploying residential technology solutions, however, may be the default approach for rural and remote areas where geographic distance from the nearest resilience hub or cooling center may render community-level services inaccessible.

The Role of State Energy Offices

State Energy Offices can draw on their expertise to tailor programs to the specific needs and circumstances of communities, as well as provide low-income communities with dedicated resources to address the costs of cooling. By advancing priorities such as reducing greenhouse gas emissions, spurring economic development, supporting community energy resilience, improving energy reliability, and maintaining energy affordability, State Energy Offices can be at the helm of programs and policies that contribute to an energy system that works for everyone.

To effectively shape energy policies and programs that provide necessary cooling to the most vulnerable communities and align with statewide priorities, State Energy Offices can consider the following principles:

- **Adopt an energy efficiency-first approach.** Tightening building enclosures and addressing pre-existing structural inadequacies reduces energy loss, ensures proper sizing and design of new energy systems and appliance installations, contributes to passive survivability, and minimizes monthly energy bills for homeowners.
- **Center consumer protections and affordability in program design.** This ensures that low-income households can access clean energy technologies without facing initial cost barriers or future energy burdens.
- **Determine how to prioritize households.** Nuanced criteria for income-qualified and targeted assistance programs will efficiently allocate limited state and federal resources to generate the most impact.
- **Strengthen supply chains and workforce.** A skilled workforce and robust supply chains capable of supporting high-quality efficiency measures across the country can ensure that homes are receiving timely and appropriate retrofit solutions, increase satisfaction and uptake, and meet future system repair and maintenance needs.
- **Foster interagency and intergovernmental partnerships.** Collaboration between State Energy Offices and other agencies or existing programs can optimize resources for and expand assistance to vulnerable populations.

Over the next several years, State Energy Offices will oversee billions of federal dollars from the Inflation Reduction Act and the Infrastructure Investment and Jobs Act, in addition to annual appropriations and other funding at the federal and state level. Most State Energy Offices are the direct recipients of funding for Home Energy Rebates and Home Electrification and Appliance Rebates, which provide households with financial incentives to improve residential energy efficiency and reduce indoor and outdoor air pollution,⁵ and funding through the Energy Auditor Training Grant and Training for Residential Energy Contractors programs, which increase the training, resources, and support available for building energy auditors, contractors, and equipment installers.⁶

These timely investments can be used to support energy efficiency measures for homes so that cooling systems can be properly sized and operationally efficient, with lower up-front costs to install air-source heat pumps or other forms of energy-efficient and electrified heating and cooling equipment, such as ground-source heat pump or networked geothermal heat pump systems. The latter are cost-effective for some multifamily applications. The financial incentives driving these improvements take the form of rebates, grants, low-cost loans, and transferable and direct pay-eligible tax credits that low-income households, non-profits, and others with lower tax burdens can use to defray equipment and installation costs.

Where allowable, State Energy Offices can also combine funding from new or one-time federal programs with regular annual appropriations from WAP and LIHEAP for greater reach and impact. Approximately half of the State Energy Offices administer WAP funding, several administer LIHEAP, and those State Energy Offices that don't administer either program generally have robust relationships with the state or community-level agencies that deliver them.

Under LIHEAP, 26 states and territories offer cooling programs in the form of bill payment assistance for eligible low-income households. For example, Florida offers bill payment assistance with additional funding for households with senior citizens, disabled, and young children, in addition to making crisis funds available for the replacement or repair of cooling equipment. Another example is Texas, where cooling assistance is offered year-round and income-eligible households with vulnerable members, high energy burdens, or high energy consumption can receive up to \$7,500 for the purchase, repair, or replacement of a heating or cooling unit or the crisis-related purchase of portable cooling and/or heating units, window units, evaporative coolers, and mini splits.⁷

States located in warmer regions of the country have historically helped households manage extreme heat during summer months through WAP, LIHEAP, and emergency response programs. With milder winters and fewer concerns about stress-testing the performance of heating systems during deep-freeze events, the Southeast region has more electrified heating systems and dual heating and cooling heat pump systems than anywhere else in the country. These homebuilding legacies may position the Southeast region to demonstrate pathways towards developing infrastructure to support widespread residential electrification and the deployment of emerging heating and cooling technologies.⁸

Adopting an Efficiency-First Approach

State Energy Office programs such as the Massachusetts Low and Moderate-Income Housing Decarbonization Grant Program, administered by the Department of Energy Resources (the Massachusetts State Energy Office), exemplify an efficiency-first approach by funding ground and air-source heat pump and solar panel installations alongside insulation, roof repairs, electrical updates, and envelope improvements.⁹ Another example is the New York State Energy Research and Development Authority's (NYSERDA) EmPower Plus program, which provides low- and moderate-income households with free comprehensive home energy assessments and subsidized energy efficiency improvements from state-approved contractors.¹⁰

After completing an assessment, a contractor develops a report of findings that identifies ways for a household to improve its energy efficiency, which can include attic and wall insulation, air-sealing, and health and safety upgrades. Once the efficiency measures are complete, contractors can recommend appropriate equipment upgrades, such as installing an air-source heat pump. The program sequence prioritizes energy efficiency ahead of further electrification or appliance installations. Through EmPower Plus, participants are capped at efficiency and installation projects equivalent to \$10,000 or less. However, NYSERDA encourages households to explore incentives from utilities and local community-based organizations, potentially allowing them to supplement the financial discounts offered by NYSERDA to further minimize total out-of-pocket costs.

Various weatherization initiatives across states situated in warmer climate zones offer comprehensive support for efficiency measures that facilitate cooling system integration too. The Alabama Department of Economic and Community Affairs, which houses the Alabama State Energy Office and administers WAP by distributing the funding to community action agencies for a wide range of make-ready repairs to reduce energy consumption, enhance the effectiveness of existing residential cooling, or enable the installation of upgraded systems. In Florida, WAP funding is distributed to community action agencies, local governments, and non-profit agencies. For qualifying homes, eligible weatherization measures that can mitigate the impacts of extreme heat include air filtration, attic insulation and ventilation, solar screens, solar reflective coating, and cooling unit replacement. For State Energy Offices that are WAP

administrators and State Energy Offices working in close collaboration with their states' administering entities, WAP and other federal support for weatherization are inroads to expanding residential cooling by maximizing energy efficiency and affordability for vulnerable communities.

In many states, an efficiency-first approach to expanding residential cooling access may require strategic coordination among multiple funding streams and program initiatives. The aggregate of funding and programs from the U.S. Department of Energy (DOE), U.S. Department of Housing and Urban Development (HUD), Federal Emergency Management Agency (FEMA), investor-owned and municipal utilities, and states offers significant resources to support the requisite energy efficiency measures that optimize new installations and the performance of existing cooling systems. These measures include conducting home energy audits and performance assessments to ensure proper HVAC equipment sizing, integrating smart thermostats, utilizing heat-reflective window and door materials, using outdoor shade structures, installing storm windows, sealing envelopes, improving attic insulation and ventilation, and opting for the highest-efficiency appliances.

Centering Consumer Protections and Affordability

In most U.S. homes, energy-efficient air-source heat pumps have been found to be cost-effective over their lifetime of use.¹¹ Homes without existing cooling equipment may opt for new heat pumps to serve the same cooling purpose as new AC units, while replacing their existing heating systems with heat pumps' dual heating capability. The current market price and installation costs of heat pumps, however, pose significant barriers to low-income households that would benefit most from lower monthly utility bills. For low-income households that are appropriate candidates for heat pump installations, State Energy Offices can provide appliance or installation subsidies in the form of grants, rebates, or on-bill financing. States can also identify income-qualified homes with installation barriers such as electric panel capacity limits, space constraints, and leaky envelopes to prioritize for weatherization funding and alternative HVAC system solutions.

