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OPPORTUNITIES FOR EQUITY-FOCUSED BUILDING ENERGY CODE ACTIVITIES

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National Association of State Energy Officials

Opportunities for Equity-Focused Building Energy Code Activities

Introduction

For decades, the National Association of State Energy Officials (NASEO) has supported State Energy Office engagement on the two national model energy codes, the International Energy Conservation Code (IECC) developed by the International Code Council (ICC) and ANSI/ASHRAE/IES Standard 90.1 (ASHRAE 90.1) created by ASHRAE. These two codes are often used as the foundation for state and local residential and commercial building energy codes across the country. State and local code authorities or boards, which may include appointees from State Energy Offices, can strengthen, weaken, modify, or keep the language of these codes, to shape them to meet the unique needs of the state. As a result, the implementation of building energy codes involves decision-makers and implementers at the national, state, and local levels, with wide-ranging impacts to stakeholders like industry members, the construction workforce of the residential and commercial building sectors, and multiple generations of building occupants. Decisions surrounding advanced energy code adoption impact utility bill costs, building safety and resilience, and housing affordability for generations of households and business owners, and require alignment with builders and code officials at the helm of energy code implementation. By overseeing the equitable development and enforcement of building energy codes, State Energy Offices can help ensure that benefits around energy cost savings and building resilience reach underserved populations, rather than inadvertently introducing undue burdens.

This memo identifies opportunities for State Energy Offices to leverage federal programs for advancing state and local energy codes and ensure more equitable outcomes in energy code adoption and implementation. These suggestions are based on information gathered by NASEO through discussions with State and Territory Energy Offices, representatives from federal agencies, and relevant stakeholder organizations through forums like the NASEO Buildings Committee.[i]

Implications of Building Energy Codes on Low-Income and Disadvantaged Communities

Building energy codes can help make buildings more resilient and more energy efficient, thereby lowering occupant utility bill costs. Even when built to code, a building requires significant energy and costs to operate. These costs tend to be felt most acutely by low-income and non-white households, who are more likely to occupy inefficient homes and bear a larger energy burden than their higher-income, white counterparts.[ii] According to the U.S. Department of Energy's (DOE's) Low-Income Energy Affordability Data (LEAD) Tool, low-income households in the United States spend an average of 8.6 percent of their monthly incomes on energy bills, nearly three times more than all other households in the United States, which spend an average of three percent.[iii] Households with higher energy burdens may need to forgo essential expenditures like food and medications in order to pay energy bills on time, or otherwise face potentially life-threatening utility shut offs. Moreover, some households with energy inefficient homes – and subsequently, high utility bills – require government utility bill payment assistance that adds costs to taxpayers and diverts spending from other public funding needs. Among tenants who try to conserve their energy use, aged and drafty buildings may result in thermal discomfort and illness. Communities targeted by racially and economically discriminatory housing policies like redlining – which denied homeownership to racial minorities in the 1930s and pushed prospective homeowners into lower-resourced neighborhoods – often face deteriorating infrastructure and poor environmental conditions.[iv] The impacts of redlining are felt to this day, where the inability to build wealth through homeownership has contributed to generational cycles of poverty and energy insecurity.[v]

Building energy and resilience policy mechanisms can rectify inequities in access to healthy and efficient buildings. According to an impact analysis by DOE, the adoption of model energy codes for residential and commercial buildings is projected to result in a cumulative $138 billion in energy cost savings and 900 million metric tons (MMT) in avoided CO2 emissions between 2010 and 2040, the equivalent of taking 195 million passenger vehicles off the roads for a year.[vi] From the building resilience angle, adopting the latest national model energy codes, fire codes, mechanical codes, and life safety codes has demonstrated $11 in savings per $1 invested by way of disaster mitigation.[vii] Stretch codes, which are locally mandated code or alternative compliance paths more stringent than the local base code, increasingly feature requirements for new clean energy technology in all new buildings, such as electric vehicle (EV) charging equipment, electric heat pumps for water and space heating, or on-site renewables. While advanced building energy system technologies are becoming more widely available, stretch code requirements may initially result in higher associated product and installation costs. Several states are addressing this by requiring cost effectiveness analyses on code updates to demonstrate higher energy cost savings than incremental costs. There are, however, intrinsic complexities with measuring program costs and benefits – for instance, low-income households that qualify for subsidized energy bills may not realize the full benefit of energy cost savings, but may experience considerable comfort and health benefits from increased energy efficiency and indoor air quality measures that are typically difficult to quantify.[viii] By conducting nuanced and holistic impact analyses after each model code update or stretch code adoption, states and localities can help homeowners and building owners ensure meaningful energy cost savings and create safer and healthier building environments.

