Code and Communities: Opportunities to Incorporate Equity into Building Energy Codes

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ABSTRACT

Through the Inflation Reduction Act (IRA), Bipartisan Infrastructure Law (BIL), and American Rescue Plan, the federal government is directing historic levels of investments for a clean and sustainable energy economy. Building energy codes are an instrumental and cost-effective market transformation and climate policy tool for the energy industry. As such, IRA and BIL allocated unprecedented funds for developing, adopting, and implementing building energy codes. Notably, these laws also advance the critical Justice40 initiative, which aims to deliver benefits to disadvantaged communities, prompting a reexamination of whether and how energy code benefits can be equitable.

The Department of Energy (DOE) recognizes that "the current process by which national, state, and local energy codes are developed has historically been structured in a manner that does not directly address the needs of disadvantaged communities" (BIL). Most states and local jurisdictions in the U.S. adopt national model energy codes, such as the International Energy Conservation Code (IECC) and ASHRAE Standard 90.1, either wholly or with amendments. These model energy codes are developed by consensus among stakeholders across the building sector who are members of the council, with periods throughout the process for public comment. However, many energy equity leaders advocate for community-based approaches, raising questions about whether the prevalent process of developing building energy codes at the national level can effectively advance the goals of equity and the Justice40 initiative.

This paper summarizes the work the authors undertook to identify strategies and best practices to consider as part of an equitable energy code adoption and implementation process. While the research focused on building energy codes, the findings and strategies are applicable to other building energy policies. Local, state, and tribal governments, consultants, advocates, and community-based organizations can use these recommendations as a roadmap to center equity in their building policies and programs.

Introduction

Building codes set minimum requirements to ensure buildings are built to health, safety, and, increasingly, resiliency standards. Building energy codes (energy codes) are a subset of building codes and strive to reduce energy use, operating costs, and emissions over the lifetime of a building, by establishing minimum energy efficiency requirements for new construction and major renovations. Energy-efficient buildings can be cheaper to operate and maintain and are often more comfortable, healthy, and safe for building occupants. Additionally, they are typically more resilient to disruptions caused by power outages and weather events.

Model energy codes, such as IECC or ASHRAE Standard 90.1, are updated every three years. Notable changes in the most recent editions of model energy codes include provisions for

electrification, renewable energy integration, grid responsiveness, and zero energy or zero energy readiness. The primary criterion for energy code development and adoption is meeting the cost-effectiveness requirement- which is determined for an "average" newly constructed building using energy modeling. As such, equity has not been the focus or an area that has been considered historically in the development, adoption, and implementation processes of energy codes. Additionally, from a procedural perspective, there is no clear precedent to address community-specific needs in the broader energy code development and adoption processes.

Equity considerations in energy codes are an emerging area of interest, exemplified recently through IRA and BIL with limited precedence and established best practices. To address this need, this research proposes a framework that outlines key areas of focus for incorporating equity into energy codes at the local, state, and national levels.

A Shared Understanding of Environmental Justice Communities and Equity

Throughout this paper, we reference "environmental justice (EJ) communities" or disadvantageous communities. These terms broadly refer to groups that have faced disproportionately negative impacts from energy system disinvestments, climate change, and other structural harms[1]. Past or current structural inequalities and discriminatory policies such as redlining resulted in unequal burdens on these communities. Consequently, EJ communities have a disproportionate share of poor housing, high energy burden, poor air quality, and health issues.

In addition to these outsized burdens, EJ communities have not historically been included in the processes, nor have they been able to benefit equally from building and energy policies. Equity refers to a shift where policy and decision-making are centered around the voices and needs of EJ communities. Equity can be understood in terms of equitable processes and equitable outcomes, where the benefits and burdens of energy policies are shared equally by all.

A Note on the Intersection of Equity and Building Codes

As we explore the intersection of building energy policies and equity, it is important to note the potential disconnect between energy codes and the priorities of EJ communities. Considering that building codes set the baseline for the building stock of the future, EJ communities will benefit from the improved energy performance of newly constructed buildings in the long run. Some argue an inherent misalignment exists between the scope of building energy codes and EJ communities' priorities. Building energy codes do not directly affect many of the typical home types of EJ community residents. In most regions, new construction is commonly outside the purchasing power of the EJ communities. In part because of this disconnect, EJ communities view building codes as less of a priority. Conversely, EJ communities view building initiatives that improve existing buildings as more relevant to their immediate health, well-being, and financial situation.