For low-income households with existing AC systems that are not conducive to heat pumps for reasons including space constraints and limited cost-effectiveness, State Energy Offices may be interested in partnering with affordable housing and public health agencies to offer affordable systems (including window or portable units) as emergency response measures. In collaboration with the District of Columbia Sustainable Energy Utility, the District of Columbia Department of Energy and Environment (DOEE) offers an Emergency HVAC Program to help repair and replace broken heating and air conditioning systems for eligible senior citizens and people with disabilities owning or renting homes.¹² Along with the provision of AC, DOEE seeks to target long-term electrification by eventually providing heat pump units under this program.

State Energy Offices can also work with public utility commissions to advocate for the prohibition of utility service disconnections on very warm days, ensuring that cooling systems can stay plugged in. Protective utility shut off moratoriums exist across 18 states, where households that struggle to keep up with electricity bills do not face the risk of having life-sustaining appliances turned off, including AC units and refrigerators storing medication and food.¹³ In addition to establishing moratorium policies, State Energy Offices can encourage utility commissions to lower the minimum temperature threshold that triggers protective disconnection moratoriums. For instance, in 2022, the New Jersey Board of Public Utilities ratified a decision to lower the minimum temperature threshold from 95 degrees to 90 degrees for their moratorium to take effect.¹⁴ This comports with the FEMA definition of an extreme heat event

as a period of at least two days of high heat and humidity with temperatures above 90 degrees Fahrenheit.¹⁵

Another idea is to offer energy bill payment assistance during summer months, particularly to households that cannot replace existing cooling systems while facing prohibitively high energy loads or higher-than-average electricity rates. To abate cost barriers to operating newly installed electric equipment, State Energy Office-led programs frequently contain provisions to manage post-project energy burden. For instance, the New York Energy Affordability Guarantee ensures that participants in the NYSERDA EmPower Plus program do not pay more than six percent of their total household income on energy. Washington State’s Clean Energy Transformation Act requires utilities to offer payment assistance to low-income households and demonstrate a reduction in energy burden. Among public utility commissions, some state regulators have approved discounted rates to address energy burden, with Connecticut approving a 50 percent discount on monthly electric bills for households with incomes under 160 percent of the federal poverty line. Other states, such as Ohio through the Department of Development (which houses the State Energy Office), offer percent-of-income payment programs, providing low-income ratepayers with fixed utility bills, discounts, and forgiveness of arrearages through funding from utility ratepayer program revenues.¹⁶

Finally, to maximize the impact of incentive, direct installation, and bill assistance programs for residential cooling, states can consider employing equity-oriented approaches to reduce program participation barriers. Printed program materials and grassroots outreach through community-based organizations may increase participation from elderly, rural, or other residents with limited use of the Internet. Offering services in multiple languages and simplifying application processes can also improve program reach. Some State Energy Offices or local governmental entities may be interested in employing energy navigators, or designated individuals to assist with community outreach and engagement, as exemplified by the Hawai’i State Energy Office’s Clean Energy Wayfinders program.¹⁷

The Clean Energy Wayfinders share information and opportunities for energy conservation and clean energy adoption with Hawai’i’s schools, community organizations, and households — especially in low-to moderate-income (LMI), asset-limited, income-constrained, employed (ALICE), and under-resourced communities — to help increase energy conservation and efficiencies, lower monthly energy bills, increase access to clean transportation and renewable energy resources, and promote green career training and employment opportunities.

With recruiting focused in the targeted communities, the Clean Energy Wayfinders receive energy and community outreach and engagement training to provide information on energy conservation, efficiency, clean energy, and clean transportation, and to direct community organizations and households to programs and resources, including LIHEAP and WAP funds, statewide Solarize initiatives, community-based renewable energy subscriptions, and clean energy workforce development opportunities.

Determining How to Prioritize Households

In April 2022, the California Governor’s office released “Protecting Californians from Extreme Heat: A State Action Plan to Build Community Resilience”, which acknowledged the disproportionate consequences of extreme heat events on vulnerable populations, including children, the elderly, low-income households, and those with medical conditions.¹⁸ The Action Plan takes stock of existing extreme heat response efforts across state agencies, as well as recommendations for future actions. The

recommendations fall into four main categories, one of which focuses on programs to accelerate protection of low-income households in disadvantaged communities. The suggested approach for low-income households is to provide no- or low-cost direct heat pump installations, air-conditioning retrofits or replacements, and energy efficiency measures. There are also recommendations to conduct more analyses of vulnerable populations for targeted public awareness campaigns during extreme heat events, improve the effectiveness of early heat warning systems, evaluate energy, and implement cost-efficient strategies that protect vulnerable populations against heat and air pollution impacts.

In response to deadly heat waves in 2021, the Oregon State Legislature passed Senate Bill 1536, which provided funding to establish cooling programs that protect against future heat waves. This included directives for the Oregon Department of Energy (ODOE) to conduct a cooling needs study across publicly supported housing, manufactured housing, and recreational vehicles used as housing, as well as assess the feasibility of broadly deploying heat pumps for their cooling capabilities.¹⁹ The study, published in December 2023, focused on the prevalence, need, and barriers to cooling facilities, and informed an Oregon heat vulnerability index to identify where cooling investments are most needed at the household, neighborhood, and community levels.

Under SB 1536, ODOE also launched the Oregon Rental Home Heat Pump Program to address the unique barriers to installing heat pumps in renter-occupied housing, including renters of manufactured housing and manufactured homes situated on leased land.²⁰ SB 1536 also established a Community Cooling Spaces program, offering grant funding to landlords to provide cooling centers to tenants. These common spaces must be able to accommodate five or more occupants and cool to 80 degrees Fahrenheit or lower, and located within a quarter mile of the property to be eligible for state financial support. The grant funding can also cover up to 100 percent of window or portable AC, heat pumps, and traditional AC installation and equipment costs. Under this program, tribal housing, affordable multifamily, non-profit managed multifamily, senior housing, agricultural workforce housing, and manufactured home parks have been identified as priority housing types.²¹

In New York, NYSERDA demonstrates a leading example of defining, identifying, and targeting disadvantaged communities (known as “priority populations”) for the state’s portfolio of energy efficiency and clean energy programs. Predating the federal Justice40 program, New York’s Climate Leadership and Community Protection Act of 2019 required that disadvantaged communities in New York State receive 40 percent of the benefits of spending on clean energy and energy efficiency programs. In the following years, NYSERDA spearheaded an extensive mapping process through public input and various indicator metrics to identify disadvantaged communities by census tract.²² As a result, 55 percent of the census tracts in New York were designated as disadvantaged, representing about 56 percent of the total state population.