A jurisdiction's energy code authority or board sets the required energy efficiency levels within newly constructed or majorly renovated site-built buildings, establishing the required airtightness and insulation levels for building envelopes to minimize thermal inefficiencies, minimum lighting efficiency, duct tightness, among other key energy-related design specifications for buildings to use less total energy.[ix] In attempts to address persistent housing supply shortages, states have been advancing zoning reforms to encourage new high-density mixed-income multifamily developments near job sites and public transportation.[x] For the first and subsequent tenants of these new developments, advanced local building energy codes could promise high efficiency designs for the buildings and offer significant energy savings benefits. Building energy codes are the only policy mechanism regulating building energy efficiency levels in some jurisdictions, and thus become a crucial policy lever for reducing the energy use of all new buildings and their building life cycles.[xi]

A key determinant of a building's energy performance is the year that it was built, as each newly constructed or majorly renovated existing building must comply with the current building codes in place prior to being occupied. The efficiency of a jurisdiction's new building stock compared to older existing buildings, however, also depends on whether the code is regularly updated and complied with to keep pace with industry standards. To achieve jurisdiction-wide energy use reduction and emissions targets, state-level policymakers have proactively adopted advanced building energy codes to manage the energy use across the expanding footprint of newly constructed or majorly renovated buildings in the United States, where the annual number of residential housing starts has consistently increased since 2009.[xii] In their roles of implementing building codes, engaging the local building and energy workforce, and meeting jurisdiction-specific climate goals, states and localities are uniquely positioned to advance building codes that provide meaningful and impactful benefits across all types of communities, regardless of their location, race/ethnicity, or income levels. Building energy code updates offer an important opportunity for states and localities to alleviate energy insecurity and offer built environments that are energy efficient, comfortable, resilient, and safe.

Focus Areas for Equity-Focused Building Energy Code Activities

In many states, State Energy Offices hold responsibilities for supporting the process of updating building energy codes. As energy program and policy implementors, State Energy Office Directors and staff may be appointed as members on code decision-making boards that draft and adopt new codes, support the training of building code officials following version updates, and conduct field studies to determine code compliance across existing buildings, among other activities. According to the 2019 Activities Framework for the Building Energy Codes Program (BECP) under DOE's Office of Energy Efficiency and Renewable Energy, federal priorities of supporting building energy code and standard development, adoption, implementation, and enforcement rely on state and local governments to lead adoption and implementation processes. For State Energy Offices, this may entail pursuing interagency and inter-jurisdictional collaborations and advancing net-zero building codes and policies.[xiii] Summarized in the six key energy code focus areas below, State Energy Offices can consider opportunities to center equity through their responsibilities for:

1) State and Local Code Adoption
2) Implementation and Compliance
3) Building Performance Standards
4) Stretch Codes

5) Strategic Partnerships
6) Workforce Development

The suggestions outlined in this document under each of these key focus areas include examples of existing equity activities in states, which could be replicated in states that wish to pursue similar approaches.

Examples of Equity Activities Under State and Local Code Adoption

1. Increasing community input across the code adoption process.

Building energy codes are technical and complex, but their impacts are felt by a wide audience of stakeholders who do not necessarily have building science knowledge, such as homeowners and businesses. Accordingly, building energy code adoption decisions should weigh stakeholder perspectives through a transparent and inclusive decision-making process. To assess the extent to which affected community voices are brought into the decision-making process, policymakers might consider a framework authored by Rosa Gonzalez and Facilitating Power, "The Spectrum of Community Engagement to Ownership."[xiv] The Spectrum offers a scale to gauge a decision-making body's level of engagement with its stakeholders, which includes six categories of engagement: Ignore, Inform, Consult, Involve, Collaborate, and Defer To.[xv]

While the traditionally prescriptive processes that govern energy code development and adoption may not be suitable for the community ownership framework, Gonzales' Spectrum can inform more robust and inclusive approaches to stakeholder engagement. Some states have moved to more intentional community engagement by welcoming a diverse set of input during code deliberations. By statute, building energy codes in Oregon are adopted under the administrative oversight of the Oregon Building Codes Division and are adopted as statewide codes.[xvi] The Oregon Department of Energy (ODOE) acts as a consultant to the Building Codes Division: organizing committee meetings and public feedback periods during code adoption cycles, advising on technical topics, and holding a position on the state board that reviews initial code change proposals prior to consideration by the Building Codes Division. Facilitating much of the boots-on-the-ground stakeholder engagement in their most recent adoption of the 2021 Oregon Energy Efficiency Specialty Code,[xvii] ODOE identified a need to rectify the underrepresentation of rural communities in the decision-making process. As a result, ODOE developed a "101" webinar providing background to those new to the energy code space and convenes monthly virtual stakeholder meetings open to the public that serve to both demystify the code and gather public input. As technical advisors to Oregon's Building Codes Division, ODOE transmits the community perspective expressed within these public forums. The exclusively virtual format has attracted greater attendance and reduced travel barriers, welcoming attendee perspectives regardless of their geographic proximity or in-person work flexibility into code change deliberations in the state of Oregon.

2. Conducting community-level impact studies on code updates to understand costs and benefits experienced by marginalized communities.