[1] Different terms are used to describe these communities, including Energy and Environmental Justice (EEJ) communities, historically disinvested communities, underserved populations, Disadvantaged Communities (DAC), Overburdened Communities (OBC), or priority populations.

"*Well, you know when codes impact new construction and major renovation and not all EJ communities get to live in new construction, they don't get to live in, in it until years […], so it just doesn't relate to them." Expert Interview A*

Regardless of the challenges and potential misalignment, an equity lens necessitates the inclusion of these groups in the energy code development and adoption process. Our paper proposes a framework to include equity as part of code development, adoption, and implementation.

Methods

In 2022, Pacific Northwest National Laboratory (PNNL) commissioned the authors to investigate opportunities to integrate equity within its Building Energy Code Program. We conducted a literature review and interviews with industry experts for this research. As the literature on this subject is limited, we relied on case studies on net zero or Building Performance Standards (BPS) policies at the city or local jurisdiction levels. We interviewed thirteen experts who work at the intersection of building energy policies and equity.[2] The key areas of focus and equity themes were informed by these expert interviews and local BPS and zero-energy building policy case studies. Our research included both commercial and residential buildings.

Findings and Discussion

Examples of Equity in BPS Policies

BPSs are building energy performance policies that address existing buildings. BPS policies are developed and implemented mostly at the local level. Early adopters of BPS, such as Denver, Orlando, and Boston, have made considerable strides in incorporating equity into their local BPS policy and program development. Our review identified two key strategies to incorporate equity that are common in all these case studies: community engagement and participation and aligning with community's needs and priorities.

Meaningful Community Engagement and Participation

Planning for and investing in meaningful community engagement was a core strategy in developing and implementing BPS in the studied cities. Cities planned for (and used) different strategies to engage communities and include them in goal setting and policy development.

Denver created a Task Force of 25 diverse stakeholders, including residents, tenants, non-profit housing representatives, and community advocates, to ensure equitable benefits across Denver. Task Force members were responsible for keeping their constituents informed. The City

[2] We interviewed experts from the Institute for Market Transformation (IMT), Urban Sustainability Directors Network (USDN), Association for Energy Affordability, New Building Institute (NBI), Barr Foundation, ICC, and Southwest Resilience Code Partnership. We also solicited input from experts at Northeast Energy Efficiency Partnerships (NEEP), the Southeast Efficient Energy Alliance (SEEA), and TRC.

produced education and outreach material and helped the Task Force members set up and present briefing and feedback sessions.

The City of Boston undertook a multi-pronged engagement strategy and created two advisory groups. The first, a 'technical advisory group' consisting of local experts from the building science, construction, retrofit, and management sectors. The second, a 'residential advisory group' comprised of local community-based organizations (CBOs) supported by a non-profit facilitator. This group convened residents most impacted by building emissions in key neighborhoods, involving them as co-designers of this new climate justice ordinance.

The city also hosted a series of open houses for the public and conducted dedicated focus groups with other stakeholders, such as labor groups. The City of Orlando partnered and worked with Poder Latinx, a CBO that focuses on civic engagement of the Latinx community for issues around economic, immigrant, and climate justice. The City and Poder Latinx used the Spectrum of Community Engagement to Ownership (CE2O) framework to gauge which level of engagement best describes the community's existing engagement level.[3]

Aligning with Community's Needs and Priorities

In working with affected communities, cities defined specific equity or equitable outcomes for their BPS policy or program. In the case of the City of Denver, one of the initial items that the Task Force addressed was defining equity. The City brought in a racial equity expert to explain how racial equity must be considered at every step of the process. The Denver Task Force recommended that the city plan, measure, and account for benefits to people of color (POC). The Task Force recommended extra support for "under-resourced buildings," defined as buildings in areas with high Social Equity Index scores.[4] After the adoption of BPS, the City of Denver created the Equity Priority Buildings Compliance Assistance performance requirements to serve frontline communities that may face more barriers to adapting to a changing climate.

