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Navigating Energy Mandates in Multifamily Sector: Insights from Apartment Owners and Managers

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The built environment accounts for a substantial share of urban greenhouse gas emissions, and a growing number of U.S. cities have responded by enacting mandatory building performance standards (BPS) that impose energy and emissions targets on commercial and multifamily properties. Multifamily housing, which represents roughly one-third of the U.S. housing stock and an even larger share of building-sector emissions in major cities, sits at the center of this regulatory shift. However, the BPS landscape is highly fragmented across jurisdictions in terms of metrics, targets, and enforcement, thus creating compliance complexity for developers, owners, and asset managers. This report draws on interviews with executives of representative multifamily companies across the United States to document industry perceptions and experiences of municipal energy efficiency mandates. It summarizes the principal compliance challenges, cost and operational implications, and strategic considerations that shape how the multifamily sector is navigating the transition to stricter performance standards.

Keywords

Building performance standards (BPS), Multifamily housing, Energy efficiency mandates, Urban decarbonization, Real estate compliance

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1. Introduction

With the built environment accounting for approximately 30–70% of total citywide greenhouse gas emissions in dense urban centers[1], a growing number of municipalities are implementing mandatory energy efficiency and building performance standards (BPS) that target ambitious carbon emission reductions in order to achieve their climate action plans. As of 2025, around 50 United States (U.S.) cities that are required to report or benchmark their energy use for commercial and multifamily properties have enacted formal BPS that include performance targets and penalties[2]. A subset of those cities include New York City, Boston, Washington, D.C., Denver, Seattle, and St. Louis.

BPS are mandates that vary in terms of structure, metrics, and enforcement strategies, thus creating a piecemeal compliance landscape for developers and building owners who operate across multiple markets. For example, the Local Law 97 (LL97) of New York City establishes carbon emissions caps based on building typology and floor area, with financial penalties of $268 per metric ton of carbon dioxide equivalent (CO_2e) emitted above the limit[3]. The Building Emissions Reduction and Disclosure Ordinance (BERDO 2.0) of Boston requires buildings over 20,000 square feet to report emissions annually and meet declining emissions targets that align with the carbon neutrality goals of the city, with special compliance options for income-restricted housing. If a building does not comply and no alternative compliance plan is submitted and approved, the city may assess a penalty of up to $1,000 per day[3]. The Building Energy Performance Standards of Washington, D.C. use ENERGY STAR scores and site Energy Use Intensity (EUI) as performance benchmarks, with noncompliance triggering prescriptive improvement pathways[4]. The Energize Denver ordinance imposes specific site EUI targets by building type, with penalties beginning in 2025 and alternate compliance pathways including electrification credits. Buildings that do not meet performance targets face fines up to $0.30 per excess kilo British Thermal Unit (kBtu) used above the target[5].

Multifamily housing comprises a substantial share of the U.S. residential built environment and is therefore central to understanding the implications of

[1] U.S. Environmental Protection Agency. (2021). *Greenhouse Gas Inventory Guidance: Direct Emissions from Stationary Combustion Sources*.

[2] Institute for Market Transformation. (2024). *U.S. City Building Performance Standards Tracker*. Available at: https://www.imt.org

[3] New York City Mayor's Office of Sustainability. (2023). *Local Law 97: Climate Mobilization Act*. Available at: https://www.nyc.gov/ll97

[4] City of Boston. (2023). *BERDO 2.0 Technical Guidance*. Available at: https://www.boston.gov/departments/environment/building-emissions-reduction-and-disclosure-ordinance

[5] Department of Energy and Environment. (2023). *Building Energy Performance Standards (BEPS)*. Available at: https://doee.dc.gov/service/building-energy-performance-standards

emerging BPS policies. Nationally, multifamily buildings (defined as structures with two or more housing units) account for approximately 32% of the housing stock and house more than one-third of all U.S. households (Joint Center for Housing Studies of Harvard University, 2024). According to the Residential Energy Consumption Survey (U.S. Energy Information Administration, 2022), multifamily buildings are responsible for roughly one-quarter of the total residential energy consumption, thus reflecting both their scale and the high energy demand associated with space heating, cooling, and domestic hot water. Their contribution to residential greenhouse gas emissions is similarly significant, especially in markets dominated by electricity generated from fossil fuels. In major U.S. cities where BPS policies have been adopted, such as New York; Boston; Washington, D.C.; Seattle; and Los Angeles, the concentration of multifamily housing is much higher than the national average, and these buildings account for 30-40% or more of the total building-sector emissions[6, 7]. This combination of high density, large aggregate energy use, and jurisdictional regulatory focus makes the multifamily sector a critical locus of urban decarbonization efforts.

For multifamily developers, owners and managers, these evolving standards can be complicated to navigate. Complying with the standards could require early-stage integration of high-performance envelope design, electrified heating, ventilation, and air conditioning (HVAC) systems, and energy modeling during the pre-development and development phases. For existing buildings, BPS mandates may accelerate the timeline for capital-intensive retrofits, demand-side management upgrades, and the integration of on-site renewables or grid-interactive technologies. However, an unintended effect of BPS is the delay of such improvements; in some cities, routine upgrades can trigger compliance with new BPS, thus disincentivizing potentially efficiency-boosting improvement projects that would otherwise have been completed. In certain markets, noncompliance can translate into asset value obsolescence, higher financing costs, or landlord-tenant tensions, particularly for long-hold assets or regulated affordable housing.

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[6] See: City of New York. 2023. *New York City Greenhouse Gas Inventory 2021*. Mayor's Office of Climate & Environmental Justice. https://climate.cityofnewyork.us/initiatives/nyc-ghg-inventory/
City of Boston. 2023. *Greenhouse Gas Emissions Inventory 2005–2021*. Environment Department. https://www.boston.gov/sites/default/files/file/2023/12/2005-2021 City of Boston Greenhouse Gas Emissions Inventory.pdf
District Department of Energy & Environment (DOEE). 2023. *District of Columbia Greenhouse Gas Inventories*. https://doee.dc.gov/service/greenhouse-gas-inventories
City of Seattle Office of Sustainability & Environment. 2021. *Seattle 2019 Building Emissions Performance*. https://greenspace.seattle.gov/2020/12/2019-building-performance-data-published/

[7] City of Los Angeles, Los Angeles Sanitation & Environment (LASAN). 2024. 2022 Community Greenhouse Gas (GHG) Inventory Report. City of Los Angeles. https://cityclerk.lacity.org/onlinedocs/2022/22-1402_misc_6-3-25.pdf

This study analyzes the perceptions and experiences of multifamily developers, investors and managers of municipal energy efficiency mandates and BPS. Through interviews with executives in representative apartment companies across the U.S., we identify key compliance challenges, cost and operational implications, and strategic considerations. The objective of this paper is two-fold. First, the study intends to summarize the barriers and enablers of compliance with energy efficiency mandates. Second, the work aims to equip developers, asset managers, and owners with actionable insights for aligning project delivery, asset and portfolio management with increasingly stringent energy performance standards, while balancing financial performance, affordability considerations, and long-term asset resilience.