Strengthening the Workforce and Supply Chains

States can take several approaches to strengthen equipment supply chains and contractor availability. Developing public-private memorandums of understanding and bulk procurement agreements with manufacturers can ensure the availability of cooling equipment and achieve economies of scale to offer the lowest possible purchase price on equipment offered through public programs. One example is the California Air Source Heat Pump Manufacturer Council, a state-industry partnership aimed at meeting state heat pump installation targets. The 10 signatories of this partnership agreement included manufacturers, distributors, and suppliers that have committed to meeting California’s goal of installing six million electric heat pumps by 2030.²³

Additionally, investing in workforce development and diversity initiatives can increase contractor availability. This enables states to build a high-quality contractor network to meet demand for timely and easily accessible direct-install programs. It also assures that future repair and maintenance needs for heat pumps can be met. State Energy Offices have a wide array of options to support workforce development and diversity, including forming partnerships with vocational and minority-serving institutions, embedding local hiring and community benefits into state procurement and purchasing processes, and cultivating inter-agency coordination with workforce and economic development counterparts. State Energy Offices may refer to various NASEO reports, including “Energy Sector Workforce Diversity, Access, Inclusion, and the Policy Case for Investment” and “Realizing the Workforce Potential of Infrastructure Investments,” for detailed recommendations on strengthening a clean energy workforce.²⁴

Fostering Interagency and Intergovernmental Partnerships

Collaborations between State Energy Offices and other state or local agencies can combine program resources to maximize the assistance available to vulnerable populations. LIHEAP, a federal energy bill payment assistance program, grants states the flexibility to allocate funding toward heating and cooling assistance, energy crisis interventions, and low-cost residential weatherization measures as needed. Of the 50 states and District of Columbia, 26 states allocate at least some percentage of LIHEAP program funds to cooling assistance. State Energy Offices that do not administer LIHEAP or WAP may nonetheless be interested in aligning the program criteria of new residential cooling initiatives with those of LIHEAP and WAP. Such coordination can inform State Energy Offices about target populations and opportunities to streamline LIHEAP, WAP, and residential cooling funds.

Cross-agency coordination may also reduce administrative burdens and capacity constraints, enabling state home cooling programs to leverage existing procedures for prioritizing households, verifying eligibility, and defining eligible measures for funding support already in place. Leveraging the existing institutional knowledge of program support staff can also reduce the start-up of deploying equitable and energy efficient residential cooling. After 30 days of consecutive excessive heat warnings across several counties in Arizona during August 2023, Governor Katie Hobbs signed an executive order to advance a coordinated statewide heat response. This order includes action items across seven state agencies: the Office of Resiliency, Department of Administration, Department of Economic Security, Department of Emergency and Military Affairs, Department of Health Services, Department of Public Safety, and Department of Corrections Rehabilitation and Reentry. The executive order implies that the Arizona Department of Economic Security, the state LIHEAP administrator, would benefit from coordinating with the Office of Resiliency (the Arizona State Energy Office) and includes a directive to administer \$80 million in federal rebates and grants for energy efficiency projects to decrease monthly energy costs.²⁵

Interagency collaboration and convergence of resources can result in states offering a “one-stop shop” program for low-income households seeking cooling solutions, which could remove the onus from homeowners to identify and patch together relevant opportunities or undergo multiple application and eligibility verification processes. However, if households must stack funding streams from discrete programs to maximize the available financial incentives, State Energy Offices can collaborate with or employ local and community-based organizations to drive program participation as energy navigators. State-level decision makers that recognize the value of continuous and equity-centric engagement

through trusted community level partners can also design state programs to meet local priorities and maximize direct community benefits.

Conclusion

States can play a critical role in ensuring that communities and households, regardless of income and other barriers, can invest in affordable cooling solutions to stay comfortable and safe in extreme heat. In their roles supporting energy efficiency, advancing beneficial electrification, and investing in grid modernization and resilience, State Energy Offices are well-positioned to take a leadership role. In partnership with LIHEAP offices, local communities, community-based organizations, and other stakeholders, State Energy Offices can tailor programs to the specific needs and circumstances of the communities they intend to reach and provide low-income households with dedicated resources to address the costs of cooling.

As the examples explored in this report illustrate, every state may take a unique approach to meet its specific economic, energy, and community needs; however, guiding principles can help protect consumers, prioritize public funds and investments effectively, and leverage the respective strengths of various agencies and partners. Key considerations to inform State Energy Office actions in affordable and efficient cooling technologies include:

- Adopting an energy efficiency-first approach;
- Centering consumer protections and affordability in program design;
- Determining how to prioritize households;
- Strengthening supply chains and workforce; and
- Fostering interagency and intergovernmental partnerships.

As climate and extreme events continue to harm the most vulnerable communities and households across the United States, states offer an important source of leadership to direct resources to and alleviate the economic and health risks borne by those with the greatest needs.

Appendix A

State Case Studies

Arizona

In 2023, Arizona recorded the hottest summer on record, where inadequate emergency response and heat relief protocols may have contributed to the nearly 600 deaths in Maricopa County alone. In response, Governor Katie Hobbs issued an emergency declaration and executive order to create a comprehensive extreme heat response plan. In March 2024, Arizona unveiled the statewide Extreme Heat Preparedness Plan, outlining the measures state agencies are taking to brace for extreme heat occurrences and proposing longer-term strategies for enhancing inter-agency and cross-jurisdictional readiness and response.²⁶ Executive Order 2023-16 mandated the Governor's Office of Resiliency to spearhead the plan's development, collaborating with various state agencies such as the Department of Emergency Management and Military Affairs, the Department of Economic Security, the Department of Health Services, the Department of Administration, the Industrial Commission, the Department of Housing, and the Residential Utility Consumer Office. Recommendations for preparedness and response span several areas, including ensuring safe and affordable housing, enhancing emergency response protocols, bolstering the cooling center network, and investing in data, knowledge, and workforce development.

Implementation of the plan is already underway, with Governor Hobbs announcing the appointment of the nation's inaugural state-level Chief Heat Officer, Dr. Eugene Livar. Filling the position is a core recommendation of the Extreme Heat Preparedness Plan. Dr. Livar will collaborate with the Office of Resiliency to roll out the plan across agencies. Governor Hobbs also advocates for fair distribution of LIHEAP funds to Arizona, aiming to assist low-income families in weatherizing their homes and covering utility bills. Additionally, the Hobbs Administration is preparing to deploy 18 solar-powered, mobile cooling units throughout the state.

California

The California Energy Commission (CEC) is advancing residential demand flexibility and grid reliability to manage electricity demand during extreme heat events, regulating the global warming potential of refrigerants used in cooling equipment, and driving heat pump adoption through market transformation programs.

State Context

California faces grid outage risks during extreme heat events, while trying to meet high energy demand to sufficiently cool homes and buildings across the state. In September 2022, all-time high temperature records were broken in Sacramento, San Jose, Santa Rosa, and Fairfield, such that electricity demand for air conditioning threatened to overwhelm the state power supply. The state was able to avert grid outages with emergency statewide demand response signals that deployed load shedding and modulation across smart thermostats and other grid-connected building systems.

In April 2022, the Governor's office released "Protecting Californians from Extreme Heat: A State Action Plan to Build Community Resilience", which acknowledged the disproportionate consequences of extreme heat events for vulnerable populations, including children, the elderly, low-income households, and those with medical conditions. The Action Plan takes stock of existing extreme heat response efforts

across state agencies, as well as recommendations for future actions. The recommendations fall into four main categories, one of which focuses on increasing the resilience of the built environment through building regulations and codes that advance heat adaptation as well as programs to accelerate protection of low-income households in disadvantaged communities that are impacted by extreme heat. The suggested approach for low-income households is no- or low-cost direct heat pump installation and air-conditioning retrofits alongside complementary efficiency measures. There are also recommendations to conduct more analyses of vulnerable populations for targeted public awareness campaigns during extreme heat events, improve the effectiveness of early heat warning systems, evaluate energy, and implement cost-efficient strategies that protect vulnerable populations against heat and air pollution impacts.