DOE conducts national and state-wide energy and economic analyses on each new edition of the national model codes.[xviii] Jurisdiction-led measurement and valuation of impacts from energy code updates, which may leverage community-based organizations and local representative perspectives, can supplement DOE analyses and yield inclusive and tailored policies that directly address community needs. Independent analyses of updated codes might focus on charting energy savings improvements, reduced emissions, utility bill cost savings, and equity-centered metrics such as energy burden mitigation in minority and low-income census tracts. However, these impact analyses must also acknowledge how stricter residential building energy codes may increase the first costs on homes and its implications. For instance, high first costs may result in reduced access to new and majorly renovated home ownership for low-income homebuyers that face barriers to obtaining mortgage loans, despite utility bill savings leading to lower total cost of ownership of high efficiency homes in the long-term. Future-looking benefit analyses, on the other hand, should recognize that occupants can reap benefits from code-compliant buildings for the life of the building, which can last a hundred years, or more. Future building occupants may avoid price volatility of fossil fuels, enjoy health benefits from reduced emissions,[xix] and reap safety benefits from a more resilient home, where strong passive survivability of a building would ensure prolonged occupant comfort and safety during outages, helping ratepayers avoid peak power prices and emissions and contributing to grid resilience.[xx]

Several State Energy Offices have established criteria for what constitutes a "disadvantaged community" in their state, while others are still in the process of developing definitions or seeking input from federal agencies and others. Future federally funded code projects will need to be responsive to the White House's Justice40 Initiative. The Justice40 Initiative requires federally funded programs to deliver at least 40 percent of program benefits (monetary, resilience, or otherwise) to disadvantaged communities (DACs). In support of the Justice40 Initiative, DOE has classified DACs based on 36 indicators across four categories: fossil dependence, energy burden, environmental and climate hazards, and socio-economic vulnerabilities. DOE also developed the Disadvantaged Communities Reporter, a mapping tool that displays DACs across the United States at the census tract level.[xxi] The White House Council on Environmental Quality (CEQ) provides a mapping tool as well, the Climate and Economic Justice Screening Tool, for helping federal agencies identify DACs as part of the Justice40 Initiative.[xxii] Developing jurisdiction-wide criteria for DACs, which could leverage indicator metrics from DOE and CEQ or build upon existing state-led energy justice programs, can better direct program benefits and mitigate harm toward vulnerable populations. To develop building energy codes that are responsive to communities in greatest need, code boards may consider metrics such as a community's pollution legacy (e.g., spatial proximity to a Superfund site or hazardous waste facilities) to enact higher minimum ventilation or air change rate requirements, or a community's incidence of energy burden (e.g., average annual household energy costs being greater than or equal to the 90th percentile of Americans) to encourage residential energy code provisions that drastically reduce household energy use intensity.

Examples of Equity Activities Under Implementation and Compliance

1. **Establishing circuit rider programs to support the construction of code compliant and energy efficient buildings.**

A "circuit rider" is typically an individual with the expertise and credibility to explain the energy, safety, and resilience benefits of energy code compliance and provide effective one-on-one or small group technical support. They are technical experts and resources for local jurisdictions, design and construction professionals, permitting departments, and building officials. Circuit riders have been useful for reaching rural and remote areas in need of technical energy code expertise, but without the resources or constituency for a dedicated building code official. Circuit rider programs may be funded by the state and offered as a shared resource for communities that otherwise do not have the capacity to assess code compliance or spearhead workforce training interventions for the implementation of code updates. Ideally, circuit rider programs make the circuit rider accessible by phone and email, which circumvents issues with broadband access in more rural parts of the state, as well as offer multiple language services to communicate with non-English speaking stakeholders.

The Nevada Energy Code Circuit Rider program is a collaboration between the Nevada Governor's Office of Energy and Southwest Energy Efficiency Project (SWEEP) to provide technical support on energy code interpretations, installation practices, and compliance to building departments, builders, design and construction professionals, auditors, and inspectors.[xxiii] The New Mexico Energy Code Circuit Rider program is an initiative funded by SWEEP through DOE grant funding and receives programmatic support from the New Mexico Energy, Minerals, and Natural Resources Department. Similar circuit rider programs can be found in Idaho, Iowa, Missouri, and Nebraska, where individuals hired by the State Energy Office or state building codes department will field questions on energy code interpretations and enforcement strategies, offer on-site education and training, and advise on installation best practices, all free of charge.

2. Using outcomes from energy code field studies to address compliance disparities in low-income or disadvantaged communities.

