From Compliance to Performance: Bridging the Lifecycle Discontinuity in Building Policy

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ABSTRACT

Energy codes and building performance policies, such as building performance standards (BPS), share a common objective: improving building energy performance while supporting broader climate and affordability goals. Codes establish minimum standards for the design and construction of new buildings, additions and significant alterations, while building performance policies target the measured performance of existing buildings absent any building permit activity. In principle, these policies should function as components of a continuous regulatory system governing building performance across the building lifecycle. In practice, however, they remain siloed in separate institutional structures with different metrics, compliance pathways, and enforcement mechanisms.

This paper argues that misalignment between energy codes and building performance policies arises primarily from a structural break at occupancy—a lifecycle discontinuity in which policy design, governance, and compliance responsibility all shift. This discontinuity limits the ability of construction-phase requirements to reliably translate into operational outcomes. Without mechanisms connecting these phases, buildings that comply with code may nevertheless struggle to meet future operational requirements once occupied.

Drawing on prior research and new case studies from Massachusetts, New York, and Virginia, this paper identifies three policy interventions that strengthen continuity across the occupancy threshold: (1) designing codes around future operational objectives, (2) maintaining accountability through the occupancy transition using complementary policies, and (3) using compliance modeling to evaluate readiness to meet future operational requirements.

Together, these interventions reduce the lifecycle discontinuity at occupancy and reposition energy codes as the first component of a continuous regulatory system.

Introduction

For decades, jurisdictions have looked to building energy codes to regulate and manage energy use in buildings based on how they are constructed and renovated. More recently, jurisdictions have turned to building performance policies like building performance standards (BPS) to regulate the energy use and emissions of existing buildings (Nadel and Hinge 2023). Building energy codes govern how newly built and renovated buildings are designed and constructed to use energy, while BPS require certain sizes and types of existing buildings to achieve quantified standards of measured building energy and/or emissions performance by specific deadlines (IMT 2025). In principle, these policies should function as components of a continuous regulatory system governing building performance across the building lifecycle. In practice, however, they are typically developed and implemented as disconnected policies.

Ideally, buildings constructed to code should enter operation prepared to meet performance expectations arising from building performance standards, climate commitments, resilience objectives, or other policy goals throughout their service lives. In reality, buildings that fully comply with the energy code at construction may fail to satisfy those future performance requirements within only a few years of occupancy, triggering costly retrofits, electrical grid impacts, risk of stranded assets, and policy pushback (Boyce, Cheslak, and Edelson 2022, Cheslak et al. 2024). This misalignment undermines energy savings projections, increases costs for building owners and cities, and limits progress toward climate and affordability objectives.

Prior research has identified differences in policy design and siloed implementation processes as drivers of this disconnect (ACEEE 2025). This paper identifies a deeper structural cause at work. The transition from unoccupied to occupied building represents a regulatory discontinuity in the building lifecycle: a point at which code authority ends and responsibility for achieving performance goals begins. Energy codes regulate design compliance, while building performance policies like BPS regulate measured building performance, but no mechanisms ensure that compliance with design requirements translates into operational outcomes. Although many jurisdictions still have weak or poorly enforced codes, even stringent, well-enforced energy codes are structurally bounded at occupancy, creating gaps in policy design, governance, and compliance responsibility, as discussed below. As a result, buildings can meet code requirements on paper yet still fail to achieve energy, climate, and affordability goals.

This paper argues that energy codes should no longer be viewed solely as construction regulations, but as the first component of a continuous regulatory system for building performance that connects design requirements with building performance across the building lifecycle. It identifies three policy interventions needed to support that transition: (1) designing codes around future operational objectives, (2) maintaining accountability through the occupancy transition, and (3) orienting compliance modeling toward future performance goals.