In the City of Boston, community input not only informed but helped co-design their building energy performance policy. Some of the communities' priorities in forming the City's emission reduction building policies included improving air quality for residents, reducing renter energy bills, not contributing to displacement, improving heating and cooling in homes, and creating jobs for residents.

The City of Orlando obtained direct community feedback on the proposed policy, and Poder Latinx developed a list of recommendations based on the community's needs and priorities. The key community concerns were energy cost and burden, rent increase, tenant protection displacement, and gentrification.[5]

[3] Poder Latinx noted that "the CE2O tool was crucial in creating the space for honest conversations, an understanding of the community vantage point, and the impact of past actions."

[4] Denver's Social Equity Index is a visual representation of some of the socioeconomic, built environment, health care, and heath barriers that residents of Denver neighborhoods face in accessing opportunities to lead healthy, productive lives.

[5] Poder recommendations were to ensure that the BPS is created with, equity as the main priority, is non-negotiable for a BPS and tenants will not be displaced, with special attention to low-income residents so rent will not be raised, buildings where low-income people and people of color live do not get left behind and a plan to prevent gentrification is implemented.

A Proposed Framework for Integrating Equity into Energy Codes

We propose a framework for incorporating equity into energy codes based on the key themes identified in expert interviews, literature reviews, and BPS case studies. The framework comprises of four parts: 1) Equity Inquiry, 2) Align Priorities and Processes, 3) Incorporate Procedural Equity, and 4) Equitable Code Compliance. Each is described further below followed by recommendations based on our research findings.

1. Equity Inquiry: Start with an Inquisitive Process:

Integrating equity in any policy, including energy codes, requires starting with an inquisitive process centered around asking guiding questions. These questions allow for the development of a vision that is most useful for impacted communities. The City Energy Project's "Incorporating Equity into Benchmarking Requirements" underscores the importance of this approach, offering useful guidance on integrating equity through a process that leads with guiding questions[6]. Energy codes and other building benchmarking programs like (LEED or BPS) are building-focused and do not often address everyday problems faced by disadvantaged communities, such as health disparities and access to food, housing, etc.

To effectively center equity, it is crucial to begin with a clear understanding of the "why" and intended outcomes, which should be specific and measurable. It is important to understand the inequities communities face, as well as their needs and goals, before developing policies and programs. Impacted communities need to be part of this critical first step. We will discuss meaningful community engagement in the following section. Guided inquiries, like the ones recommended below, may help identify a path forward for equity-centered outcomes. This process, also referred to as an "equity inquiry" (Zero Cities Project), involves successfully incorporating equity into the process by setting up and working through thoughtful questions. The BPS case studies that incorporate equity used an equity inquiry as a starting point.

Recommendations

The following set of guiding questions could help integrate equity into building energy code development, adoption, and implementation when addressed within communities. Code development entities, including state and local government, should consider:

- How can building energy codes address disparities or inequalities? How can they prevent introducing inequitable outcomes?
- How can state and local governments support building energy code policies or processes that include communities historically excluded from decisions on their built environment?
- What data do we need to inform policies and interventions, and how/where can we access that data? How can that data be used in the future?

[6] The City Energy Project was a joint project of the Natural Resources Defense Council (NRDC) and Institute for Market Transformation (MIT).

2. Align Priorities and Processes: Updates to Cost-Effectiveness Criteria

Centering equity in energy codes and programs requires an understanding of the landscape of issues that EJ communities are experiencing that can be addressed by energy codes. After starting with the equity inquiry approach to develop a nuanced understanding of the priorities of EJ communities, the next step is to compare and align EJ communities' priorities with energy code development and adoption processes.

This crosswalk between EJ communities' priorities and energy codes can help identify where energy codes and equity are at odds and explore opportunities to address that tension. EJ communities' priorities in buildings are often affordability, resilience, and health (indoor air quality) USDN (2021). A study in California found that the non-energy benefits of high-performance buildings align well with EJ priorities. Though the researcher noticed variation in the non-energy benefits indicated by EJ communities, non-energy benefits broadly "were highly valued, nearly all interviewees emphasized the importance of indoor air quality and its resultant health effects" (Blankenship et. al. 2020). However, the cost-effectiveness criteria followed in energy code development do not consider the non-energy benefits of energy efficiency measures including health and resilience, which are high-priority items for EJ communities. Incorporating non-energy benefits into the cost-effectiveness analysis methods could elevate additional measures for inclusion in energy codes that are more closely aligned with EJ communities' priorities.