Energy code field studies have been conducted in 20 states to assess single family homes for compliance on energy code measures before and after the implementation of training programs on the jurisdiction's most currently adopted code. Pacific Northwest National Laboratory (PNNL) analyzed the data from 19 of these states to identify differences in outcomes based on county income levels. The overall compliance rate to the jurisdiction's adopted energy code specifications in lower income counties (counties where the low- and moderate-income population, earning below 80 percent of average median income, is greater than 38 percent) was shown to be 67 percent, a six percent difference with the overall compliance rate in higher income counties of 73 percent. The study concludes that counties with lower incomes have higher rates of noncompliance with energy codes across nearly all measured categories – including duct tightness, wall insulation, roof insulation, lighting, and fenestration. These findings support the anecdotal understanding that better resourced jurisdictions are also better able meet the staffing capacity required to ensure compliance with all applicable building codes. The disparity in compliance rates may also point to the disinvestment that marginalized communities continue to experience that exacerbates hazards in both aged buildings and new construction. Future iterations of the study could involve an analysis of code compliance rates by other indicator metrics, such as race, environmental exposures, energy burden, health vulnerabilities, and history of redlining and/or underinvestment in the studied communities.[xxiv]

Examples of Equity Activities Under Building Performance Standards

1. **Designing building performance standards and other complementary building energy code policies that include opportunities for community input as early in the design phase as possible.**

Building performance standards (BPS) establish minimum levels of energy efficiency for existing buildings in a jurisdiction and are seen as a complementary policy to building energy codes. Energy codes need to be calibrated so that buildings do not fail to meet a BPS requirement soon after construction. BPS present an opportunity for the equitable distribution of building retrofit benefits, where large multifamily buildings that may include affordable housing units and large commercial buildings that may have minority-owned small businesses as tenants are improved to meet jurisdiction wide efficiency and emissions targets. In a joint study, the Institute for Market Transformation (IMT) and Elevate conducted surveys with a range of affordable housing stakeholders, the results of which reinforced the importance of having local affordable housing stakeholders (tenant associations, community-based organizations, and affordable housing providers) serve on boards that advise the implementation of a BPS. According to the Building Electrification Institute, the "community co-creation process", based on the Spectrum of Community Engagement to Ownership, should include a diversity of impacted stakeholders, including tenants, low-income residents, labor organizations, women and minority-owned contractors, historically redlined communities, and the unemployed or under-employed labor force.[xxv] Accessing diverse perspectives and rectifying the power imbalance between all stakeholders in the policymaking process requires state and local governments to devote resources toward a facilitator or skilled process designer who is experienced in equitable stakeholder engagement. Like in energy code development and adoption procedures, wrap-around services should be offered for stakeholders participating in the design process of a BPS, including childcare, free or subsidized transportation to in-person meetings, translation or native language meetings, or time-based compensation.

In addition to representation in the policy creation process, the policy design itself helps direct technical assistance and funding to existing buildings that serve frontline communities and ensure a strong advocacy voice for low-income tenants that would be disproportionately impacted by changes in housing affordability.[xxvi] Among naturally occurring affordable housing buildings (those without mandated rent control), landlords may increase rent to cover buildings improvement costs to comply with the local BPS, exacerbating already high housing cost burdens and threatening to displace vulnerable rental tenants.[xxvii] Complementary policies to the jurisdiction's BPS are needed to reduce collateral affordability challenges from the compliance requirements and monetary penalties imposed by the standards, including anti-displacement and tenant protection laws, alternative compliance pathways and financial assistance mechanisms for under resourced building owners, and local hiring provisions or workforce training initiatives to meet building retrofit demand. For subsidized or affordable housing buildings that typically operate with limited resources, it can be helpful for the BPS to permit longer compliance horizons and align with rehabilitation and refinancing schedules to allow building owners to streamline their capital planning with meeting BPS targets. Allowing for flexible compliance timelines can provide a tiered approach for under resourced buildings that often serve frontline communities to comply. State and local governments might also partner with utilities, leverage

capital from third parties, repurpose compliance fines, or braid in resources from city or state budgets to alleviate the costs of compliance retrofits among building owners and managers with less technical and financial capacity.[xxviii]

Examples of Equity Activities Under Stretch Codes

1. **Supporting the implementation of stretch codes while acknowledging cost barriers imposed by early-stage market transformation.**

A growing number of jurisdictions have been exploring stretch codes and net zero codes, enacting requirements beyond those in the most recent IECC and ASHRAE model codes that result in net zero building energy use or carbon use. These same jurisdictions, however, are offering phased approaches and alternative compliance pathways to provide adequate pilot periods that alleviate the initial affordability and design challenges with constructing net zero buildings. Delaware Title 16: Chapter 7602 Code for Energy Conservation requires the Delaware Division of Climate, Coastal and Energy to establish programs that promote the construction of "net zero capable homes", or homes that are highly energy efficient and could achieve net-zero energy with the installation of on-site renewable generation. The provision sets the stage for constructing only net zero capable residential buildings by 2025 and only net zero capable commercial buildings by 2030. Washington D.C.'s Appendix Z offers a phased approach to net zero energy, establishing an optional compliance pathway for the construction of net-zero energy commercial and residential buildings prior to the District's adoption of mandatory net-zero energy codes for new construction in 2026. The 2021 IECC commercial and residential codes included an appendix with a net zero adoption framework that jurisdictions without the in-house expertise to develop net zero code language can adopt. This national framework facilitates a consistent net zero policy approach across multiple jurisdictions that would simplify how manufacturers, builders, and stakeholders in the residential industry might prepare for these newly adopted provisions.