The Lifecycle Discontinuity in Building Policy

To understand the lifecycle discontinuity, it is useful to examine the relationship between energy codes and BPS, an increasingly common building performance policy in the United States. Although energy codes and BPS regulate different phases of the building lifecycle, they should ideally function as sequential elements of a coordinated policy system. Instead, they currently regulate buildings in fundamentally different ways, with different performance metrics, compliance processes, responsible parties, and regulatory authority. Table 1 highlights several key differences between traditional energy codes and BPS that contribute to the lifecycle discontinuity (ACEEE 2025; IMT 2025).

Table 1. Key differences between traditional energy codes and BPS

	Building Energy Codes	BPS
Buildings covered	New buildings, additions, and major renovations	Existing buildings meeting policy thresholds, typically based on size and building type
Scope	Pre-occupancy design and construction	Post-occupancy operational performance
Compliance trigger	Permit application	Recurring compliance deadlines
Compliance verification	Plan review, inspections, and/or energy modeling	Metered utility data
Duration	One-time, at time of permitting	Ongoing, with regular reporting
Compliance responsibility	Design and construction teams	Building owners
Consequences of non-compliance	Delayed or denied permits and certificates of occupancy	Fines or fees and public disclosure of non-compliance

The regulatory boundary between energy codes and building performance policies occurs at building occupancy. When a certificate of occupancy is issued, authority under the energy code ends and responsibility shifts to performance policies, such as benchmarking requirements and building performance standards. This transition defines the lifecycle discontinuity examined in this paper: the point at which construction-phase compliance ends and operational performance begins.

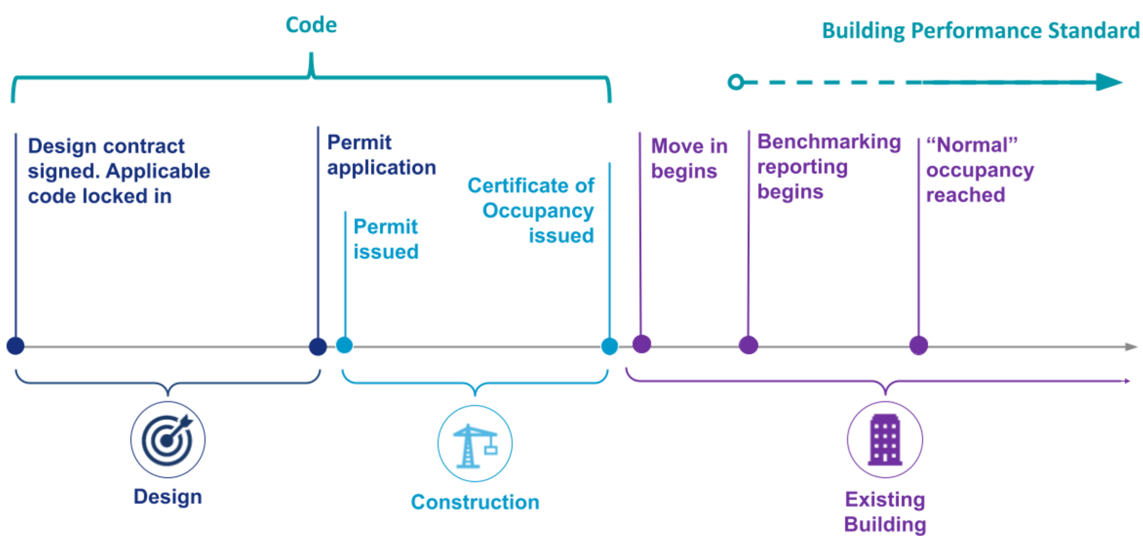

Figure 1. Typical timeline of building design, construction, and operation, showing the gap between code and BPS authority. Source: Duer-Balkind and Sharrow 2024.

Before occupancy, energy codes govern design and construction through plan reviews, inspections, and compliance modeling. After occupancy, performance policies evaluate measured building performance, such as metered energy use (or by extrapolation greenhouse gas emissions), and hold building owners accountable for achieving specified outcomes. The transition at occupancy involves three simultaneous shifts: from predicted performance to measured performance, from design and construction teams to building owners, and from building departments to agencies responsible for performance policies. These shifts represent fundamental changes in how buildings are regulated.