According to the Building Decarbonization section of the 2021 Integrated Energy Policy Report (IEPR), California's comprehensive state energy plan, California will look to install six million heat pumps by 2030. According to the U.S. Energy Information Agency, California has approximately 5.5 million residential central air-conditioning units, 35 percent of which are greater than 14 years of age and will soon require replacement. If every homeowner in California chose an air source heat pump to replace retired gas furnaces for heating and forwent a new stand-alone air conditioning unit for cooling, the state could electrify 51 percent of home heating by 2030.²⁷

The IEPR also presents a cost analysis suggesting that replacing HVAC systems with heat pumps is less expensive than installing the traditional split-system air conditioner and furnace, due to lower combined equipment and installation costs. When installed, high efficiency heat pumps with demand-flexible controls can optimize energy conservation and savings during peak demand periods and provide grid benefits. These savings, however, may be diminished in older homes that require panel upgrades to accommodate additional electric plug loads or that lack adequate insulation and air sealing to retain conditioned air and allow temporary set point adjustments. In most jurisdictions, panel replacements must be completed by accredited engineers. Electrification that requires panel upgrades may result in higher installation costs or service delays if there are workforce availability constraints.

How California Defines "Low Income"

CEC defines low-income households as those at or below 80 percent of the statewide median income or those defined as low-income by the California Department of Housing and Community Development.

State Programming

Financial Incentive Programs

The Technology and Equipment for Clean Heating (TECH) Program is a \$120 million market transformation effort administered by the California Public Utility Commission (CPUC) in consultation with the CEC to meet goals established by the 2021 IEPR to install six million residential heat pumps by 2030. TECH offers financing solutions to increase access for low-income households along with additional incentives for multifamily residences of "equity communities," defined as communities identified through the CalEnviroScreen 4.0 Disadvantaged Community tool or affordable housing developments with two thirds of all units serving households under 80 percent of the area median income (AMI). The program, now in its second year, provides a single-family electrification incentive that offers a minimum \$3,000 rebate for any heat pump HVAC system installation. CPUC rebates can be combined with incentives from local electric utilities. These incentives are available on a first-come, first-served basis until funds are depleted.

Consumer Education Programs

TECH developed an incentives clearinghouse that summarizes the landscape of funding to support heat pump deployment for consumers. TECH also awards quick start grants for solutions that overcome market barriers and target hard-to-reach communities. These grant scopes include testing behavioral load shifting programs, financing options, and other methods to scale the installation of heat pumps.

Workforce Development Programs

TECH trains contractors to help households claim heat pump incentives and to integrate the technology into service offerings. TECH's workforce trainings target contractors in low-income areas and address common installation challenges, such as those in multifamily retrofit projects. To facilitate installation demonstrations and trainings, TECH offered 3,000 free heat pump water heating units to contractor firms.

Pilot Programs

TECH has goals of implementing scalable pilot programs and contributing recommendations to a statewide building decarbonization framework based on pilot program outcomes. Among other efforts, TECH offers an Inclusive Utility Investment Pilot, which establishes an on-bill repayment mechanism for upgrades funded by utilities. Participants are protected from foreclosure, repossession of upgraded devices and appliances, and utility shut-offs as a result of nonpayment. 40 percent of total program investments will be targeted toward low-income and disadvantaged communities.

CEC is in the design phase of their Equitable Building Decarbonization Program, soliciting public input on program elements of the direct install program for no- or low-cost electrification retrofits in low- and moderate-income households and the statewide incentive program to increase adoption of electric technologies in homes. Preliminary guidance directs funding to disadvantaged and low-income communities. Eligible building types include single-family and multifamily homes, mixed-use buildings with residential units, other types of residential buildings (including assisted living facilities and group homes), and manufactured homes (which receive a required set aside of at least five percent of the total program budget). These residential units can be either owner-occupied or rented. There is broad project eligibility, including for heating and cooling equipment electrification, building envelope improvements, water heating electrification, and other upgrades that involve ENERGY STAR certified equipment or other appliance standards.

Program Funding Sources

Governor Gavin Newsom earmarked almost \$1.3 billion in the proposed 2022-2023 California budget towards decarbonizing buildings and processes, \$922.4 million of which is for Equitable Building Decarbonization funding for building upgrade rebates, a statewide low-income direct-install building retrofit program, and to accelerate adoption of ultra-low-global warming potential (GWP) refrigerants.⁷ The CEC Equitable Building Decarbonization Program was established under Assembly Bill 209 with an initial budget of over \$130 million. The TECH program's initial \$120 million in funding was authorized by California Senate Bill 1477 in 2018; the program has been allocated an additional \$145 million over the next two years.

Cooling Technology Research

The Electric Program Investment Charge (EPIC) is a ratepayer-funded program through the three California investor-owned utilities, and is co-managed by the CEC. The EPIC program advances clean energy technology research and development, as well as technology demonstration and deployment for projects that benefit under-resourced communities. Researchers participating in the EPIC program have tested the integration of smart ceiling fans and smart thermostats through pilots in affordable

multifamily housing sites and are developing a next-generation residential space conditioning system that optimizes efficiency and utility integration.²⁸

Colorado

Colorado House Bill 19-1261 requires the state to achieve 90 percent statewide greenhouse gas pollution reductions by 2050 from 2005 levels, citing increased climate risks that disproportionately impact vulnerable populations, including extreme heat, prolonged drought, and wildfires.²⁹ Since then, state legislation has enabled pilots and direct installations of geothermal and air-source heat pump systems that provide energy-efficient cooling and heating across the state. In July 2023, the Colorado Energy Office launched a statewide community-level electrification pilot, the High Efficiency Electric Heating and Appliances grant program, which offers grants to support the adoption of heat pumps, high-efficiency electric equipment, and pre-electrification measures for communities or multiple residential housing units. Colorado House Bill 22-1362 funded the pilot with \$10.85 million to implement between five and 10 electrification projects in the state through June 2026.³⁰ In 2024, the Colorado legislature passed House Bill 24-1370, which will allow local governments to apply to the Colorado Energy Office to become gas planning pilot communities. Within these communities, the local government and utilities will collaborate to identify opportunities to avoid gas infrastructure projects by instead building thermal energy networks or accelerating building electrification, investing in neighborhood-scale projects and allowing utilities to meet their obligation by alternative thermal service rather than gas. Thermal energy networks refer to ambient temperature loop systems that connect multiple buildings with geothermal infrastructure to provide heating and cooling year-round.

In 2022, Colorado House Bill 22-1381 established geothermal energy grants that support the use of zero-emission, geothermal energy for electricity generation and high-efficiency space/water heating and cooling.³¹ The following year, House Bill 23-1252 authorized tax credits for heat pump installations and added thermal energy networks as an eligible measure for the geothermal energy grants.³²

The Colorado Energy Office is demonstrating the feasibility and cost-effectiveness of heat pump technology across different housing types, including factory-built affordable housing units. Having piloted successful all-electric development with solar PV and geothermal on 18 prefabricated homes in Gunnison (for residents at or below 80% AMI), there are plans to deploy air source heat pumps within the second phase of development as well. Overall costs will come in well below the average cost to build a home in Gunnison County. Colorado's [Innovative Housing Incentive Program \(IHIP\)](#) further supports the localized design, development, and production of energy efficient factory-built housing.³³ By offering housing manufacturers operating expense reimbursements, per-unit incentives (with a bonus for committing at least 10 percent of homes produced to affordable housing), and factory development loans, IHIP creates manufacturing capacity to grow the number, size, diversity, and performance of Colorado's homes.