A caveat to zero carbon building and building electrification policies is that near-term cost savings are not guaranteed with the variable costs of electricity and operational cost projections between climate zones.[xxix] Where possible, state-led tax rebates and incentive programs can reduce the incremental costs of meeting net zero and all-electric requirements for new and existing buildings. An example is the Affordable Housing Retrofit Accelerator offered in partnership by the District Department of Energy and Environment (DOEE), the DC Sustainable Energy Utility (DCSEU), and the DC Green Bank, which offers technical and financial assistance to owners and managers of qualifying affordable multifamily buildings that may otherwise face challenges complying with the District-wide energy building performance standard.[xxx] To manage costs for the electrification of new construction, states might also consider leveraging tax credits and rebates from the Inflation Reduction Act of 2022 to accelerate the commercial availability and purchase of all-electric appliances.

States considering stretch codes can conduct studies to understand the impacts of fuel switching for residents and businesses and concurrently engage diverse stakeholders to foster a data-driven and inclusive development process. The Massachusetts Department of Energy Resources (DOER) documented their process for updating their existing stretch code and developing the new Municipal Opt-in Specialized Stretch Energy Code as established by the Massachusetts Climate Act of 2021. To optimize both development processes, DOER issued multiple public comment periods that fielded

hundreds of responses, assembled a technical advisory committee of subject matter experts to advise on best practices in building energy codes and low-carbon construction, and convened four regional hearings and one hearing specifically for environmental justice communities – all of which offered interpretation services in multiple languages and were held virtually for ease of access – to meaningfully engage stakeholders in this high-impact decision making process.[xxxi]

Examples of Equity Activities Under Strategic Partnerships

1. **Partnering in multistate or regional collaborations or national energy code collaboratives to scale energy code adoption and compliance for under-resourced states.**

Multi-state building energy code initiatives can be convened with the assistance of regional planning organizations and regional energy efficiency organizations. The Illinois Environmental Protection Agency Office of Energy, Nevada Governor's Office of Energy, and Hawaii State Energy Office, in coordination with the University of Illinois Smart Energy Design Assistance Center (SEDAC), received funding from DOE to deliver energy efficiency and energy code trainings. This program, called "BEE Fundamentals", brought the three states together to develop and disseminate free code trainings that leverage the technical expertise of SEDAC, that had been providing energy code trainings across the state of Illinois since 2004.[xxxii] The output, which includes fifteen on-demand education modules, not only help the participating states build economies of scale but also the audience address their gaps in building code training measures. The focus on this program, to advance energy efficiency curriculum content and increase visibility of energy and code-related careers by engaging with community colleges and vocational programs, were determined by a needs assessment[xxxiii] conducted by SEDAC. The unique multi-state and university partnership launched its first iteration of energy code resources and curriculum content in the beginning of 2022.

Leveraging the capacity of a regional energy efficiency organization, "The Continuum from Energy Codes to Advanced Technologies: A New Approach to Training", a DOE-funded program by Midwest Energy Efficiency Alliance (MEEA), introduced comprehensive code education and technical support structures to help Nebraska implement LB 405, a bill signed by the governor in 2019 to update the statewide code from 2009 IECC to the 2018 IECC. The trainings provide attendees with continuing education credits through ICC and the American Institute of Architects (AIA). The training is targeted towards both the industry workforce and other stakeholders, such as students and public officials, through tailored training topics. This program convenes a project team that includes the Nebraska Department of Environment and Energy (NDEE) to advise on training topics, offer cross-disciplinary perspectives, and facilitate local government connections, as well as an in-field partner to deliver the trainings and conduct stakeholder engagement and must have a robust understanding of challenges, perspectives, and motivations in the field. Within MEEA's program proposal, this individual was identified and described as having extensive experience in the construction industry, success in past training programs, and the ability to tailor messaging to an audience comprised of both energy code supporters and skeptics.

2. **Establishing code collaboratives that invite stakeholders to weigh in on code revision deliberations and serve as forums for idea exchange.**

Several states play important roles in convening key stakeholders and facilitating collaborative energy code implementation efforts. To enhance stakeholder engagement and feedback, the Delaware Division of Climate, Coastal and Energy created the Delaware Energy Code Collaborative in November 2011. Delaware was an early adopter of the "code collaborative", a clearinghouse for states to convene stakeholders (homebuilders, building code officials, contractors, representatives) to share ideas as well as resources for increasing code compliance. This type of program has now been stood up in several states, including Colorado, Iowa,[xxxiv] Michigan,[xxxv] Nebraska, Nevada, New Hampshire,[xxxvi] and Vermont.

Examples of Equity Activities Under Workforce Development

1. **Growing the code professional workforce via accessible and inclusive training and educational opportunities.**

An ICC and National Institute of Building Sciences (NIBS) study conducted in 2014 showed that the typical code official was a white male between the ages of 55 and 64, with the intention to leave the industry within the next five to 15 years.[xxxvii] Having responded to the survey study approximately eight years ago, these code officials are likely exiting the industry today. To address the code professional workforce shrinkage, there is a demonstrated need for workforce retention and revitalization.