The discontinuity at occupancy has three major dimensions: policy design, governance and authority, and compliance responsibility. Distinguishing among these dimensions is critical because each presents different opportunities to improve continuity across the occupancy transition.

Table 2: Aspects of the discontinuity at occupancy

Discontinuity Dimension	Before Occupancy	After Occupancy
Policy design	Energy codes	Building performance policies
Governance & Authority	State, county and municipal departments implementing the energy code	City or state departments implementing a building performance policy
Compliance responsibility	Developers and design teams	Building owners and managers

Policy design. The first dimension of the discontinuity is the way the policies themselves are structured. Energy codes regulate how buildings are designed and constructed, while performance policies regulate how buildings actually perform once occupied. These policies evolved from different policy traditions. Energy codes originated as construction regulations within the broader building code framework and continue to be developed through model code consensus processes before adoption and amendment by states and jurisdictions. By contrast, building performance policies emerged through state and local legislative and regulatory processes to address the measured energy use and emissions of existing buildings. Because these policies have historically been developed independently, construction requirements are rarely calibrated to the outcomes buildings will ultimately be required to achieve. This policy design disconnect is the primary focus of this paper because, unlike governance or ownership structures, it can be addressed directly through policy development.

Governance. The pre- and post-occupancy phases are often governed by different agencies and legal authorities, with responsibilities established in law and therefore difficult to change. In some jurisdictions, this governance disconnect is structural. For example, energy codes are often adopted at the state level, while BPS policies have historically been adopted and enforced by cities, though statewide BPS are becoming more common. Even where the same jurisdiction is responsible for both policies, energy codes and BPS are frequently administered by different departments that have distinct objectives, regulatory processes, and data systems, with staff required to have different skill sets. Among the 16 jurisdictions in the United States where a BPS is in place, only two—New York City and the City of St. Louis—administer both the energy code and BPS within the same department. In the remaining 14 jurisdictions, responsibility is divided either between state and local governments or among different departments within the same government, with BPS implementation commonly assigned to energy, environmental, or sustainability agencies.

This governance discontinuity is not accidental. Legislators often assign responsibility for energy codes and building performance policies to different agencies because the policies historically serve different purposes and require different regulatory approaches. Energy codes naturally reside alongside other building codes within building departments, while benchmarking and BPS are often administered by energy, sustainability, or environmental agencies because they are viewed primarily as energy management or emissions reduction policies. Likewise, building departments primarily respond to permit applications and certificates of occupancy initiated by developers seeking approval. By contrast, benchmarking and BPS require ongoing reporting and proactive enforcement because building owners have little incentive to voluntarily report noncompliance.

Compliance responsibility. Compliance responsibility also shifts at occupancy—from developers and their design teams during construction to building owners and managers during operation. This transition reflects the underlying structure of the real estate market and is largely outside the control of policymakers. The responsibility discontinuity can be partially bridged through contract language and liability protections, but these approaches remain uncommon and fall outside the scope of this paper (Building Innovation Hub 2021; Duer-Balkind, Koolbeck, and Kelley 2025).

Because governance structure and ownership transitions are largely fixed, the most practical opportunity to reduce the discontinuity lies in policy design. The remainder of this paper therefore focuses on interventions that better connect construction-phase requirements with operational performance at the policy design level, while recognizing that governance and ownership transitions will continue to exist.

Implications of the Lifecycle Discontinuity

The lifecycle discontinuity has important consequences for building policy. At the building level, it increases retrofit risk and lifecycle costs by allowing newly constructed buildings to enter operation without being prepared to satisfy future performance requirements. At the governance level, it creates uncertainty around regulatory authority, compliance responsibility, and coordination among the agencies responsible for construction and building performance policies. More broadly, it reduces policy effectiveness by weakening the connection between construction requirements and long-term building performance.