2. Literature Review

Building Regulations, Energy Efficiency Policy, and Building Performance Standards

Building regulations in the U.S. emerged as a response to public health and safety concerns. Early codes were legal instruments designed to ensure minimum standards of structural soundness, sanitation, fire safety, and habitability (Chauvin et al., 2016; Meacham et al., 2005).

Nineteenth-century reformers treated unhealthy indoor environments as a public health threat, by making ventilation a central focus of early building standards. Health-based ventilation requirements were widely codified by the 1920s (Allen, 2024; LaFay and Sampson, 2024). Major disasters also catalyzed regulatory reforms: for example, the 1911 Triangle Shirtwaist Factory fire in Manhattan, U.S., contributed to updates in fire egress, sprinkler mandates, and workplace safety provisions (Nikolaou and Gilsanz, 2016). Over time, the focus of building codes has extended from safeguarding occupants against immediate hazards to addressing broader societal risks. Since the late twentieth century, the primary motivation for regulatory updates has increasingly been climate mitigation and energy conservation (Carmichael et al., 2020).

Energy efficiency policies are now a central component of environmental and climate governance, which offer pathways to reduce energy use and greenhouse gas emissions. Regulatory tools, including energy codes and BPS, are mandatory administrative instruments that set enforceable performance requirements (Brown, 2015; Lee and Yik, 2004). Traditional building energy codes, such as the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90-75 and the International Energy Conservation Code, emerged in the 1970s during the global oil crisis. These codes primarily apply to new construction and major renovations, which rely on prescriptive requirements, such as equipment efficiency (Edelson and Cheslak, 2021; Rosenberg et al., 2016). By contrast, BPS establish outcome-

based performance thresholds for existing buildings, including energy use or carbon intensity limits, and are often enforced on fixed compliance cycles with escalating stringency and penalties for non-compliance (Duer-Balkind et al., 2024). Since only a small percentage of commercial buildings undergo retrofits annually in business-as-usual scenarios, BPS are considered to be critical for accelerating retrofit activity at the scale required for decarbonization (Berzolla et al., 2023). Nadel and Hinge (2020) suggest that a substantial share of the 2050 U.S. housing stock already exists, with about 67% built in 2019 or earlier, thus highlighting that retrofits are essential for meeting climate goals.

Energy regulation in the U.S. is characterized by decentralized authority, which produces substantial variation across states and cities. Federal laws such as the 1975 Energy Policy and Conservation Act and the Energy Policy Act of 1992 established the role of the Department of Energy in developing model codes, while adoption remains state-determined (Sun et al., 2016). Even after the American Recovery and Reinvestment Act of 2009 incentivized the adoption of ASHRAE 90.1-2007 or equivalent codes, states retained discretion over enforcement and stringency (Shen et al., 2016). Local governments now lead the proliferation of BPS, with more than a dozen jurisdictions adopting mandatory standards to meet climate and decarbonization goals (Duer-Balkind et al., 2024; Edelson and Cheslak, 2021).

BPS policies vary across cities. Some jurisdictions use site or source energy intensity (e.g., D.C.) as measurement, while others use carbon intensity (e.g., New York City)(Nadel and Hinge, 2020) . In terms of phasing and compliance cycles, cities typically phase in requirements starting with large buildings, and BPS are often subject to periodic tightening to pursue long-term goals (Nadel and Hinge, 2020). Multiple pathways coexist. D.C. allows performance, prescriptive, and alternative compliance options, while New York City is an example of penalty-based alternatives (Nadel and Hinge, 2020). At the same time, cities increasingly incorporate equity-focused assistance programs. For example, the Affordable Housing Retrofit Accelerator and DC Sustainable Energy Utility (DCSEU) incentives of D.C. target under-resourced buildings (DCSEU 2026). These variations illustrate the highly localized nature of building energy governance in the U.S., where cities adapt BPS frameworks to local political, economic, and equity considerations while pursuing shared goals of climate mitigation and improved building performance.

Estimates and Outlook of Decarbonization Investments

The financial costs associated with BPS and energy efficiency measures vary widely, from modest residential upgrades to large-scale commercial retrofits and system-wide enforcement costs. Deep energy retrofits of all U.S. single-family homes are estimated to require roughly $240 billion at current costs (De Simone et al., 2025; Reinhart et al., 2021), with individual household investments ranging from $500 to $50,000 (Berzolla et al., 2023). Walker et al.

(2022) compile data on the total gross costs of more than 1,500 energy upgrade projects across the U.S., and find that project costs can exceed $100,000. At the policy level, Duer-Balkind et al. (2024) survey service providers, consulting engineers, and city staff (in New York City, St. Louis, Denver, Boston, and Washington, D.C.) and estimate that BPS-driven retrofit investments typically range from $10-$20 per square foot, with unit investment costs translating to $0.46-$0.63 per kBtu in annual energy savings. On the returns side, evidence for the value of energy efficiency upgrades in existing buildings remains limited. One relevant piece of evidence comes from new construction: Muzio et al. (2025) compare sales prices of single-family properties constructed before and after the Stretch Energy Code was adopted in Massachusetts from 2005 to 2021 and estimated an overall 8.8% increase in sales prices associated with the adoption of the code, thus reflecting both the value premium of improved energy efficiency and reduced housing supply that results from more stringent code requirements.

BPS also involves additional economic considerations. Non-compliance fees, such as $268/tCO$_2$e/year in New York City, $256/tCO$_2$e/year in Vancouver (Canada), and $234/tCO$_2$e/year in Boston, are deliberately set above the expected cost of retrofitting to ensure that non-compliance is the more expensive option (Nadel and Hinge 2020). Enforcement costs can be comparatively small, which average $50-$200 per home and $61-$1,000 per commercial building, with nationwide 90% energy code compliance estimated to require $810 million annually (Vine et al., 2017).