The ICC and NIBS study found that the average building energy code official entered the code profession through building-related educational programs, possessed at least one professional license or certification, and had an aggregate 26-35 years of experience within the building industry. Exact certification or licensure requisites, however, depend on jurisdiction-specific requirements and the specialty area of the position; there are more than 25 possible areas of focus for building inspectors (energy, plumbing, mechanical, residential, rental, etc.). At a minimum, most code professional positions require a high school diploma and prefer applicants with Building Inspection Technology Certificates through community college degree programs, passing scores on ICC building official examinations, documented years of field experience, among other credentials.

To increase recruitment into the industry, state agencies are well-positioned to develop accessible opportunities for training and education. State agencies might consider partnering with minority-serving institutions, community or technical colleges, or community-based organizations to offer these opportunities to underrepresented populations within the industry. Where agency budgets allow, paid internships could be offered within buildings divisions in State Energy Offices and other relevant agencies for code compliance. The same agencies could also offer programs to subsidize certification and licensure courses and promote union-supported apprenticeships. Existing examples can be found within the Hawaii State Energy Office, which used U.S. State Energy Program funds in 2020 to develop workforce training and apprenticeship opportunities that support skills training for the energy efficiency, renewable energy deployment, and energy resilience workforce in the state;[xxxviii] and the North Carolina Department of Environmental Quality (the State Energy Office), which provided a $165,000 grant for a Clean Energy Youth Apprenticeship Pilot Program that has engaged hundreds of community college and high school students in clean energy career opportunities, including many from rural and underserved counties.[xxxix] According to the 2020 U.S. Energy and Employment Report by NASEO and Energy Futures Initiative (EFI), just 25 percent of the energy efficiency sector workforce are women with lower

representation of Black and Hispanic workers compared to the national workforce average.[xl] Given the long tenure of the typical building code official, states could also leverage this institutional knowledge by developing mentorship and on-the-job training programs that connect older, more experienced officials with new professionals in the field.

Another finding of the ICC and NIBS study was that 27 percent of respondents held unconventional educational backgrounds in fields like business administration. This suggests the viability of partnerships with educational institutions to engage students and professionals from seemingly disconnected degree programs. The ICC and NIBS study further showed that the typical code professional's top reason for pursuing the job was job security, followed closely by reasonable salary/benefits and respect for the profession. Energy code agencies can speak directly to these priorities when promoting their openings through career offices and when developing cross-curricular educational content to introduce new professionals to building code careers.

There are several other roles within code boards or buildings departments that work towards increasing a jurisdiction's energy code compliance, including home energy raters, building auditors, and building inspectors, who all face similar challenges with staying abreast of code change developments and accessing training opportunities. Home energy raters are accredited individuals who complete a training program, pass a core competency exam, complete probationary ratings, and fulfill a continuing education requirement every three years. These requisites may be inaccessible without states, utilities, institutions – or partnerships among the three – creating braided workforce incentives (e.g., subsidized course fees, integration with community college and vocational curricula).

To increase employee retention, the building code enforcement and auditing career paths should meet job quality metrics such as competitive salaries, job stability, retirement and healthcare benefits, safe and harassment-free work sites, childcare, flexible hours, and opportunities for career advancement and professional development. State Energy Offices and other agencies with staff involved in code compliance efforts might consider prioritizing position salaries in annual budget plans and pursuing funding for hiring new staff that will increase department bandwidth and accordingly, jurisdiction-wide code compliance rates.

2. **Supporting incumbent building code professionals by expanding access to professional development opportunities.**

Training programs on new energy code developments should strive to eliminate common attendance and completion barriers for code professionals by offering wrap-around services. These barriers include childcare expenses, transportation costs, and language, as well as limited access to mentoring, peer networking, and qualified apprenticeship or internship opportunities for newer professionals. According to an analysis by NASEO and BW Research Partnership, commonly cited barriers to career navigation and advancement in the clean energy sector are distance of educational opportunities from home, language, affordability of trainings, and time for continuing education.[xli] Seeing as most building code departments have a staff size between one and four full time employees, it is difficult for code professionals to step away from their daily responsibilities to attend continuing education opportunities and trainings.[xlii] Virtually accessible and on-demand training options could alleviate these hurdles. Attendees of a public workshop session hosted by the U.S. DOE Building Energy

Codes Program (BECP) on April 27, 2022, also emphasized participant support services as a key equitable design element of building energy code trainings.

Conclusion

Pursuing equity-focused building energy code activities not only addresses requirements set through the White House's Justice40 Initiative, but also sets in motion important efforts to mitigate energy burden in disadvantaged communities, increase workforce diversity, and prioritize community engagement in policy making. Adopting an equitable approach to updating state and local energy codes shifts a typically top-down decision-making process to one that responds to the experiences and needs of those who have faced long-term disenfranchisement. State Energy Offices' roles in policy and program development and implementation make them ideally suited to advance equity across building code adoption, enforcement, training, and innovation activities. Moreover, where State Energy Offices lead building energy code decision-making or are appointed onto code decision-making bodies, they can bring intentional equity considerations to those processes.