When buildings that fully comply with the energy code fail to meet performance requirements only a few years after construction, owners may be required to undertake costly retrofits well before building systems reach the end of their useful lives. These unplanned upgrades increase lifecycle costs, create stranded assets, and contribute to frustration among building owners and policymakers, leading to policy pushback. For example, some stakeholders have argued that buildings complying with the energy code should automatically be deemed compliant with a BPS (Desiderio 2024). However, this solution does not resolve the underlying problem. Energy codes vary substantially in stringency and are often outside the control of the jurisdiction administering the BPS. More fundamentally, as discussed below, compliance with the energy code is not a reliable predictor of actual building performance.

Discontinuity also creates governance challenges. Limited coordination between agencies responsible for energy codes and building performance policies can produce duplicative compliance processes, fragmented reporting, and uncertainty regarding responsibility when new buildings fail to achieve expected outcomes. These challenges slow progress toward energy, climate, and affordability objectives while increasing regulatory costs and reducing confidence in building policy.

Why Energy Codes Do Not Guarantee Operational Outcomes

Understanding the lifecycle discontinuity requires understanding the role energy codes were originally designed to play. Energy codes regulate design and construction, ensuring buildings are built to a minimum level of efficiency. They were never intended to guarantee post-occupancy energy performance. Even when compliance is demonstrated through energy modeling, codes evaluate predicted performance based on assumptions about how a building will be occupied and operated. In practice, real buildings rarely operate as modeled. This "energy performance gap" has been extensively documented, with studies of robust datasets showing measured energy use typically ranging from 10% to 30% higher than predicted—though in some edge cases, measured energy use exceeded modeled values by as much as 150% to 250% (Hinge 2019).

One proposed solution has been the concept of "outcome-based" energy codes, which use measured building energy performance in place of design specifications or modeled performance to demonstrate compliance. Using this method, buildings would be required to show that their actual measured energy use falls below a prescribed performance target after the building is occupied (Frankel 2012).

While conceptually appealing, outcome-based codes do not resolve the timing, governance, and responsibility disconnects associated with occupancy. Compliance with the energy code must be confirmed before a certificate of occupancy is issued, yet the operational data needed to demonstrate measured performance may not be available for months or years. The primary enforcement mechanism—the certificate of occupancy—would no longer align with the timing of compliance verification. Additionally, once the building is occupied, regulators have limited authority to require corrective action to address underperformance. Furthermore, occupant behavior and operational practices remain largely unpredictable and uncontrollable, meaning the performance of even a well-constructed building can still vary significantly from modeled expectations (Rosenberg and Hart 2014).

These limitations illustrate why energy codes alone cannot guarantee operational performance. The challenge, therefore, is not to transform energy codes into outcome-based regulations, but to better connect construction-phase regulation with the operational policies that follow. The next section presents three interventions that orient energy codes toward future performance while preserving their role as construction regulations.

From Discontinuity to Continuity: Orienting Energy Codes Toward Operational Performance

The following case studies illustrate three policy design interventions that reduce the lifecycle discontinuity at occupancy by better connecting construction-phase requirements with long-term operational performance.

Intervention 1 – Design for Future Performance

Align codes with operational performance goals. Most energy codes are developed using incremental efficiency improvements, cost-effectiveness screening, and assumptions about currently available technologies and construction practices. This approach produces steadily more efficient construction standards, but it does not intentionally calibrate building design and construction requirements with future operational objectives.

Historically, energy codes were not expected to prepare buildings for long-term operational obligations that may arise from building performance standards, long-term climate commitments, resilience goals, or other policies that rely on buildings performing at a certain level. Their purpose was to establish minimum efficiency requirements for construction, not to ensure that buildings would satisfy long-term operational objectives years later. As jurisdictions increasingly adopt policies that depend on long-term building performance, however, this traditional approach becomes insufficient.

This reveals a fundamental challenge in how building policy is organized across the building lifecycle. The greatest opportunity to influence building performance is during design and construction, when changes are least expensive and least disruptive. Yet the performance expectations buildings will ultimately be expected to meet are often developed separately from the energy code. Jurisdictions may establish the long-term performance they expect from new buildings but fail to incorporate those expectations into the requirements governing their design and construction. As a result, new buildings may comply fully with construction requirements while still requiring significant modification to satisfy future obligations.