The provision of innovative heat pump technology for cooling is accompanied by Senate Bill 24-214, requiring ENERGY STAR appliances for affordable housing and directing the Colorado Energy Office to conduct a market study to estimate the incremental cost of replacing existing AC units with HVAC systems that meet the latest prescribed standards. In 2023, as a part of House Bill 23-1161, Colorado was the first state to adopt a minimum efficiency standard for residential windows, reducing solar heat gain and air leakage that could otherwise significantly increase required cooling loads.³⁴ This standard, set to take effect in 2026, will help drive down the cost of windows through product standardization and market simplification.

Massachusetts

In February 2023, Governor Maura Healey launched a \$50 million LMI Housing Decarbonization Grant Program to fund replacements of fossil fuel-reliant heating systems with heat pumps, rooftop solar, and insulation and envelope improvements. Within this program, LMI is defined as households with incomes less than 80 percent of the state median income, which represent 43 percent of all households in Massachusetts. This program is funded through the American Rescue Plan Act, Alternative Compliance Payments from investor-owned utilities in the state, and the Massachusetts Department of Environmental Protection Climate Protection and Mitigation Trust, and administered by the Massachusetts Department of Energy Resources (the State Energy Office). The first round of awardees was announced in November 2023, in which 10 affordable housing properties were selected to receive \$27 million to fund deep energy retrofits, building system electrification, and onsite renewable energy installations.³⁵ A second round of funding is currently underway, with awards anticipated in the coming months.

Minnesota

In 2023, the Minnesota legislature established several new energy programs including heat pump rebates, grants to upgrade residential electrical panels, and pre-weatherization and weatherization funding. Legislation also established the Strengthen Minnesota Homes program that provides funding for retrofits to make homes resilient to common events such as tornados and windstorms.³⁶ The Environment, Climate, and Energy Finance and Policy Bill of 2023 sets aside \$690,000 to contract with the University of Minnesota to conduct research on extreme weather adaptation in publicly owned building construction, specifically for design measures that reduce energy costs through energy efficiency and renewable energy measures.

New York

The New York State Energy Research and Development Authority (NYSERDA) is undertaking a multipronged approach to accelerate the deployment of heat pumps for residential cooling and heating to meet legislative requirements to reduce statewide greenhouse gas emissions. The state funds deployment and workforce programs and is also leading research on thermal energy networks for a community-based strategy to phase out the use of fossil fuels in home heating and cooling systems. These initiatives can increase access to cooling technologies across the state.

State Context

Established by the Climate Leadership and Community Protection Act of 2019, the New York State Climate Action Council published a “New York Climate Action Council Scoping Plan” in 2022 that outlines a multi-year approach to achieving the state’s energy and climate goals. The New York Climate Action Council Scoping Plan is guided by goals set in legislation, that includes 40 percent economywide greenhouse gas emissions reduction levels by 2030 and 85 percent reduction by 2050, compared to 1990 levels. To achieve the target, the Scoping Plan sets milestones of equipping one million to two million homes with electric heat pumps by 2030 and ensuring that “by 2030 heat pumps will be the majority of new purchases for space and water heating” for commercial and residential buildings alike.

According to a 2023 heat pump shipment report from the Building Decarbonization Coalition, if every homeowner in New York chose an air-source heat pump to replace their existing gas furnaces for heating and air-conditioner for cooling, New York could electrify space heating in 47 percent of all homes by 2030, exceeding its current pace of electrification. The Scoping Plan also calls for the

electrification of 85 percent of homes and commercial building space statewide by 2050 using heat pump technologies and community heat pump systems.³⁷

How New York Defines “Low Income”

Income is just one metric in NYSERDA’s disadvantaged community designation. According to the Scoping Plan, LMI households make up nearly half (48 percent) of all households in New York. The Climate Leadership and Community Protection Act of 2019 requires that disadvantaged communities in New York State receive 40 percent of the benefits of spending on clean energy and energy efficiency programs. NYSERDA spearheaded an extensive mapping process through public input and various metrics to identify disadvantaged communities by census tract, designating 55 percent of the census tracts in New York as disadvantaged, representing about 56 percent of the total population of the state.³⁸

State Programming

To meet the electrification goals laid out by the Climate Leadership and Community Protection Act of 2019, New York must install heat pumps in at least 250,000 housing units each year, a tenfold increase from current installation rates. According to the New York Climate Action Council Scoping Plan, this will require additional investment in workforce preparedness, such as training existing skilled contractors to install new models or recruiting new industry hires to close the workforce availability gap. This will also require public funding to offer fully or partially subsidized heat pump installations for LMI households and those in disadvantaged communities, who may benefit most from heating and cooling system upgrades that improve housing quality, comfort, and resilience.

To increase access to decarbonized heating and cooling systems for LMI households, NYSERDA has introduced programs that help residents mitigate financial barriers to heat pump adoption, increase consumer buy-in on heat pump technology, ensure workforce availability for system installments, and scale innovative technology solutions. NYSERDA and New York’s investor-owned utilities also deliver on the NYS Clean Heat Initiative, a statewide investment and coordinated effort to drive awareness and adoption of heat pumps in buildings.³⁹ Under this initiative, there are various low-interest loan financing programs, customer engagement programs, workforce development programs, and pilot demonstration programs. A full list of program offerings are as follows:

Financial Incentive Programs

- NYSERDA offers [On-Bill Recovery Loans and Smart Energy Loans](#), which are low-interest unsecured loans with terms of up to 15 years for borrowers to finance energy efficiency and mechanical system improvements to their homes. The on-bill recovery loans can facilitate home electrification upgrades with no upfront costs. Homeowners named on the utility accounts can set up automatic loan repayments through regular utility bill payments, such that monthly payments do not exceed estimated average monthly energy cost savings. These programs are not income-qualified but may facilitate combined weatherization and electrification measures for moderate to higher income households, including the adoption of heat pumps for decarbonized heating and cooling.
- Utility incentives from the state’s six investor-owned electric utilities provide \$454 million in consumer rebates and contractor incentives for heat pump installations. To ensure satisfaction and high-quality installations, NYSERDA maintains a qualified contractors list, product selection guidelines, and best practices on product operation and maintenance. Significant incentives and standardized best practices are intended to help spur broader market adoption of heat pumps and optimize household experiences with the new systems.

Consumer Education Programs

- The [Clean Heating and Cooling Communities Campaign](#) supports community-based organizations to engage homeowners and businesses about clean energy heating and cooling systems, particularly high efficiency heat pump systems. The campaign offers no-cost support from experienced professionals for nonprofits, local governments, and networks of friends, neighbors, and advocates to advance customer engagement with heat pumps on a grassroots scale. The purposes of the program are to establish economies of scale to support heat pump installation and cost-cutting goals.⁴⁰
- NYSERDA supports the [Regional Clean Energy Hubs Program](#) that employs community-based organizations as trusted local advisors to help steer consumers to clean energy programs and opportunities for which they are eligible. The idea and design of the hubs were developed with substantial engagement with climate justice organizations to educate households, primarily those in disadvantaged communities, and help them navigate the numerous energy improvement programs across the state.⁴¹

Workforce Development Programs

- The [Clean Heat Connect Program](#) engages a network of heat pump manufacturers and distributors that provides retailers and contractors with trainings and sales and marketing resources. Partners of Clean Heat Connect can also access resources to subsidize wages for interns and full-time hires, support new employee recruitment, and offer cost-share for clean heat advertising and installation skills training. New York expects that 14,000 new workers across the heat pump supply chain are necessary to meet the anticipated demand and market growth for heat pumps.⁴²
- Under a funding opportunity announcement (FOA) titled “Career Pathway Training Partnerships for High Efficiency HVAC and Heat Pumps”, NYSERDA issued \$3.7 million in 2022 to fund workforce training programs for careers specializing in air and ground source cold climate heat pump technology installation. This FOA offered maximum awards of \$550,000 and required proposals to direct at least 50 percent of their job placement, training, and resources toward trainees from disadvantaged communities and priority populations.