References

[i] NASEO, 2022, "Buildings Committee", *NASEO,* https://naseo.org/issues/buildings/committee.
[ii] Drehobl, A., L. Ross, and R. Ayala, 2020, "How High are Household Energy Burdens?" *American Council for an Energy-Efficient Economy*, https://www.aceee.org/research-report/u2006.
[iii] DOE, 2022, "Low-Income Community Energy Solutions", *DOE*, https://www.energy.gov/eere/slsc/low-income-community-energy-solutions.
[iv] Gross, T., 2017, "A 'Forgotten History' Of How the U.S. Government Segregated America" https://www.npr.org/2017/05/03/526655831/a-forgotten-history-of-how-the-u-s-government-segregated-america#:~:text=Rothstein%27s%20new%20book%2C%20The%20Color%20of%20Law%2C%20examines,neighborhoods%20%E2%80%94%20a%20policy%20known%20as%20%22%20redlining.%22.
[v] Drehobl, A., L. Ross, and R. Ayala. 2020, "How High are Household Energy Burdens?". *American Council for an Energy-Efficient Economy*, https://www.aceee.org/research-report/u2006.
[vi] These estimates apply a discount factor of five percent to future cost savings relative to 2020 dollars and take into account the average adoption rates in states, modeling code update realization rates accordingly. Tyler, M., Winiarski, D., Rosenberg, M., and Liu, B., 2021, "Impacts of Model Building Energy Codes – Interim Update", *Pacific Northwest National Laboratory,* https://www.energycodes.gov/sites/default/files/2021-07/Impacts_of_Model_Energy_Codes_2010-2040_Interim_Update_07182021.pdf.
[vii] National Institute of Building Sciences (NIBS), 2019, "Natural Hazard Mitigation Saves: 2019 Report", *NIBS*, https://www.nibs.org/projects/natural-hazard-mitigation-saves-2019-report.
[viii] Blankenship, B., Renner J., Werner, H., Lerner, M., Cunningham, K., 2020, "Hand-in-Hand: Environmental and Social Justice Communities and California Energy Code", *Energy Solutions,* https://energy-solution.com/wp-content/uploads/2021/07/Building-Energy-Equity.pdf.
[ix] Unlike site built or modular buildings, manufactured homes are not subject to state or local building codes, but are instead required to comply with a standard promulgated by the U.S. Department of Housing and Urban Development.

[x] Freddie Mac, February 27, 2020, "The Housing Supply Shortage: State of the States", *Freddie Mac,* https://www.freddiemac.com/research/insight/20200227-the-housing-supply-shortage.
[xi] Maggie Kelley Riggins, August 2021, "Enhancing Equity through Building Energy Codes", *Southeast Energy Efficiency Alliance,* https://www.energycodes.gov/sites/default/files/2021-08/NECC2021_D2S1_KelleyRiggins.pdf.
[xii] Statista Research Department, "New privately-owned housing construction starts in the United States from January 1968 to August 2022", 2022, *Statista,* U.S. monthly housing starts 2022 | Statista.
[xiii] DOE, "Building Energy Codes Program Activities Framework", August 2019, *DOE,* https://www.energycodes.gov/sites/default/files/2019-08/BECP_Activities_Framework.pdf.
[xiv] Rosa Gonzalez, Facilitating Power, 2019, "The Spectrum of Community Engagement to Ownership", *Movement Strategy Center,* https://movementstrategy.org/resources/the-spectrum-of-community-engagement-to-ownership/.
[xv] NASEO, Facilitating Power, Minnesota Department of Commerce, Energy Division, July 2020, "Designing Equity-Focused Stakeholder Engagement to Inform State Energy Office Programs and Policies", *NASEO,* https://naseo.org/data/sites/1/documents/publications/13-0376_0549_000208-KOEWLER%20FINAL%20cover.pdf.
[xvi] ICC, June 2019, "Code Adoption Process by State", *ICC,* https://iccsafe.org/wp-content/uploads/Code-Adoption-Process-by-State-June-2019.pdf.
[xvii] The 2021 Oregon Energy Efficiency Specialty Code (OEESC) is based on ASHRAE Standard 90.1-2019.
[xviii] DOE will also conduct energy and economic impact analyses for local jurisdictions as requested. Pacific Northwest National Laboratory, "National and State Analysis", *DOE,* https://www.energycodes.gov/national-and-state-analysis.
[xix] Brady Seals, Andee Krasner, 2020, "Gas Stoves: Health and Air Quality Impacts and Solutions", *Rocky Mountain Institute,* https://rmi.org/insight/gas-stoves-pollution-health.
[xx] Lisa M. White, Graham S. Wright, 2020, "Assessing Resiliency and Passive Survivability in Multifamily Buildings", *ASHRAE*, https://www.ashrae.org/file%20library/conferences/specialty%20conferences/2020%20building%20performance/papers/d-bsc20-c018.pdf.
[xxi] DOE, 2022, "Energy Justice Mapping Tool – Disadvantaged Communities Reporter", *DOE,* https://energyjustice.egs.anl.gov/
[xxii] The White House Council on Environmental Quality (CEQ), November 2022, "The Climate and Economic Justice Screening Tool", https://screeningtool.geoplatform.gov/en/#3.4/30.61/-95.66.
[xxiii] "Nevada Energy Code Circuit Rider", *State of Nevada*, https://energy.nv.gov/Programs/Building_Energy_Codes/Nevada_Energy_Code_Circuit_Rider/.
[xxiv] Chitra Nambiar, Ian Blanding, Carmen Cejudo, Michael Reiner, Chris Perry, 2022, "Falling Short: Does Energy Code Compliance and Enforcement Vary by Income?", *ACEEE*, https://aceee2022.conferencespot.org/event-data/pdf/catalyst_activity_32622/catalyst_activity_paper_20220810191644106_531806ec_362c_4d8f_bc18_21ef6a5a8f48.
[xxv] Building Electrification Institute, July 2022, "Equitable Approaches to Building Performance Standards", *Building Electrification Institute,* https://static1.squarespace.com/static/5b6a482db27e39e8fcf65bbf/t/62dee651086dc41b0aae71d4/1658775123616/BEI_Equitable+Building+Performance+Standards_July+2022.pdf.
[xxvi] Benjamin Silverman, Jessica Miller, Quinn Biever, May 2022, "Building Performance Standard Module: Housing Affordability", *Institute for Market Transformation,* https://www.imt.org/wp-content/uploads/2022/05/IMT-Housing-Affordability-CW5.pdf.
[xxvii] Building Electrification Institute, "Equitable Approaches".
[xxviii] Urban Sustainability Directors Network (USDN), July 2021, "Building Performance Standards – A Framework for Equitable Policies to Address Existing Buildings", *USDN,* https://www.usdn.org/uploads/cms/documents/bps-framework_july-2021_final.pdf.
[xxix] Sherri Billimoria, Leia Guccione, Mike Henchen, and Leah Louis-Prescott, 2018, "The Economics of Electrifying Buildings", *Rocky Mountain Institute*, https://rmi.org/insight/the-economics-of-electrifying-buildings/.