One way to address this disconnect is to design codes that anticipate future operational objectives instead of simply improving incrementally over previous code cycles. Code development can begin by asking what operational outcomes new buildings should be capable of achieving over their service lives. Design and construction requirements can then be developed to position buildings to achieve those outcomes.

Case study: Outcome-oriented code design in Massachusetts. Following passage of the Commonwealth's 2021 Climate Act, Massachusetts became one of the first jurisdictions to explicitly design an energy code around previously established long-term climate objectives (DOER). The legislation directed the state to create a code pathway ensuring new construction would be consistent with Massachusetts' greenhouse-gas limits and net-zero energy emissions goals through 2050. Policymakers and code developers also considered several other long-term drivers, such as the state's electrification trajectory and the need to avoid new fossil fuel infrastructure (Massachusetts Department of Energy Resources n.d.).

The resulting Specialized Code, Massachusetts' most advanced code, moves new buildings toward net-zero performance through higher efficiency standards, reduced heating loads, electrification, and performance-oriented compliance pathways (SOCOTEC US 2026). To date, 60 of the Commonwealth's 351 municipalities have adopted the Specialized Code (DOER).

Codes can anticipate performance obligations. Massachusetts demonstrates that energy codes can be designed around future operational outcomes, making long-term performance an explicit design objective rather than a future retrofit challenge. By aligning construction requirements with established policy objectives, the Specialized Code reduces the disconnect between design expectations and long-term performance. Its voluntary adoption by 60 municipalities suggests that this approach is not merely theoretical, but a practical pathway for jurisdictions seeking to align new construction with long-term policy goals.

Designing codes around established policy objectives sets the right destination. Ensuring that buildings remain on track to achieve those objectives after construction, however, requires more than construction-phase compliance. Compliance that ends with construction cannot guarantee performance outcomes, as real-world performance depends on construction quality, building operation, and occupant behavior. Addressing those challenges requires extending regulatory oversight beyond occupancy—a challenge that is explored in the next intervention.

Intervention 2 – Maintain Accountability Through Occupancy

Layer complementary policies to sustain accountability through occupancy. Once energy codes are designed around future performance objectives, the next challenge is ensuring that buildings remain on track to achieve those objectives after construction is complete. Jurisdictions can address this challenge by extending regulatory oversight beyond the certificate of occupancy through complementary policies that evaluate whether buildings continue to perform as intended during the early years of operation. As described in previous research, mechanisms such as commissioning, energy benchmarking, and post-occupancy equipment evaluation can create continuity across the occupancy transition by extending regulatory engagement beyond construction so that performance expectations don't disappear when the certificate of occupancy is issued (ACEEE 2025).

Commissioning provides the first step in this transition. Unlike traditional code inspections, which verify that required equipment has been installed, commissioning evaluates whether building systems function according to design intent and achieve expected performance. However, commissioning alone cannot fully bridge the discontinuity if regulatory engagement ends at occupancy. To sustain the connection between design intent and operation, commissioning must be paired with post-occupancy monitoring and evaluation mechanisms that track real-world performance once the building is in use. Benchmarking and reporting laws, retrocommissioning requirements, and building performance standards each extend regulatory engagement further into operation, maintaining the connection between design expectations and long-term performance.

Case study: Policy layering across the occupancy threshold in New York City. New York City illustrates how jurisdictions can extend oversight beyond construction by layering multiple policies that engage buildings before and after occupancy. While these policies were not necessarily developed as a single integrated framework, they provide a useful model for how jurisdictions can create continuity between construction-phase compliance and real-world operation.