Pilot Programs

- The [Community Heat Pumps Pilot Program](#) offers grant funding to applicants that propose low-carbon community heat pump system installation projects in newly constructed or existing single-owner campuses, including residential complexes. In support of applicants to this program, NYSERDA compiles a list of solution providers with experience in community thermal energy network design and construction as potential partners for project deployment. Through this program, NYSERDA is leading the research and adoption of community heat pump systems, promoting a community-based approach to helping space and electric capacity constrained building owners access all-electric heating and cooling systems.

Outside of heat pump-specific programs, there are also no- or low-cost programs that enhance heat pump adoption through efficiency and pre-installation measures:

- The [EmPower New York Program](#) offered through NYSERDA allows low-income households to access energy efficiency upgrades, including air sealing and insulation improvements, and clean energy heating and cooling solutions such as heat pump

installations, at no cost. Eligible households must make 60 percent or less of the state median income or qualify for SNAP and other income-based programs. The cost of upgrades may not exceed \$10,000 per household.

- [The Home Energy Affordability Program](#) is offered through the New York Office of Temporary and Disability Assistance uses the same income eligibility as EmPower New York. The program provides heating and cooling bill payment assistance or funding for equipment repair or replacement. This program can also be used for heat pump installation in households currently relying on fossil fuels for heating and cooling.
- [The Assisted Home Performance with ENERGY STAR Program](#) offered through NYSERDA pays for 50 percent of the costs of energy efficiency upgrades such as insulation, air sealing, and heat pump installations (up to \$5,000) for households making between 60 percent and 80 percent of state median income.

Program Funding Sources

The Clean Heating and Cooling Communities Campaign, Clean Heat Connect Program, and Clean Heat for All Challenge are funded through the annual NYSERDA budget. NYSERDA programs focused on advancing clean energy innovation receive a combination of funding from the New York Public Service Commission-approved Clean Energy Fund (CEF) and Clean Energy Standard suite of programs, and Regional Greenhouse Gas Initiative allowance auction proceeds. The Public Service Commission authorized approximately \$5.3 billion for the CEF to spend through 2025 in support of clean energy programs, with a goal of 40 percent of all investment benefits reaching disadvantaged communities.

Cooling Technology Research

CEF provides \$70 million annually over a 10-year period to support product design, demonstration, testing, and market development for efficient building heating and cooling technologies, as well as related innovations in thermal storage, building envelope retrofit technologies, and low global warming potential refrigerant solutions.

Funded by CEF, New York City Housing Authority (NYCHA), and New York Power Authority, [the Clean Heat for All Challenge](#) launched in 2021 to award funding for manufacturers to deploy widely scalable heat pump solutions to decarbonize heating and cooling operations within NYCHA buildings. Participants were called upon to develop high efficiency cold climate window unit heat pumps, particularly to deploy within older building stocks that often face design and structural barriers to heat pump installation. The first winners of this industry challenge, Midea America and Gradient, were announced in August 2022 and awarded seven-year contracts and \$70 million to deploy 30,000 120V window-unit heat pumps across NYCHA affordable housing units.

In 2021, NYSERDA offered \$5 million in heat pump system incentives for a heat pump demonstration study that could service up to 3,000 multifamily affordable housing units. The program offered incentives of \$2,000 per dwelling unit to deploy an air source heat pump, \$4,000 for a ground source heat pump, \$900 for a heat pump water heater, and \$1,500 for a required electric service upgrade. Those participating in the demonstration study and leveraging the incentives could stack them so that project costs would be entirely offset by incentives. The Multifamily Performance Program ended in February 2022, having enrolled 16 projects from a waiting list. The program provided market data and takeaways on participation from LMI households, the LMI housing building profile, energy burden reduction for residents in affordable multifamily housing, contractor installation practices and pitfalls, and the need and cost of electrical panel and service upgrades to accommodate heat pumps.⁴³

According to the Statewide Heat Pump Program Implementation Plan, NYSERDA, investor-owned utilities in the state, New York Power Authority, and the Long Island Power Authority will offer incentives for financing toward clean thermal district systems.

Oregon

Introduction

In 2021, inadequate access to cooling for vulnerable populations led to at least 100 deaths due to heat related illnesses during several heat waves that impacted Oregon. In response, the Oregon State Legislature passed a bill with funding to establish programs to provide access to cooling in future heat waves. These programs are under development at the Oregon Department of Energy (ODOE).

State Context

2022 Senate Bill 1536 (SB 1536) directs ODOE to administer a heat pump deployment program, offer grants to landlords for the installation of heat pumps, fund community cooling centers, and conduct a cooling needs study.⁴⁴

How Oregon Defines “Low Income”

In a joint report identifying strategies to reduce energy burden, the Oregon Department of Energy, Oregon Public Utility Commission, and Oregon Housing and Community Services state that “Low-income housing is defined as housing occupied by a household with income less than or equal to 80 percent of the area median income. 41 percent of Oregon households (~634,000 households) are considered low-income.”⁴⁵

State Programming

In 2023, ODOE launched the Community Heat Pump Deployment Program as mandated by SB1536. ODOE will select 11 regional administrators to receive a total of \$8.5 million in funding. The selected administrators will design heat pump deployment programs to meet the unique needs of each region. Each administrator must serve at least one environmental justice community or federally recognized tribe. Programs may also prioritize individuals that rely on delivered fuels, electric resistance heating, or homes without heating or cooling systems. As of July 2023, ODOE was reviewing applications for regional administrators.⁴⁶

Also required by SB 1536, ODOE launched the Oregon Rental Home Heat Pump Program to address the unique barriers to installing heat pumps in tenant occupied housing and tenant occupied spaces. Rebates will be available for heat pumps and associated upgrades that allow for installation in tenant occupied homes and manufactured housing or recreational vehicles in rented spaces.⁴⁷ Rebate amounts vary based on tenant income and heat pump efficiency levels with a maximum amount of \$7,000 for heat pump installation and \$4,000 for associated upgrades (see Figure 1). The rebate will be automatically applied to the cost of the project. As of July 2023, ODOE was accepting registration for contractors; only approved contractors will be able to offer rebates to participants.