Akimoto et al. (2012) project that marginal abatement costs (MACs) are expected to grow by roughly 2.7% annually between 2020 and 2030, which would increase a $50/tCO$_2$e cost in 2020 to about $65/tCO$_2$e in 2030; stabilizing atmospheric concentrations at 450 ppm CO$_2$e would require an estimated $70/tCO$_2$e carbon price by 2030 (Akimoto et al., 2012). Another more recent model indicates that achieving mid-century net-zero emissions may yield net positive macroeconomic outcomes. Global abatement costs in 2050 are projected to range from -0.7% to -1.4% of the gross domestic product, with a median of -1.1%, thus reflecting net savings from avoided fossil fuel use and technological improvements (Keys and Mulder, 2025).

Overall, the literature indicates that even though the upfront costs of BPS and energy efficiency measures can be substantial, the long-term trajectory of decarbonization costs points to increasing cost-effectiveness, growing mitigation potential, and ultimately net economic benefits as economies transition toward zero-carbon building stock.

Decarbonization of Multifamily Residential Sector and Emerging Best Practices

The multifamily residential sector is a critical focus for decarbonization policy due to its scale and energy-efficiency potential. This sector also presents unique economic and equity challenges. Many jurisdictions are increasingly extending BPS and related mandates to multifamily housing, which positions the sector to the forefront of decarbonization efforts in cities such as Washington, D.C., New York City, St. Louis, and Reno (Duer-Balkind et al., 2024; Nadel and Hinge, 2020). As of 2024, more than one-third of U.S. households are renters (Joint Center for Housing Studies of Harvard University, 2024), nearly half of whom are cost-burdened, and spend more than 30% of their income on housing (United States Census Bureau, 2024). Understanding how BPS policies influence the operations of multifamily property owners and managers, as well as the relationships among owners, managers, and renters, is therefore essential. Moreover, the inherently higher energy efficiency potential of dense multifamily development relative to single-family homes (Rosenberg et al., 2016) underscores the importance of the sector in achieving large-scale emissions reductions.

Yet the multifamily rental market faces several persistent barriers. The split-incentive problem, where landlords fund capital upgrades but tenants pay utility bills, could significantly weaken owner motivation to invest in energy efficiency (Kontokosta, 2016). Renter-occupied units are also routinely (e.g., 25% of buildings that were renter-occupied in Oshkosh, WI) excluded from existing incentive structures, which leaves many necessary upgrades unfunded (De Simone et al., 2025). Additional challenges include potential impacts on rental affordability as stricter standards increase construction costs (Bartram, 2019; McFarlane et al., 2021), potential health risks such as excess cold, heat, dampness, mold, and inadequate ventilation associated with tighter building envelopes (Carmichael et al., 2020; Foroushani et al., 2022), and the coordination difficulties inherent in multi-owner or multi-tenant decision-making. Together, these factors underscore why the multifamily sector requires tailored policy approaches and sustained empirical attention.

Several policy approaches have emerged as leading practices for addressing decarbonization barriers in the multifamily sector while safeguarding affordability and health. First, urban building energy modeling tools enable cities to simulate retrofit scenarios and evaluate sector-wide decarbonization strategies, thus producing comparative insights across building archetypes and household demographics to inform policy design (Ang et al., 2020; De Simone et al., 2025). Second, rental-focused performance requirements, such as the SmartRegs program of the City of Boulder (2026) in Colorado, may have potential to address the split incentive by mandating minimum energy performance in rental units.

Additionally, many jurisdictions that implement BPS also incorporate equity-adjusted compliance pathways. Nadel and Hinge (2020) document mechanisms such as extended compliance timelines for affordable housing (e.g., Washington, D.C., and St. Louis) and alternative or prescriptive compliance options, including exemptions for units that are participating in the weatherization assistance programs (Boulder) and reduced requirements for rent-regulated buildings under LL97 (New York City). Furthermore, a systems-based approach that integrates energy efficiency with indoor environmental quality is increasingly emphasized to avoid unintended health consequences. The CIBSE Guide A: Environmental Design is a notable example, by offering health-centered design guidance and detailed methods for effective heating and ventilation system sizing (CIBSE, 2015). Taken together, these practices illustrate why the multifamily sector is essential and uniquely complex yet promising in the transition toward a low-carbon building stock.

In short, across the literature, BPS and related energy efficiency policies have emerged as central strategies for decarbonizing building stock, with growing attention to their costs, implementation pathways, and equity considerations. However, despite this expanding body of work, a critical gap remains: little is known about how BPS policies shape the day-to-day operations of multifamily property owners and managers, as well as how they influence the relationships and dynamics among renters, managers, and owners. As cities adopt and implement BPS, understanding these organizational processes and experiences is essential for evaluating policy feasibility. Addressing this gap is therefore vital for designing and assessing decarbonization policies that are not only technically effective, but also socially and economically responsive to the realities of multifamily housing.

3. Methodology and Descriptive Profile of Interviewed Firms

This paper draws on a series of semi-structured interviews conducted with multifamily real estate developers, property owners and managers, and sustainability professionals across the U.S. The participants are recruited through a partnership with the National Apartment Association (NAA). The interviewees are drawn from firms of different sizes, and in different geographies and roles within development, asset management, and sustainability teams. Each interview is approximately 60 minutes in length. The interviews follow a standardized guide developed by the research team, and cover four thematic areas: (1) the impact of BPS on energy efficiency and cost structures, (2) effects on property pricing and rent levels, and implications for housing affordability, (3) landlord-tenant cost-sharing dynamics, and (4) the feasibility and challenges of compliance strategies.

All of the interviewees provided informed verbal consent to participate in the research (MIT Committee on the Use of Humans as Experimental Subjects, Protocol E-6307). The interviews were recorded and transcribed, and all personally identifiable information was removed. The transcripts were then coded in EthNote, a qualitative analysis platform, according to both the thematic and analytical codes. The thematic codes were derived from the interview protocol, while analytical codes emerged inductively from the data. This approach allowed us to identify recurring patterns across firms and markets, as well as surface tensions and trade-offs in compliance strategy, financial decision-making, and tenant engagement.

The interviews were conducted between February and June 2025 by the co-authors of this paper. The participants were recruited through outreach to members of the NAA. We initially contacted 26 firms that represent a range of geographic regions and market segments, and 13 firms agreed to participate after one or more follow-up invitations. This sampling strategy is designed to ensure variation in portfolio size, regulatory exposure, and sustainability engagement, rather than to obtain a statistically perfect representative sample of the entire multifamily sector. As with most qualitative studies, participation is voluntary, and respondents may differ systematically from non-respondents, for example, in their familiarity with energy regulations or their internal organizational capacity. We therefore note these potential sources of self-selection bias while emphasizing that the sample nonetheless reflects a diverse cross-section of multifamily owners, developers, and managers operating under different regulatory and market conditions.