In addition to non-energy benefits considerations new construction focused energy codes do not address older buildings. As discussed previously, individuals in EJ communities commonly live in older homes, rental homes, or multifamily properties. New homes are commonly outside the purchasing power of EJ communities.

When individuals in EJ communities reside in new construction, it is often in affordable housing developments. Affordable housing development financing differs from single-family homes or market-rate multifamily development. For example, affordable housing developments commonly use multiple funding sources. In addition to a different funding structure, there is a misalignment between cost and savings associated with updated energy codes in rental affordable housing properties. Typically, the model energy code cost analysis looks at the estimated energy cost savings for an 'average homeowner' to calculate the life cycle cost and simple payback period against the increased upfront cost to the homeowner. This 'average homeowner' assumption in the cost-analysis model does not apply to rental properties that house most EJ communities. Moreover, the issue of split incentives between homeowner and renter to undertake efficiency upgrades poses a further challenge for adopting efficiency upgrades in rental homes. The below quote from an interviewee underscores these findings:

"Financing for low-income, multifamily development projects is commonly structured differently from market-rate developments. Additionally, energy savings attribution of upfront investment for rental properties, which house EJ communities, differs from owner-occupied homes. The building energy code cost analysis must include the EJ community housing models."

Based on these findings, we provide the following recommendations to address the misalignment between energy codes and EJ community priorities. We also recommend future

studies, data collection, and local collaboratives to identify additional areas of misalignments based on local climate, geography, history, and cultural needs.

Recommendations

Expand the scope of energy code cost effectiveness to include what matters to EJ communities, i.e., affordability, resilience, health, comfort, and indoor environmental quality. A few steps required for this are:

- Identify and develop metrics and valuation approaches to recognize the non-energy benefits of building codes that are uncompromisable for EJ communities.
- Develop a more comprehensive cost-benefit analysis in which resilience, comfort, indoor environmental quality, ventilation, affordability, and energy burden are evaluated as part of the new building energy code or code amendment development process. Blankenship et al. (2020) suggest expanding existing cost-effectiveness reporting to include low-income households. "This analysis should consider and value non-energy benefits like improved health and reduced healthcare costs and lengthen time horizons to account for the benefits of building codes for Environmental and Social Justice (ESJ) communities beyond the current 30-year period of analysis."[7]
- Consider the effects of climate change in projecting future temperature patterns and in assessing indoor air quality, resilience, and energy burden for building energy code decisions. Climate and future temperature climate prediction models used in energy code analyses commonly use historical weather data that cannot account for the impacts of climate change. Considering climate change and the increased frequency of extreme weather events, buildings' resilience, energy performance, and indoor air quality become even more critical for EJ communities. EJ communities have the least resources and are more sensitive (vulnerable) to climate shocks. A building's resilience affects its ability to weather the storm and allow occupants to shelter in place.
- Expand cost and benefit analyses to include other cost benefit models, such as financing models for low-income rental properties, and inclusion of non-energy benefits and equity-centered metrics. Develop a methodology to use the income-based calculation of cost-effectiveness in lieu of "average" homeowner assumptions used in the current analysis.

3. Incorporate Procedural Equity: Making Space and Advancing Meaningful Engagement

Engaging impacted communities in shaping and executing solutions and policies that directly affect them is a fundamental step to advancing equity. This engagement and

[7] "Environmental and Social Justice (ESJ) Communities" is a term used in California and established by CPUC for the purposes of CPUC policy and programs: "predominantly communities of color or low-income communities that are underrepresented in the policy setting or decision-making process, subject to a disproportionate impact from one or more environmental hazards, and are likely to experience disparate implementation of environmental regulations and socioeconomic investments in their communities.

participation is known as procedural equity. Procedural equity requires EJ communities' meaningful participation, engagement, and contributions to the building energy code development, adoption, and implementation processes. An effective application of procedural equity is demonstrated by the Zero Cities Project, led by the Urban Sustainability Directors Network (USDN). This project centers on meaningful participation as a key strategy to advance equity.