Maximum Rebate Levels for Purchase and Installation of Heat Pumps

		Residential tenancy (incentive cannot exceed 60% of cost to purchase and install heat pump)		Manufactured dwelling or recreational vehicle (incentive cannot exceed 80% of cost to purchase and install heat pump)	
		Standard efficiency	Higher efficiency	Standard efficiency	Higher efficiency
Not LMI	\$2,000	\$3,000	\$2,000	\$4,000	
LMI	\$4,000	\$5,000	\$5,000	\$7,000	

Figure 1. Oregon Rental Home Heat Pump Program: Owners and Tenants. Source: Oregon Department of Energy

SB 1536 also required the creation of a \$2 million Community Cooling Spaces program. ODOE entered a contract with Energy Trust of Oregon to administer a program for landlords to provide cooling centers to tenants. These common spaces must be able to accommodate five or more people and cool to at least 80 degrees Fahrenheit. It is allowable for landlords to partner with other entities to offer these spaces, but the space must be within one-quarter mile of a property to be eligible. Up to 100 percent of costs can be covered for window or portable AC, heat pumps, and traditional AC. Tribal housing, affordable multifamily, non-profit managed multifamily, senior housing, agricultural workforce housing, and manufactured home parks are priority properties.⁴⁸

Program Funding Sources

Rebate and loan programs funded by SB 1536 can support electrical and mechanical upgrades or the direct installation of cooling equipment.

Cooling Technology Research

SB 1536 directs ODOE to conduct a study to assess cooling needs in publicly supported housing, manufactured housing, and recreational vehicles used as housing. The report will focus on the prevalence, need, and barriers to cooling facilities. The report was due to the legislature in September 2023.⁴⁹

Endnotes

¹ The U.S. Environmental Protection Agency (EPA) found that cooling degree days, a measure of cooling needed to maintain indoor thermal comfort on warm days, have increased over the past 100 years. This signals warming climate trends and increased energy demand to meet cooling needs.

“Climate Change Indicators: Heating and Cooling Degree Days”, U.S. Environmental Protection Agency, <https://www.epa.gov/climate-indicators/climate-change-indicators-heating-and-cooling-degree-days>.

² Central air is a relatively recent feature of residential construction, a more efficient and effective cooling system than window units, which are pervasive in older homes and only cool small spaces while consuming much more energy to do so.

Rebecca Mann and Jenny Schuetz, “As extreme heat grips the globe, access to air conditioning is an urgent public health issue”, Brookings (July 2022), <https://www.brookings.edu/articles/as-extreme-heat-grips-the-globe-access-to-air-conditioning-is-an-urgent-public-health-issue/#:~:text=About%2012%25%20of%20households%20in,than%2080%25%20have%20central%20air.>

³ New York City Housing Authority (NYCHA), and New York Power Authority (NYPA), [the Clean Heat for All Challenge](#) launched in 2021 to award funding for manufacturers to deploy widely scalable heat pump solutions to decarbonize heating and cooling operations within NYCHA buildings. Participants were called upon to develop high efficiency window unit heat pumps that can be used for both heating and cooling, to then deploy within an older building stock that often faces design and structural barriers to heat pump installation. The first winners of this industry challenge, Midea America and Gradient, were announced in August 2022 and awarded seven-year contracts and \$70 million to deploy a combined 30,000 120V window-unit heat pumps across NYCHA affordable housing units.

“Governor Hochul and Mayor Adams Announce \$70 Million Initial Investment to Decarbonize NYCHA Buildings as Part of Clean Heat for All Challenge”, NYSERDA (August 2022), <https://www.nyserdera.ny.gov/About/Newsroom/2022-Announcements/2022-08-02-Governor-Hochul-and-Mayor-Adams-Announce-Clean-Heat-for-All>.

⁴ The U.S. Green Building Council defines “passive survivability” as a measure of a building’s ability to passively maintain thermally safe conditions during a power outage that lasts four days during peak summertime and wintertime conditions, as achieved through design measures including building orientation, a highly insulated building envelope, natural ventilation, passive solar heating, and cooling-load-avoidance measures.

“Passive Survivability and Back-Up Power During Disruptions”, U.S. Green Building Council, <https://www.usgbc.org/credits/new-construction-core-and-shell-schools-new-construction-retail-new-construction-data-48>.

⁵ “About the Home Energy Rebates”, U.S. Department of Energy, <https://www.energy.gov/scep/home-energy-rebates-programs>.

⁶ “Energy Auditor Training Grant Program”, U.S. Department of Energy, <https://www.energy.gov/scep/energy-auditor-training-grant-program>.

“Training for Residential Energy Contractors Grants”, U.S. Department of Energy, <https://www.energy.gov/scep/state-based-home-energy-efficiency-contractor-training-grants>.

⁷ “Texas Department of Housing and Community Affairs Governing Board Approved Draft of 2024 Low Income Home Energy Assistance Program (LIHEAP) State Plan”, Texas Department of Housing and Community Affairs (April 2023), <https://www.tdhca.state.tx.us/community-affairs/ceap/docs/24-LIHEAP-State-Plan.pdf>.

⁸ William D. Bryan, Ph.D. and Joy Ward, “Map of the Month”, Southeast Energy Efficiency Alliance (February 2023), <https://www.seealliance.org/map-of-the-month-february/>.

⁹ “Healey-Driscoll Administration Announces \$50 Million Grant Program for Low- and Moderate-Income Electrification”, Massachusetts Department of Energy Resources (February 2023), <https://www.mass.gov/news/healey-driscoll-administration-announces-50-million-grant-program-for-low-and-moderate-income-electrification>.

¹⁰ Participants of EmPower Plus include both homeowners and renters and must have household incomes under 80 percent of the state median income or are pre-qualified through participation in a utility payment assistance program.

“EmPower+ Eligibility Guidelines”, NYSERDA, <https://www.nyserdera.ny.gov/All-Programs/EmPower-New-York-Program/Eligibility-Guidelines>.

¹¹ According to the cited NREL report, “For the 49 million homes that use electricity, fuel oil, or propane for heat and have air conditioning, 92% to 100% of homes would see energy bill savings, with median savings of \$300 to \$650 a year depending on heat pump efficiency”.

Ysabelle Kempe, “Heat pumps would cut energy bills for majority of US homes: NREL research”, Smart Cities Dive (February 2024), https://www.smartcitiesdive.com/news/heat-pumps-lower-energy-bills-ghg-emissions-us-nrel-research/708378/?utm_source=Sailthru&utm_medium=email&utm_campaign=Issue:%202024-02-23%20Smart%20Cities%20Dive%20Newsletter%20%5Bissue:59448%5D&utm_term=Smart%20Cities%20Dive.

¹² “Keeping DC Cool with the Emergency HVAC Program”, DC Sustainable Energy Utility, <https://www.dcseu.com/news-blog/news-blog/blog-posts/keeping-dc-cool-with-the-emergency-hvac-program>.

¹³ Juanita Constible and Joe Vukovich, “Safe Indoor Temperatures Should Be a Right, Not a Luxury”, Natural Resources Defense Council (August 2022), <https://www.nrdc.org/bio/juanita-constible/safe-indoor-temperatures-should-be-right-not-luxury>.

¹⁴ “All Utilities Readoption with Amendments”, New Jersey Board of Public Utilities (August 2022), [https://www.nj.gov/bpu/pdf/rules/R.2022%20d.102%20\(54%20N.J.R.%201612\(a\)\).pdf](https://www.nj.gov/bpu/pdf/rules/R.2022%20d.102%20(54%20N.J.R.%201612(a)).pdf).

¹⁵ “Extreme Heat”, Federal Emergency Management Agency, <https://community.fema.gov/ProtectiveActions/s/article/Extreme-Heat>.

¹⁶ “Targeting LIHEAP Benefits”, National Center for Appropriate Technology (March 2010), <https://liheapch.acf.hhs.gov/pubs/510targ.htm>.

¹⁷ “Clean Energy Wayfinders”, Hawai’i State Energy Office, <https://energy.hawaii.gov/get-engaged/clean-energy-wayfinders/>.