New York City has progressively adopted a series of policies that engage large buildings throughout the occupancy transition. The sequence begins with the City embedding commissioning requirements into the New York City Energy Conservation Code (NYCECC), requiring large buildings to verify that, at project completion, building systems are functioning according to design intent (NYC DOB 2014). Next, shortly after occupancy, Local Law 84 requires large buildings to benchmark and report annual energy use, introducing measured performance into the first year of operation (NYC DOB n.d.-a.). Local Law 87 then requires periodic energy audits and retrocommissioning, while Local Law 97 establishes long-term greenhouse gas emissions limits. This progression extends regulatory oversight from project completion into the early years of building operation, ensuring that building performance continues to be evaluated.

Together, these policies create a layered oversight structure across the occupancy threshold. Commissioning initiates the transition from construction oversight to building operation, while benchmarking, periodic evaluation, and building performance standards sustain regulatory oversight during the early years of operation. While no single policy fully bridges the occupancy threshold, in combination they create a framework in which each policy extends regulatory oversight further into the building lifecycle. New York City's approach is further strengthened by institutional alignment, as the city's energy code, benchmarking, auditing, and building performance policies are administered by the same department.

New York City is now beginning to connect this layered oversight structure back to code development itself. Effective in 2025, Local Law 32 requires future energy codes to incorporate performance-based or predictive energy use targets that support the city's long-term carbon neutrality goals, and the Department of Buildings is working to align those targets with the greenhouse gas limits established under Local Law 97 (Cheslak et al. 2024).

Energy codes begin the bridge; layered operational policies sustain it. New York illustrates that continuity across the occupancy threshold does not depend on any single regulation. Instead, complementary policies can extend regulatory oversight beyond occupancy by carrying design intent into operation.

One additional policy layer—post-occupancy commissioning—could strengthen this transition further. Studies have shown that even when code-required commissioning is completed at the end of construction, complex building systems—particularly HVAC and lighting controls—often deviate significantly from their intended sequences once buildings are occupied (Zhang, Morrison, and Sadler 2025). Requiring a round of post-occupancy commissioning—for example after the first year of operation—would help ensure that design intent is maintained under real operating conditions before primary responsibility for evaluating building performance shifts to a building performance policy. Where benchmarking laws already exist, jurisdictions could reduce administrative burden by exempting buildings that demonstrate high performance from post-occupancy commissioning requirements.

Existing voluntary certification programs provide governance models for this approach. For example, U.S. Green Building Council's LEED certification program and Enterprise Community Partners' Enterprise Green Communities program incorporate forms of post-occupancy verification as a condition of certification, and some jurisdictions tie these certification requirements to financing or project approval. For example, Washington, D.C. requires developers to provide financial security that is forfeited if LEED certification is not achieved within two years of receiving certificate of occupancy (D.C. Code § 6–1451.05).

As valuable as these layered policies are, commissioning, benchmarking, and ongoing oversight do not guarantee that buildings will ultimately achieve the operational performance expected of them. These policies evaluate and sustain building performance after construction, but they do not provide a way to assess during design whether a building is positioned to satisfy future policy requirements. The next intervention explores how compliance modeling can be repurposed to evaluate a building's readiness to achieve long-term performance goals before construction is complete.

Intervention 3 – Evaluate Readiness for Future Performance

Repurpose compliance modeling to evaluate readiness for future performance. Designing buildings around future operational objectives and maintaining accountability after occupancy still leaves one important question: How can jurisdictions determine whether a building is actually capable of meeting those objectives before it goes into operation?

Most energy code compliance models are designed to demonstrate compliance relative to a baseline building, not to predict real-world building performance. However, studies suggest that incorporating predictive energy modeling into code compliance could improve code outcomes and strengthen alignment between new construction and long-term policy goals, including BPS. (Rosenberg et al. 2024, Karpman et al. 2024). Repurposing compliance modeling to estimate future operational energy use offers one way to evaluate whether proposed designs are capable of satisfying future operational obligations.