Our analysis is thus based on the interviews with professionals from the 13 multifamily real estate firms with their headquarters based in the U.S. While individual interviewees hold different roles, they represent firms that own or manage apartment portfolios which range from several hundred to tens of thousands of units. The sample includes a diverse mix of operational scales, market segments, and sustainability orientations, thus offering a well-rounded view of how the industry navigates emerging energy mandates.

In terms of geographic and operational scopes, the sample consists of 1 international firm, 7 national firms, and 5 regional firms; see Figure 1. The national and international firms operate across multiple states or countries, often managing portfolios that span both high- and low-regulation environments. The single international firm operates globally but contributes to insights based on its U.S. portfolio. In contrast, the 5 regional firms are concentrated in specific U.S. metro areas or states, and based in New Jersey, California, Texas, Pennsylvania, and Illinois. This geographic spread ensures a variety of regulatory contexts, with both high-regulation (“blue-state”, i.e., those who typically vote Democratic in presidential elections) and low-regulation (“red-state”, i.e., those who typically vote Republican) markets represented.

Figure 1 Operational Scope of Interviewed Firms



Sustainability commitment varies across the sample. Based on information available from the website of the involved companies (Figure 2), 8 of the 13 firms (62%) are known to participate in some form of energy and sustainability initiative. The remaining 5 firms (38%) show no evident involvement in such initiatives, at least publicly. Three (3) of those 5 firms are regional ones in the low-regulation markets.

The market segment focus also spans a spectrum (Figure 3). Five (5) of the 13 firms (38%) primarily serve the luxury, or Class A segment, with properties offering high-end amenities and finishes. The rest manage a mix of market-rate, workforce, or affordable apartments (2 firms actively operate affordable units). All of the luxury apartment companies have known green building practices and the majority (80%) have participated in some kind of climate or sustainability initiatives, while this share is much lower for the non-luxury group (60% for non-luxury companies, and 50% for those who operate affordable units).

Figure 2 **Participation in Energy and Sustainability Initiatives by Firm Type**

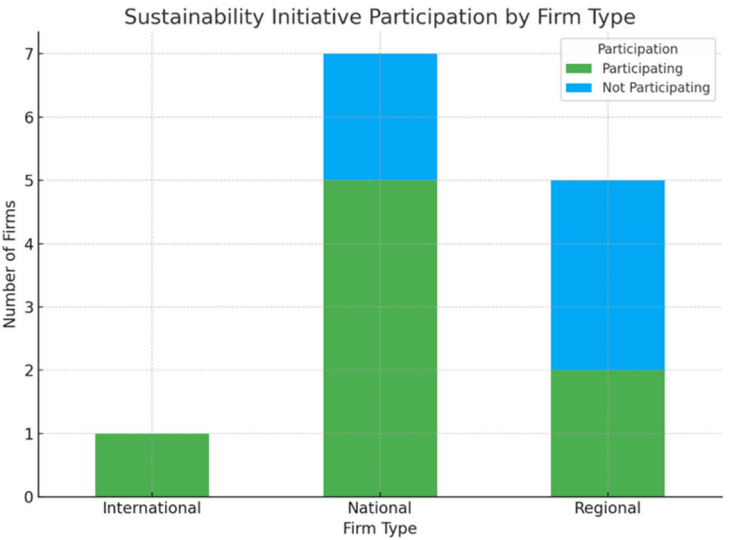
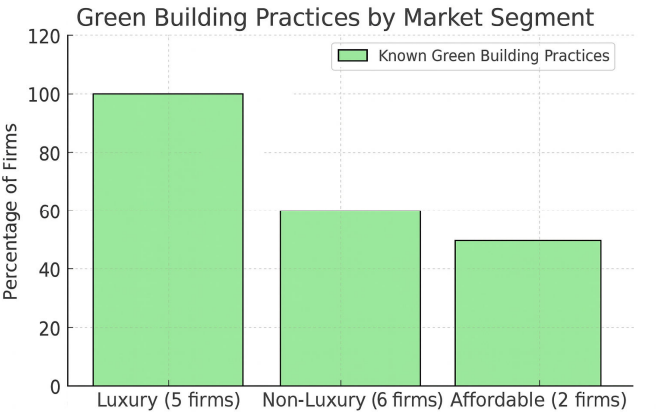


Figure 3 **Adoption of Green Building Practices by Market Segment**



Finally, the interviewees are in a range of senior roles, such as senior or executive vice presidents of investment or operations, managing directors, asset management and sustainability leads, which means that their perspectives reflect both strategic-level decision-making and implementation realities.

Together, these 13 apartment firms reflect a cross-section of the multifamily sector in the U.S.: international, national and regional; large and small; and luxury, market-rate and affordable segments. This diversity allows us to capture

a wide spectrum of regulatory exposure, investment strategies, and operational challenges under emerging BPS policies. While the sample is not intended to be statistically and perfectly representative of the entire multifamily industry, its composition ensures that major ownership and management models, market contexts, and sustainability orientations are all present. As such, the findings reflect common patterns and tensions that arise across different types of firms, thus providing meaningful insights into how the sector as a whole is navigating new decarbonization mandates.

4. Major Findings from Interviews

General Attitudes towards BPS

When asked whether BPS are well-designed or appropriate for the current multifamily real estate market, most of the respondents raised critical concerns, but the intensity and nature of these critiques vary based on firm type and prior sustainability engagement.

Among the 7 firms that addressed this issue, 4 voiced strong and unambiguous opposition to BPS. These included all 3 regional firms as well as the 1 national firm. Their critiques are rooted in the view that BPS are mainly politically driven, economically misaligned, and operationally costly. Several described that the policies are designed with limited consideration for cost realities or housing supply constraints. These respondents warned of a chilling effect on capital investment in housing, and noted that uncertainty around compliance requirements discourages both new development and acquisition of existing properties, especially when expected retrofit costs are high and future potential penalties are unclear.