¹⁸ “Protecting Californians from Extreme Heat: A State Action Plan to Build Community Resilience”, State of California (April 2022), <https://resources.ca.gov/-/media/CNRA-Website/Files/Initiatives/Climate-Resilience/2022-Final-Extreme-Heat-Action-Plan.pdf>.

¹⁹ “Oregon Cooling Needs Study”, Oregon Department of Energy, <https://www.oregon.gov/energy/Data-and-Reports/Pages/Cooling-Needs-Study.aspx>.

²⁰ “Oregon Rental Home Heat Pump Program”, Oregon Department of Energy, <https://www.oregon.gov/energy/Incentives/Pages/ORHHPP.aspx>.

²¹ “Landlord Provided Cooling Space Initiative”, EnergyTrust of Oregon, <https://www.energytrust.org/communities/landlord-provided-cooling-space-initiative/>.

²² “Disadvantaged Communities Criteria”, NYSERDA, <https://climate.ny.gov/resources/disadvantaged-communities-criteria/>.

²³ “Top Global Building Appliance Manufacturers and Distributors Commit to Help California Achieve Six Million Heat Pump Goal”, California Energy Commission (October 2023), <https://www.energy.ca.gov/news/2023-10/top-global-building-appliance-manufacturers-and-distributors-commit-help>.

²⁴ Sandy Fazeli, “Energy Sector Workforce Diversity, Access, Inclusion, and the Policy Case for Investment: Recommendations for State Energy Office Action”, NASEO (September 2021), [https://www.naseo.org/data/sites/1/documents/publications/Workforce%20Diversity%20Report_Final2\[2\].pdf](https://www.naseo.org/data/sites/1/documents/publications/Workforce%20Diversity%20Report_Final2[2].pdf).

“Realizing the Workforce Potential of Infrastructure Investments”, NASEO, <https://naseo.org/data/sites/1/documents/publications/Infrastructure-Workforce-Framework-State-Action.pdf>.

²⁵ “State of Arizona Extreme Heat Fact Sheet”, Arizona Office of the Governor (2024), https://azgovernor.gov/sites/default/files/state_of_arizona_extreme_heat_fact_sheet_2.pdf.

²⁶ “Arizona’s Extreme Heat Preparedness Plan”, Arizona Office of the Governor (March 2024), https://mcusercontent.com/44a5186aac69c13c570fca36a/files/ada1d47f-83f5-4189-d835-1eec1552aeaa/2024.03.01_Extreme_Heat_Preparedness_Plan.pdf.

-
- ²⁷ “Why Cooling is Key: How to decarbonize buildings with one weird trick”, Building Decarbonization Coalition (June 2023), https://buildingdecarb.org/wp-content/uploads/Heat-Pump-Shipment-Report-Spring-2023_V4.pdf.
- ²⁸ “Energy Research and Development Reports”, California Energy Commission, <https://www.energy.ca.gov/resources/publications/energy-research-and-development-reports>.
- ²⁹ “House Bill 19-1261: Climate Action Plan to Reduce Pollution”, Colorado General Assembly (2019), https://leg.colorado.gov/sites/default/files/2019a_1261_signed.pdf.
- ³⁰ “High Efficiency Electric Heating and Appliances Grant Program”, Colorado Energy Office, <https://energyoffice.colorado.gov/clean-energy-programs/clean-energy-grants/high-efficiency-electric-heating-and-appliances-grant>.
- ³¹ “House Bill 22-1381: Colorado Energy Office Geothermal Energy Grant Program”, Colorado General Assembly (2022), <https://leg.colorado.gov/bills/hb22-1381>.
- ³² “House Bill 23-1252: Thermal Energy”, Colorado General Assembly (2023), <https://leg.colorado.gov/bills/hb23-1252>.
- ³³ “Innovative Housing Incentive Program”, Colorado Office of Economic Development and International Trade, <https://oedit.colorado.gov/programs-and-funding/grants/innovative-housing-incentive-program>.
- ³⁴ “House Bill 23-1161: Environmental Standards for Appliances”, Colorado General Assembly, <https://leg.colorado.gov/bills/hb23-1161>.
- ³⁵ “Healey-Driscoll Administration Awards \$27 Million to Decarbonize Affordable Housing Across Massachusetts”, Massachusetts Department of Energy Resources (November 2023), <https://www.mass.gov/news/healey-driscoll-administration-awards-27-million-to-decarbonize-affordable-housing-across-massachusetts>.
- ³⁶ “New Energy Programs: 2023 Legislative Actions”, Minnesota Department of Commerce (2023), <https://mn.gov/commerce/energy/consumer/energy-programs/>.
- ³⁷ Community heat pump systems integrate heat pumps with a network of distribution pipes to serve multiple buildings, expanding the benefits to customers with insufficient building footprint space for their own heat pump. Community heat pump systems may also be referred to as “thermal energy networks”. “Large Scale Thermal”, NYSERDA, <https://www.nyserda.ny.gov/all-programs/community-heat-pump-systems>.
- ³⁸ “Disadvantaged Communities Criteria”, NYSERDA, <https://climate.ny.gov/resources/disadvantaged-communities-criteria/>.
- ³⁹ “Heat Pump Program (NYS Clean Heat)”, NYSERDA, <https://www.nyserda.ny.gov/All-Programs/Heat-Pump-Program>.
- ⁴⁰ “NYS Clean Heat Members Announce Nearly \$10 Million Consumer Education and Awareness Campaign to Accelerate Adoption of Clean Heating and Cooling Solutions that Combat Climate Change”, NYSERDA (April 2021), <https://www.nyserda.ny.gov/About/Newsroom/2021-Announcements/2021-04-12-NYS-Clean-Heat-Members-Announce-Nearly-10-Million-Consumer-Education-and-Awareness>.
- ⁴¹ “Regional Clean Energy Hubs”, NYSERDA, <https://www.nyserda.ny.gov/All-Programs/Regional-Clean-Energy-Hubs>.
- ⁴² Ibid.
- ⁴³ “Multifamily Building Solutions Provider Portal”, NYSERDA, <https://www.nyserda.ny.gov/ny/MPP-Existing-Buildings/Document-Library>.
- ⁴⁴ “Heat Pump Incentive Programs”, Oregon Department of Energy, <https://www.oregon.gov/energy/Incentives/Pages/heat-pumps.aspx>.
- ⁴⁵ “Ten-Year Plan: Reducing the Energy Burden in Oregon Affordable Housing”, Oregon Department of Energy, <https://www.oregon.gov/energy/Get-Involved/Documents/2018-BEEWG-Ten-Year-Plan-Energy-Burden.pdf>.
- ⁴⁶ “Community Heat Pump Deployment Program”, Oregon Department of Energy, <https://www.oregon.gov/energy/Incentives/Pages/CHPDP.aspx>.
- ⁴⁷ “Oregon Rental Home Heat Pump Program”, Oregon Department of Energy, <https://www.oregon.gov/energy/Incentives/Pages/ORHHPP.aspx>.
- ⁴⁸ “Landlord Provided Cooling Space Initiative”, EnergyTrust of Oregon, <https://www.energytrust.org/communities/landlord-provided-cooling-space-initiative/>.
- ⁴⁹ “Oregon Cooling Needs Study”, Oregon Department of Energy, <https://www.oregon.gov/energy/Data-and-Reports/Pages/Cooling-Needs-Study.aspx>.