Case study: Predictive modeling of energy use intensity (EUI) targets in Virginia. The City of Alexandria, Virginia, provides an example of how predictive modeling can be used to evaluate whether buildings are positioned to meet future performance expectations before construction is complete. Even where local governments lack direct authority over energy codes or building performance standards—as in Alexandria, which operates under the Dillon Rule and cannot currently adopt its own energy code or BPS—predictive modeling provides a mechanism for aligning design decisions with long-term policy objectives.

To navigate this constraint, the city adopted a new Green Building Plan and implementation law in early 2026, requiring buildings seeking zoning variances or development site plan approvals to demonstrate that they are designed to meet specified energy performance targets.[1] Those targets are aligned with the site EUI targets that ASHRAE Standard 100-2024 recommends for building performance standards in the city's climate zone, helping ensure that buildings constructed today would be prepared to comply with a future BPS should the city gain authority to adopt one (City of Alexandria 2026).

In support of this plan, Alexandria requires predictive whole-building energy modeling covering all major building systems. Projects must use a whole-building performance method, such as the Standard 90.1 Performance Rating Method (PRM), to estimate expected operational energy use, as recommended in Karpman et al. (2024). Before receiving a certificate of occupancy, project teams must submit updated energy models based on as-built drawings, ensuring that predicted EUIs reflect the completed building and not preliminary design assumptions.

Although predictive modeling offers significant promise, it also presents implementation challenges. Predictive models can estimate future EUI, emissions trajectories, and other operational outcomes during the design phase, helping developers and policymakers assess whether buildings constructed to code are likely to be capable of meeting future performance targets (Cheslak et al. 2024). However, developing and maintaining these models adds cost, complexity, and additional expertise to the code compliance process, making widespread adoption unlikely unless required by regulation (Karpman et al. 2024).

Predictive modeling also introduces uncertainty, as results may vary significantly depending on modeling assumptions. Emerging standards are beginning to improve the consistency and reliability of these models. For example, CSA/ANSI Standard Z5020.23 establishes guidance for developing predictive energy models that can be calibrated against actual building performance. Such standards improve modeling accuracy and regulatory confidence while providing clearer expectations for both modelers and jurisdictions (Karpman et al. 2024, CSA 2023).

Measured performance completes the feedback loop. The Alexandria case demonstrates how predictive modeling can help align new construction with long-term building performance

[1] Most construction projects in Alexandria end up seeking a zoning variance or development site plan approval and thus is it within the legal authority of the City to require the owner/developer to meet additional requirements.

targets, even when they lack direct policy authority. As with the previous interventions, however, predictive modeling alone cannot guarantee operational outcomes. Predictions become more valuable when they are periodically compared with measured building performance and refined over time. As jurisdictions gain experience with predictive modeling, measured building performance data should be used to refine both predictive models and future code requirements.

Looking ahead, predictive modeling and measured performance should become part of a broader lifecycle policy calibration process in which measured performance data informs future code development and operational performance targets (Scott et al. 2026). At present, no jurisdiction has fully used measured data from newly constructed buildings to set BPS targets, although Oregon's authorization to establish different BPS EUI targets for recently constructed buildings based on the statewide energy code in effect at the time of construction provides one early example of this potential strategy (H.B. 3409, 82nd Oregon Leg.).

Toward a Continuous Regulatory System

The interventions described in this paper address different aspects of the lifecycle discontinuity. Together, they demonstrate how energy codes and building performance policies can begin to function as components of a continuous regulatory system. The discontinuity does not disappear entirely, however. Occupancy will always represent a transition between different actors, responsibilities, and regulatory authorities. Even so, better policy design can substantially reduce the disconnect between construction-phase compliance and realized performance.

Set the right objective. Massachusetts demonstrates how energy codes can be designed with future performance in mind rather than simply improving incrementally over previous code cycles. When codes are designed to anticipate future operational obligations, they reduce the disconnect between what buildings are required to achieve at construction and what they will ultimately be expected to achieve during operation.

This approach increases the likelihood that buildings entering operation will be capable of meeting future operational requirements, reducing retrofit risk while supporting broader climate, affordability, and building performance objectives. It also establishes a pathway for energy codes to become more meaningful predictors of long-term performance and future policy compliance.