[xxx] DC Sustainable Energy Utility, "Affordable Housing Retrofit Accelerator", https://www.dcseu.com/retrofitaccelerator.
[xxxi] Massachusetts Department of Energy Resources, "Stretch Energy Code Development 2022", https://www.mass.gov/info-details/stretch-energy-code-development-2022#technical-advisory-committee-.
[xxxii] The University of Illinois – Smart Energy Design Assistance Center (SEDAC), "BEE Fundamentals", *The University of Illinois,* https://smartenergy.illinois.edu/instructor-toolkit/.
[xxxiii] The University of Illinois – Smart Energy Design Assistance Center (SEDAC), January 29, 2021, "Community College Energy Code Training Needs Assessment", *The University of Illinois,* https://smartenergy.illinois.edu/wp-content/uploads/2021/05/DE-EE0009092-UIUC-SEDAC_Needs-Assessment_1_29_2021.pdf.
[xxxiv] Idaho Energy Code Collaborative, https://www.idahoenergycode.com/what-we-do.
[xxxv] Michigan Department of Environment, Great Lakes, and Energy, "Michigan Energy Codes Compliance Collaborative", https://www.michigan.gov/egle/about/organization/materials-management/energy/codes.
[xxxvi] New Hampshire Energy Code Collaborative, https://nhenergycode.wordpress.com/about-the-new-hampshire-energy-code-collaborative/.
[xxxvii] International Code Council (ICC) & National Institute of Building Sciences (NIBS), August 2014, "The Future of Code Officials", *ICC,* http://media.iccsafe.org/docs/ICC-NBIS-Future-Of-Code-Officials.pdf.
[xxxviii] Hawai'i State Energy Office, July 2020, "HSEO Grant Will Support Hawaii's Clean Energy Goals, Economic Recovery", *Hawai'i State Energy Office,* https://energy.hawaii.gov/hseo-grant-will-support-hawaiis-clean-energy-goals-economic-recovery/.
[xxxix] Alexander Saunders, July 2021, "N.C. A&T Grant Develops Clean Energy Apprenticeship, First of its Kind in the Nation", *North Carolina Agricultural and Technical State University*, N.C. A&T Grant Develops Clean Energy Apprenticeship, First of Its Kind in Nation (ncat.edu)
[xl] NASEO, Energy Futures Initiative, March 2020, "2020 U.S. Energy & Employment Report", *NASEO,* https://www.naseo.org/data/sites/1/documents/publications/USEER-2020-US-Energy-Employment-Report.pdf.
[xli] NASEO, BW Research Partnership, April 2021, "Diversity in the U.S. Energy Workforce", *NASEO,* https://www.naseo.org/data/sites/1/documents/publications/Workforce%20Diversity%20Data%20Findings%20MASTER%20Final42.pdf.
[xlii] ICC & NIBS, "The Future of Code Officials", *ICC,* August 2014, http://media.iccsafe.org/docs/ICC-NBIS-Future-Of-Code-Officials.pdf.