"The key to closing equity gaps and resolving climate vulnerability is the direct participation by impacted communities in the development and implementation of solutions and policy decisions that directly impact them." – USDN Zero Cities Project

Equity is contextual, based on "local" needs, and should be addressed at the local level. National building energy codes are monoliths, while equity is multi-dimensional, multi-layered, and locally focused. While model codes are developed nationally, states and local jurisdictions can amend and revise model energy codes to meet their needs in the state or local code adoption process. In this context, equity comes into place in the local code development and adoption processes, including amendments to national models, to reflect local needs. Most state and local adoption processes include a public hearing process, but public outreach is not the same as community engagement. As part of this process, we not only need the local organizations that represent their constituents at the table, but we want them to help identify community priorities and co-create the building energy code policy and program.

"Equity is not a cut-and-paste concept. The causes and effects of inequity must be sorted out locally. Local governments can learn from one another, but there is no substitute for working out solutions in collaboration with each, distinct impacted community."– USDN Zero Cities Project

There is, however, a challenge in facilitating meaningful participation from EJ communities. Energy codes are highly technical, and engagement in the code development process requires some level of building energy knowledge or expertise. A study on EJ community participation in energy code development in California noted that "building codes are a complex set of regulatory documents. Without clear communication from a trusted source, for example, organizations that represent or partner with EJ communities, individuals who live in these communities may not have the resources to become familiar with the building code to the degree necessary to advocate for their interests." (Blankenship et al. 2020). To overcome this challenge. adequate and timely technical support and resources through trusted organizations are necessary for building capacity and meaningful community participation.

"*Engaging with affected communities early on in a city's process produces better results in planning and policy making. Allocating resources to support meaningful community engagement is necessary for plans and policies to reflect the unique perspectives, priorities, and expertise of affected people." — USDN Zero Cities Project*

Recommendations

- Early in the process, establish a framework for community engagement, leveraging existing literature such as "The Spectrum of Community Engagement to Ownership." (Gonzalez, R).
- Create and disseminate resources and materials on building energy codes that are easy to understand (and use) by local government staff, CBOs, and EJ communities to help these stakeholders learn about codes. Develop info sheets that communicate information about the code development process and highlight why energy codes matter and the implications of building energy codes for EJ Communities.
- Identify the right partners for community engagement and work through those partners to understand and integrate the community's needs within building energy code policies.
- Support the participation of affordable housing advocates and EJ community representatives in the energy code development and adoption process by offering training, resources, or monetary compensation.
- Engage and build trust with EJ communities in advance of the energy code cycle to accommodate the code review adoption timeline.
- In the absence of prior engagement, allow the time it takes to engage EJ communities to build trust meaningfully as part of the code review timeline. State and local government timelines for the review and adoption of new energy codes may be challenging for ensuring the integration of community perspectives. They should be planned carefully when considering a path to integrating equity within building energy codes.

4. Equitable Code Compliance: Identifying Gaps and Providing Resources

The various elements of energy codes work together as a system. Failure to comply with sections of the code could not only reduce the integrity of the building system and the building's energy performance but could also compromise occupants' health, comfort, and resilience. For example, failing to seal the building envelope or meet the required ventilation rate could result in the buildup of moisture, mold, and mildew issues in the building.

Though model energy codes are developed nationally, they are adopted and enforced locally by jurisdictions. In most states, local jurisdictions are responsible for code implementation, which includes energy codes. Once adopted, energy codes must be adequately enforced to be effective. Energy code compliance and enforcement ensures new homes are built based on all required provisions of adopted codes. The resources available for local buildings, code, or licensing departments that are responsible for compliance review and enforcement may vary by jurisdiction. A recent PNNL study examined whether energy codes are implemented equitably across jurisdictions. The analysis shows that lower-income counties have higher non-compliance rates than other counties (Nambiar et al, 2022). The study found differences in overall compliance rates as well as differences in energy efficiency levels for individual energy code measures like insulation levels, window performance, lighting efficiency, and envelope airtightness. Notable differences were also found in adoption rates of electric space and water heating systems, with lower adoption rates in lower-income counties. The collection and analysis

of code compliance data particularly in EJ communities can help identify areas where additional financial and technical support may be needed to advance equity in tandem with climate goals.