The other 3 firms, which comprise 1 international and 2 national firms, offered more nuanced responses. The international firm, which operates in the luxury segment and is committed to a sustainability initiative, viewed BPS as "well-intentioned" but potentially overreaching or poorly implemented. Rather than outright rejection, their comments focused on how fast the rules are rolled out, whether they reflect building-level complexity, and how effectively incentives are aligned. Similarly, the 2 national firms that participate in sustainability initiatives called for stronger analytical support, more data to justify performance thresholds, and better industry engagement. This contrast suggests an interesting pattern: firms already involved in sustainability efforts may be less likely to reject BPS outright. Instead, they tend to critique the design, timing, or data infrastructure, rather than the foundational goals. In contrast, the rest of the firms are more likely to view BPS as externally imposed mandates that destabilize capital planning and exacerbate cost pressures without clear returns.

Investment Decision-Making under BPS

When investing in an asset, there are many factors that need to be considered, but ultimately the interviewees noted that the decision comes down to the "bottom line" – the financial cost-benefit tradeoff or profitability. When considering the implications of energy efficiency mandates and codes, upfront investment and return on investment (ROI) are the most relevant factors. There are other parallel considerations such as timing of tenant turnover and equipment replacement, as well as asset appreciation and disruptions to operation.

Emphasizing Asset Value Over Operational Savings

Many of the multifamily firms noted that their investment decisions are driven more by the desire to maintain or increase long-term asset value than by expectations of recouping direct utility savings or rent premiums in the short-run. Energy efficiency measures are often viewed as part of broader capital planning and risk management strategies. For example, one interviewee noted:

"*If I can reduce those expenses, my NOI improves, and therefore the asset value can improve, and that's a key component that my industry has finally started doing lately, talking about not just the NOI, but actually the asset and the asset value. I mean, like, if I do a solar project on a building, it does more than just reduce the cost of electricity; it increases the NOI. When I further consider the cap[ital] rate, it just increases the value of the property.*"

Additionally, several participants indicated that while they may implement minor changes to meet immediate compliance targets, and avoid fines associated with noncompliance, more substantial upgrades require long-term capital investment and strategic alignment with asset holding periods. Such major investment decisions resemble those that firms have previously made in response to disruptive social and economic shocks, such as the COVID-19 pandemic or financial crises. It is an investment in something that is inevitable, but requires careful planning with a long-term view.

Leveraging Financial Incentives and Support Programs

To implement costly energy efficiency upgrades across properties, many of the multifamily firms choose to take advantage of financial incentives such as rebates or subsidies to mitigate the cost pressure of such upgrades. The interviewees consistently expressed a strong interest in, and an appreciation for, financial support tools such as green loans, rebate programs, and energy auditing aids, especially those that could reduce capital costs or improve project cash flow. Specifically, several state rebates were highlighted as effective cost and energy saving measures. The Massachusetts MassSAVE program was noted as a key way of implementing light-emitting diode lighting and programmable thermostats, and other energy efficiency measures that help to

reduce costs. In New Jersey, one interviewee highlighted a rebate in the New Jersey Clean Energy Program which they used to install high efficiency boilers. The New Jersey's Pay for Performance program was also noted as an important program for incentivizing investment in holistic energy consumption reduction of buildings. However, overall, there are geographic and temporal limitations for which programs are effective for multifamily firms. For instance, the rebate programs mentioned tend to be state specific, and funding and application requirements change from year to year. Additionally, as one interviewee noted, the needs of different assets sometimes do not align with the available rebates or tax incentives, which compel firms to find other ways to make upgrades.

"*...a lot of times you need upgrades to your electrical systems, your transformers, and all that to install them, because of the additional load. It's super cost prohibitive to do those parts of the upgrade and the rebates don't, or the tax credits don't help you with those, but in some cases, those have been really necessary, and we would add them nevertheless.*"

It is important to also note that programs backed by institutions like Fannie Mae and Freddie Mac were mentioned as being attractive, although not universally accessible.

Syncing Retrofits with Capital Cycles and Financial Logic

The way that investors are making decisions is influenced by the timing and cycles of making capital investments, which often plays into the co-purpose of meeting energy efficiency mandates. Retrofits and upgrades are often initiated not merely in response to mandates, but at times when existing systems are at the end of their useful life or when financial benefits are clear. One interviewee noted that when upgrades are not made in response to mandates, but made when systems fail and need to be replaced, there is a sense of urgency and energy efficiency is clearly not the priority. Instead, the fastest and often cheapest systems are installed for the time-sensitivity and convenience of the tenant.

However, when there is more time to consider multiple goals, some firms emphasize that their decision-making reflects short-term needs, as well as life-cycle costing and long-term performance considerations, particularly for durable components, such as the façade, insulation and HVAC systems, windows and stoves, which are intended to hold over multiple decades. Many of the interviewees saw this decision-making strategy as a way to add value to the properties while also reducing risk in the long run. Such improvements can reduce overall building energy costs and improve the asset value and ROI in the long term.

Finally, while not associated with obsolescence and capital investment cycles, some of the firms took other temporal considerations into account when making upgrades to their properties. Some firms described how they timed upgrades to the ebbs and flows of tenant turnover. This general trend was best described by

one interviewee who stated that in general, unit renovation and upgrades at the smaller scale happen at turnover, or between when tenants move out and new tenants move in. However, larger scale upgrades are happening on an as-needed basis.

"The idea of in-unit renovation is more of an affordable housing concept. And we manage a lot of affordable housing in our approach. So if it's a unit renovation, we're doing it at turnover you know, unless the system is down, and then it's being done as needed. Like, generally, a lot of these, you know, upgrades, especially at the smaller scale, are happening at turnover…when tenants are moving in and out."

Cost Pressure and Disruption to Operation

Energy efficiency mandates have had an unintentional, yet consequential shift in property pricing dynamics. The interviewees reported that BPS influence how projects are priced, financed, and acquired and disposed. In acquisition settings, firms often discount property values to account for pending retrofit obligations and expected future capital expenditure. According to one respondent,

"One of the things we do gracefully when we buy buildings is, we look at the efficiency. We do an ASHRAE level 2 energy audit, basically, review of the property to understand: what are the implications? Is this efficient? What condition is the equipment in? And I'm seeing more and more of the questions coming in from investors around, you know. Are we looking into the cost consequences of these laws on these buildings? Absolutely, and I'm going to discount the building by that. So if I'm going to go buy a building, and I need a million dollars of upgrades in order to bring it to compliance, then I'm probably going to buy the building at a discount."

At the same time, several of the participants shared that high upgrade costs and regulatory uncertainty have led firms to delay or relocate projects, particularly when faced with unclear guidance or limited incentive support. For example, one interviewee noted:

"It's just reduced [development] because of either the concern about what it will cost to comply with these standards, or just general confusion on how to comply with the standards and avoid the fines. So it definitely has a chilling effect on capital."