Recommendations

- Collect data on energy code compliance in EJ communities to identify specific needs and strategies and address compliance gaps.
- Use outcomes from energy code field studies to address compliance disparities in EJ and under-resourced communities.
- Support (and expand) regionally coordinated shared resources that have proven to be an effective means of providing code education, training, and compliance support, including regional code "Circuit Rider" models and regional training and education resource hubs.[8]

Other Considerations

We noted the importance and challenges of meaningful community participation at the local level and how the local level is the right scale to tackle equity. However, the model codes are developed nationally, and representation and procedural equity must be addressed in the national code development processes as well.

"[The] environmental justice communities are systemically excluded from participating in code or even having their interest in long-term affordability represented in those hearings or public comment or whatever. The whole idea that they call it a public comment is a misnomer. It's like it might make them feel good, but it is not public. Because no environmental justice community knows about it or would even feel comfortable. I mean, I've been in this business for 20 years. I don't feel comfortable going to those [national] committees because there's a bunch of white guys sitting around telling me how it is." — Expert Interview B

Building energy codes are highly technical, and engagement in the code development process requires some building energy knowledge or expertise. At the national level, code development bodies could engage organizations, such as affordable housing advocates, to serve as proxy representatives for and to represent priorities of EJ communities in national code development committees. Relying on these EJ advocates could be a solution to get representative voices of EJ communities at the table.

[8] The Nevada Energy Code Circuit Rider program is a collaboration between the Nevada Governor's Office of Energy and the 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. 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 Office. 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.

"I think [national] codes are systemically inequitable at all levels. Honestly, I mean, the systemic inequity begins with the 17 people that are put on a committee to develop the code. You know they have a quote-unquote, public comment period, but the public doesn't comment on that. Other code officials and [..] occupants of those buildings [who are the one affected by these codes] do not participate anywhere in the code development process." — Expert Interview A

Finally, equity in the building sector cannot be meaningfully addressed in isolation. Beyond building energy codes, zoning, and development policies play a critical role in advancing equity. Building energy codes should be integrated into broader state and regional energy, sustainability, and climate action plans. Collaboration across departments and organizations is vital to effectively address equity and ensure a comprehensive approach to building sector policies.

"[Working across] silos allow policies to move beyond solely focusing on buildings' greenhouse gas emissions to also providing critical health, resilience, environmental, and economic benefits for communities." — City Energy Project, 2021

Conclusion

Existing building energy code development and adoption processes at the national, state, and local levels do not directly address the needs of disadvantaged communities. In this paper, we present key findings from case studies and propose a framework to encourage strategies and best practices to be considered as part of energy code adoption and implementation processes.

Drawing from lessons learned from BPS adoption in cities, as well as expert interviews, we conclude that community engagement and goal setting are powerful tools for incorporating equity into building codes. Centered on these goals, we present a framework to integrate equity in codes by incorporating:

1. **Equity Inquiry: Start with an Inquisitive Process.** Starting with guiding questions to understand and address community-specific needs.
2. **Align Priorities and Processes: Updates to Cost-Effectiveness Criteria**. Incorporating non-energy benefits such as affordability, resilience, and health into building energy code processes to align with EJ communities' priorities.
3. **Incorporate Procedural Equity: Making Space and Advancing Meaningful Engagement.** Ensuring procedural equity by involving EJ communities in the code development process through clear communication and resource alignment.
4. **Equitable Code Compliance: Identifying Gaps and Providing Resources**. Addressing disparities in code compliance and enforcement, particularly in lower-income counties, through targeted data collection and support.

With unprecedented funding available to local, state, and tribal governments, consultants, advocates, and community-based organizations through IRA, BIL, and Resilient and Efficient Codes Implementation (RECI) initiatives, we hope our recommendations can serve as a roadmap to advance equity through energy codes. The first round of RECI-funded projects with a focus on

equity could provide valuable insight into how the funded community planned and incorporated equity into these projects.

Research Limitations

The current research is limited in scope, relying primarily on available literature and interviews with code experts. Further studies are needed to explore the unique challenges faced by various stakeholders in the various facets of the code process including development, adoption, and enforcement. Such studies may build on our proposed framework and help identify actionable steps to advance equitable outcomes from multiple facets of the energy code process.

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