Another remarked,

"Just the fact that the building performance standard measure has passed has reduced capital inflow for new development and for acquisitions of existing properties."

Another interviewee had specific thoughts about how Massachusetts and the precedent of the energy efficiency mandate of Boston, BERDO, is making them consider where to build and what is feasible in this changing landscape.

"BERDO is frightening. I mean, we have…12,000 apartments in Massachusetts in across 75 locations. If we had, 75 sets of rules. I mean, forget about it…You know, we're not gonna invest here. I mean, we're here, but it will spook the whole industry."

These anecdotes demonstrate a clear frustration with the constantly changing policy landscape and the wide range and variation of different mandates that firms must comply with across the country. Many of the interviewees see compliance with the mandates as a big challenge, as the changing landscape creates cost and logistical challenges for developments and retrofits, and the lack of uniformity across mandates makes the codes difficult to meet and digest, especially from a cost perspective. Many interviewees noted that the codes do not seem to reflect the financial considerations for firms or financial reality in which these capital investments are made. The interviewees are frustrated by the fact that the codes are more aspirational than realistic, and noted that they have been written by politicians as opposed to someone who might understand the engineering and financial realities.

Landlord-Tenant Dynamics under BPS

The interviewees widely perceived that the rent-based green premium from energy efficiency upgrades is insufficient to offset the investments of landlords in BPS compliance. In the interviews, the respondents provided examples of limited willingness to pay for energy-efficient upgrades among tenants, and their limited awareness of these upgrades, as well as the limited experience of landlords with gaining insight into the incentives that motivate the involvement of tenants in BPS compliance.

<u>Rent Pass-Through and Tenant Willingness to Pay</u>

An emerging view among the interviewees is that while energy efficiency improvements may justify modest rent increases, the green premium attributed solely to compliance with stricter energy standards remains limited. Across multifamily market segments, the interviewees consistently reported a low premium for improved energy efficiency. While a luxury operator estimated that energy upgrades might support a modest increase: "*less than a hundred dollars*" per unit, but never enough to fully recover investment costs, an affordable housing manager put it bluntly: "*We didn't pass that cost directly onto them... Our rents are mostly limited by what people can afford*". Even among firms with green portfolios, most noted that renters often undervalue energy efficiency unless the upgrades are tied to other visible and tangible improvements. One participant from a company with early sustainability initiatives in New England reflected that, "*We've had this debate forever –*

whether it [improving energy efficiency] was worth it, and we've never proven out that a building with LEED certification gets more rents."

The interviewees linked these low green premiums to the lack of willingness of the tenants to pay for energy efficiency improvements, their low awareness of BPS, and misaligned priorities. One participant described tenants who exhibit energy-wasting behaviors, such as "*cranking up their heat*" while "*leaving windows open*". Another respondent remarked that "*the general public has not gotten quite on board yet with going completely green with their apartment or their home*". However, this lack of awareness is not necessarily equivalent to resistance; as one interviewee clarified, "*They don't know about the BPS. It's not that they're necessarily against it*". While the residents may be open to paying for energy upgrades once they fully understand the associated benefits of achieving decarbonization and sustainability goals, their current willingness to pay remains low. Even where some willingness does exist, it is often tied to direct personal benefits, such as lower utility bills or improved comfort, rather than broader public and environmental benefits, including emissions reductions.

Free-rider behavior also emerged implicitly in several interviews. Since the tenants capture the utility savings from energy upgrades while the owners bear the capital costs, each party has an incentive to wait for the other to act, thereby reinforcing underinvestment. At the market level, some firms indicated that they may postpone upgrades until regulations stabilize or incentives improve, which reflects a broader free-rider tendency documented in the energy-efficiency literature.

Engagement Efforts to Understand and Align with Tenant Priority

While the interviewees reflected on ways to involve tenants in energy efficiency efforts and BPS compliance, the most widely adopted approach is active and multifaceted engagement. A number of firms described proactive strategies to understand tenant perspectives on sustainability and identify areas where energy efficiency initiatives may intersect with tenant priorities. For example, one respondent highlighted a targeted engagement effort that involved surveys and focus groups to understand what would motivate or deter tenant support for efficiency upgrades: "*We're trying to understand: what do you feel about this? What's keeping you? What would incentivize you?*" Another interviewee described a national sustainability survey sent to approximately 2,500 residents, which assessed tenant attitudes toward climate change and sustainability priorities.

The interviewees consistently identified comfort improvements as one of the most tangible and practical entry points for tenant acceptance of energy retrofits. Several noted that energy efficiency measures, such as installing insulation in windows and replacing HVAC systems, can help to prevent disruptive system failures and offer residents more reliable service. One interviewee based in Florida described how proactive maintenance and replacements of HVAC

systems reduce the risk of emergency repairs and ensure that "*everybody's not working under this context of urgency for replacement*". Firms that operate affordable units also showed clear willingness to invest in energy upgrades for comfort and retention, even where financial returns are unclear: "*We insulated buildings... just to make sure the envelope is tight... I don't want people moving because they're uncomfortable*".

Transparent and proactive communication of benefits to residents is another strategy that potentially contributes to successful rent increases following energy retrofits. One participant emphasized the importance of helping tenants understand why changes are occurring: "*Being able to clearly communicate '**Why am I paying more? Why is this regulation being put into effect?' is foundational*". Another regional developer offered an experience of raising rents by 4–5% after replacing boilers with more efficient gas systems while emphasizing that occupancy remained stable because staff actively explained how the new systems improve service and the living standards of the tenants: "*So it's reflected they see it going on. So you know, we try to sell them. We're putting the money back to the units. They are seeing greater comfort levels*".

The perception of the interviewees is that tenants prioritize affordability, comfort, and reliability over environmental benefits. Energy efficiency measures are more likely to gain tenant acceptance when framed through these co-benefits. Identifying and communicating the tangible improvements associated with BPS compliance are considered to be essential for building tenant support.

Barriers to Landlords and Willingness-to-Pay of Tenants

Overall, the interviews reveal several underlying reasons why both the landlords and tenants show limited willingness to pay for energy-efficiency improvements associated with BPS. On the landlord side, the split-incentive structure of rental housing reduces the financial return to upgrades when tenants, rather than owners, benefit from lower utility bills. Firms that are operating in affordability-constrained segments also noted that narrow operating margins limit their ability to absorb additional capital costs without jeopardizing rent stability. On the tenant side, the respondents emphasized that most residents prioritize comfort, reliability, and visible unit improvements, while energy performance remains a low-salience, difficult-to-observe attribute. As a result, tenants rarely perceive direct value from upgrades unless they experience immediate improvements in indoor conditions or utility bill reductions. Together, these factors explain why willingness to pay for energy-efficiency measures remains modest, even among residents and owners who express general support for sustainability goals.

Understanding Heterogeneity across Respondents

While several themes appear consistently across the interviews, the perspectives of the respondents on BPS differ systematically in ways that reflect broader structural variation within the multifamily sector. These differences are not random; rather, they show consistency with the regulatory exposure, organizational capacity, market positioning, and prior sustainability experience of firms. Firms that operate across multiple jurisdictions, or those with dedicated sustainability staff, tend to interpret BPS through the lens of implementation challenges, such as data requirements, metric inconsistencies, or compliance timelines. In contrast, firms concentrated in low-regulation environments or with more limited internal capacity express deeper concern about the feasibility and financial implications of compliance.

Market segment also shapes how the respondents viewed BPS. Operators of Class A or luxury properties generally reported more familiarity with energy-related upgrades and perceived fewer operational barriers, whereas firms that serve workforce or affordable segments emphasized narrower margins and reduced flexibility to absorb or pass through compliance costs. These differences do not merely reflect variation in property characteristics but signal how financial structure, tenant profile, and portfolio strategy shape the practical means that firms have to respond to new mandates.

Finally, sustainability orientation emerges as an important differentiator. Firms with a history of participation in environmental, social, and governance initiatives tend to approach BPS as an extension of existing practices, whereas firms newer to sustainability work face a steeper adjustment process.

Taken together, these heterogeneity patterns highlight that responses to BPS are shaped by the interaction of regulatory context, organizational capacity, and market positioning. Recognizing these differences is essential for understanding why firms interpret the same policy framework in divergent ways and for designing support structures that accommodate the varied realities of the sector, instead of a one-size fits all solution.

Interpretation and Connection to Existing Literature

The patterns that emerge from our interviews are broadly consistent with the established literature in the energy-efficiency and housing economics, while also extending the studies by providing empirical evidence specific to the multifamily sector – a context where rigorous documentation remains limited. First, the skepticism toward BPS and the lack of willingness of tenants to pay for energy-efficiency improvements align closely with the well-known split-incentive problem in rental housing (Bird and Hernández, 2012; Gillingham et al., 2009; Murtishaw and Sathaye, 2006). This body of work demonstrates that landlords typically bear the upfront capital costs of efficiency upgrades, while tenants capture most of the utility savings, thus creating misaligned incentives

that suppress investment. Our findings offer qualitative confirmation of this mechanism in the setting of emerging performance mandates.

Second, the lack of tenant awareness of BPS and the limited valuation of energy-efficiency attributes reflect broader issues of information asymmetry and low salience documented in the literature. Previous studies show that households often undervalue energy performance because such attributes are not easily observable or comparable at the point of rental (Allcott and Greenstone, 2012; Myers, 2020; Aydin et al., 2017). Tenants tend to prioritize visible and experiential features, such as comfort, reliability, or amenity upgrades, over the abstract long-term benefits of reduced energy use. The interviews reinforce this behavioral mechanism: respondents repeatedly emphasized that comfort improvements, rather than emissions reductions, drive tenant engagement.

Third, the tendency of firms to time major energy upgrades with equipment failure, refinancing events, or scheduled capital replacement cycles aligns with existing descriptions of life-cycle investment behavior in the real estate and energy policy literature (Jaffe and Stavins, 1994; Nadel and Hinge, 2020; van der Kroft et al. 2024). These studies suggest that capital stock turnover, rather than policy signals alone, often determines when efficiency investments occur. Our findings corroborate this logic and illustrate how it shapes real-world responses to BPS.

At the same time, several insights from our study extend the existing literature. Previous studies have generally discussed the administrative and informational challenges of implementing energy regulations in broad terms (such as Gerarden et al. (2017)), but our interviews reveal how these frictions manifest concretely for multifamily owners, particularly in relation to inconsistent data access, uncertainty about compliance pathways, and concerns about policy feasibility even among sustainability-oriented firms. Moreover, the prominence of comfort as the primary driver of tenant participation highlights a behavioral dimension that has received comparatively limited empirical attention in housing markets.

Taken together, these connections show that our results both confirm key mechanisms identified in prior research and provide new empirical insight into how multifamily owners and managers navigate the emerging landscape of BPS.

5. Calling for Improvements in BPS Policies and Industry Practices

Ultimately, the energy efficiency policy landscape is complex for multifamily firms to navigate and can have serious implications for the decarbonization of multifamily properties. Without addressing these key areas, progress towards meeting BPS industry-wide will be quite challenging.

Calling for Inclusive and Technically Grounded BPS Design

Concerns with BPS did not only arise around the issue of cost, but also the issues of being technically grounded and reflective of the realities of the real estate industry. To address these issues, the interviewees called for more industry-wide collaboration and training opportunities to better understand the changing policy landscape. Energy efficiency mandates as seen today will remain an integral part of real estate practice in the U.S.. Therefore it is important to identify their probable long-term challenges and implications on the real estate industry. By identifying these challenges early on, it may be possible to get ahead of future shifts and implement adaptive best practices.

Firms also expressed frustration when BPS are developed with limited inclusivity. Some perceived that these policies as being driven more by political optics than stakeholder consensus, and felt that more robust, transparent engagement processes could lead to more feasible solutions to building decarbonization. Our interviewees are frustrated by the fact that the codes feel more aspirational than realistic, and note that the codes are written by politicians as opposed to someone who might understand the financial and technical limitations of the field.

"So once again, legislators are writing legislation without meeting all the interested parties. And they typically do that in the multifamily space."

Additionally, some of the interviewees are concerned that BPS are not congruent across different policies, thus making them difficult to meet.

"What we've really learned is that some of the building performance standards - in their very detailed aspects - are not always congruent. They tend to be disruptive to each other, and it's difficult to meet."

These limitations suggest the need for real estate professionals and building engineers to provide technical expertise and support to policy making, through more transparent engagement processes. Additionally, policy makers could establish more extensive technical assistance opportunities for multifamily firms to learn more about the mandates and express their concerns through clear channels of communication.

Addressing Perception Gap between Landlords and Tenants

The participants frequently cited a misalignment between the high capital costs of energy upgrades and lack of tenant willingness to absorb those costs through higher rents. This misalignment could be attributed to the lack of awareness of most tenants of BPS and the implications of these codes, which is a theme noted across the interviews. Property owners shared that tenants mainly expressed appreciation for co-benefits such as improved air quality and thermal comfort. For example, one interviewee shared that in a recent sustainability survey collected from their residents that indoor air quality is the number one priority of the tenants with energy efficiency closely behind.

However, these non-monetary advantages are often undervalued or insufficiently recognized in rental decisions. As a result, many firms underscored the need for continued policy incentives to offset upfront expenditures and ease the cost burden, particularly in affordability-constrained markets where rent increases are not feasible. Additionally, resident education campaigns may be an effective way of informing tenants about upcoming changes, how they can help to increase the energy efficiency of their building, and the impacts that regulatory changes may have on their energy bill. However, the biggest hurdle is determining how to incentivize residents to want to pay for these upgrades, with some interviewees estimated that only 20-30% of residents have a personal commitment to energy efficiency and a willingness to pay for the increased costs that implementing new equipment would entail. Furthermore, it is not just the residents who are skeptical about energy efficient technologies as some of the interviewees are doubtful about the transition to these sorts of technologies, thus further emphasizing the need for increased transparency and training around how certain technologies are used and the contexts in which they are best suited for use.

Strengthening Supply Chains and Workforce Readiness

Several interviewees mentioned supply chain constraints and workforce mismatch as challenges to implementing decarbonization projects. Long waiting times for high-efficiency building materials and electronic appliances, and lengthy training processes for fully equipped operators were commonly reported across the regions. For example, technological changes in refrigerant standards and electrification requirements compound the need for regular retraining of facility managers, engineers, and service providers. As one interviewee put it, “these staff need their own hands-on experience, but this needs to be coupled with training to understand how the new technologies need to be managed. Training and workforce development will require a lot of behavior changes as well as time and financial investment to make these shifts happen”. One interviewee noted: “This is a time for reeducation of the industry. There’s a need for more specialized education and training on using software to track how new energy efficient equipment is working, and there is a learning curve that needs to be addressed”.

Firms also called for broader investments in workforce development and supply chain infrastructure to enhance the feasibility of compliance at scale.

"I think that it's going to take years for the industry to change the way it behaves, and I don't like that we put a lot of effort into being actively engaged in these projects, but if that is not scalable. I can't be in every replacement, in every building, across the portfolio. I think that ultimately changes in our supply chain management and technology and what is permitted to be purchased will have to be encoded there."

These scalable investments will help with the compliance of energy efficiency mandates in the long-term and develop a workforce which is more aware of emerging technologies and best practices needed to comply with these policies. It is important to highlight the impacts of BPS on the supply chain, and their pressure on developers, investors, maintenance professionals and building operators. While it may be difficult to scale effectively as the regulatory goal post continues to move and technologies keep changing and improving, thus requiring more investment and more specialized training and education, it is critical to have increased investment in supply chain management for long-term energy efficiency.

Improving Data Transparency and Energy Efficiency Measurement Tools

Many of the participants noted that tracking and quantifying the performance of energy efficiency investments remain difficult, particularly in tenant-controlled units. Residents usually pay their own bills with owners only paying for utilities of common spaces in the building. Owners often lack access to breakdowns of whole-building utility data, which make it challenging to measure actual impact or validate financial returns. As one interviewee noted:

"Typically tenants directly contract with the electric and gas companies. So they're paying their own bills, and their bill is directly driven by their usage."

This data gap undermines the case for investment and complicates the justification of sustainability measures to internal stakeholders or capital partners. Some interviewees have found ways around this such as sub-metering, using ENERGY STAR Portfolio Manager, or working closely with a utility provider to obtain the relevant data. The respondents expressed the need for standardized tools and shared data systems to improve transparency, streamline reporting, and build confidence in long-term energy savings.

The participants also pointed to systemic barriers in accessing the data needed for compliance and decision-making. Several firms noted that collective industry efforts may be more effective in negotiating data-sharing agreements with utilities than piecemeal, firm-by-firm approaches. A push towards collective efforts could change how data are shared and lead to a more even-

handed approach to gathering and using data. An interviewee who noted the success that could come from working collaboratively stated:

"We're going to be more successful at getting that utility data when we as an industry approach utility companies together, than, if just [one person] is asking for it right? If it's all the properties in Boston asking [the City of] *Boston for it, we're gonna be more likely to get it, than just hey, [I] want it."*

6. Conclusion

As cities set their climate goals, BPS have emerged as a key policy tool for reducing emissions from the built environment. However, for the multifamily sector which is operating at the intersection of residential and commercial real estate, compliance is rarely straightforward. This paper draws on interviews with 13 multifamily real estate firms to discuss the frictions, tradeoffs, and structural misalignments that shape how apartment owners and managers respond to energy mandates in practice.

Across market segments and geographies, the firms in this study consistently emphasize that compliance is not a matter of resistance but of feasibility and their business bottom line. While many firms support the goals of emissions reduction and are already investing in energy upgrades where the economics align, they are navigating policies under real constraints: fragmented local rules, unclear performance targets, inconsistent incentives, and limited technical support. Most of the investment activity occurs when upgrades coincide with capital cycles or asset repositioning; mandates that ignore these rhythms risk delaying investment or triggering unintended market distortions, especially in affordability-constrained segments.

Tenant dynamics add another layer of complexity. The interviewees report widespread tenant indifference to building energy performance and reluctance to pay higher rents to cover BPS compliance costs. Energy efficiency co-benefits such as comfort, reliability, and air quality are more persuasive to residents, but rarely sufficient to justify the full scope of upfront upgrade costs. In response, these firms are increasingly adopting proactive engagement strategies to align energy efficiency initiatives with tenant priorities and build support for long-term retrofit goals.

Looking forward, our research calls for BPS policies and practices that are technically sound, operationally grounded, and financially viable. Incentives, rebates, and loan opportunities, particularly programs and policies that are consistent and available across all states, may be key to financial viability. There is a strong need for clearer metrics, reliable incentives, consistent data access, and broader workforce and proactive tenant engagement. Multifamily housing is a critical area for integrated climate and housing policy, where the

stakes extend beyond emissions to housing opportunity and affordability, capital flows, and public trust. Meeting this challenge will require not just regulatory pressure, but alignment between policy design and building economics, environmental and social goals, and capital markets and tenant realities.

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