However, designing codes around future performance objectives cannot by itself ensure that buildings achieve those outcomes. Once the objective has been established, accountability must continue beyond construction, and compliance processes must increasingly evaluate whether buildings are positioned to achieve those future obligations.

Layer complementary policies to sustain accountability through occupancy. New York City demonstrates how complementary policies can transform the occupancy threshold from a point of discontinuity to a managed transition. By layering commissioning, benchmarking, periodic system evaluation, and building performance requirements, the city extends regulatory oversight beyond construction into the early years of operation. Each policy builds on the previous one, creating continuity between design expectations and performance.

This approach keeps regulatory oversight in place after occupancy, reducing the disconnect between construction compliance and building performance without fundamentally changing how energy codes are developed or enforced. Instead, energy codes become the first step in a broader policy system that maintains oversight of building performance beyond the certificate of occupancy.

One additional policy layer would further strengthen this transition. By extending regulatory engagement through post-occupancy commissioning, jurisdictions could verify that design intent is maintained under actual operating conditions, ensuring that buildings perform as intended before responsibility transitions to a long-term building performance policy like BPS.

Improve confidence that design intent will translate into performance. Alexandria demonstrates how compliance modeling can be repurposed to predict future performance, enabling it to evaluate readiness to meet future requirements instead of simply documenting code compliance. By requiring predictive models to estimate whether buildings are likely to achieve operational EUI targets, future performance expectations begin to influence design decisions before construction occurs. Compliance modeling becomes a tool for anticipating performance instead of merely documenting energy code compliance.

Predictive modeling improves confidence that buildings entering operation are positioned to meet long-term performance goals, supports more informed capital planning, and establishes a pathway for compliance modeling to become a more meaningful predictor of readiness for long-term operational obligations.

A fully continuous regulatory system would extend this approach by comparing predicted performance with measured operational data, allowing both predictive models and future code requirements to be refined over time.

Policy implications. These interventions have four important implications for building policy. At the building level, they increase confidence that new buildings entering operation are capable of meeting future performance obligations. For building owners and developers, they reduce economic disruption by reducing retrofit risk and improving long-term capital planning. For policymakers, they improve the effectiveness of energy, affordability, and climate policy by better aligning design and construction requirements with long-term objectives. More broadly, they establish a foundation for a more continuous regulatory system that intentionally connects design expectations with real-world performance.

These interventions begin to redefine the role of the energy code. The energy code becomes more than a construction-phase regulation, serving as the first component of a continuous regulatory system in which future operational obligations shape design requirements, layered policies sustain accountability through the occupancy transition, and compliance processes increasingly evaluate whether buildings are positioned to achieve long-term performance goals.

Looking Forward

The interventions presented above focus on reducing the lifecycle discontinuity through policy design. Fully realizing a continuous regulatory system, however, will require additional advances in both technical methods and governance. As jurisdictions gain experience with predictive modeling, commissioning, benchmarking, and building performance standards, measured operational data should increasingly be used to refine predictive models, future code requirements, and operational performance targets. Continued research should also examine how model codes and jurisdiction-specific policies can be better calibrated so that buildings constructed today are prepared to meet future performance expectations without requiring premature retrofits.

Future work should also explore governance mechanisms that strengthen coordination across the building lifecycle. This includes improving information sharing among agencies responsible for energy codes and building performance policies, clarifying when and how operational requirements should apply to newly constructed buildings, and developing practical pathways that allow buildings to transition toward long-term decarbonization goals over their service lives. These combined efforts would complement the policy interventions described previously and further advance a continuous regulatory system for building performance.

Conclusion

This paper identifies three practical recommendations for jurisdictions seeking to better align energy codes with building performance policies: (1) design codes around future operational objectives, (2) extend accountability beyond occupancy by layering complementary policies, including re-commissioning and other post-occupancy evaluation mechanisms, and (3) use predictive modeling to assess readiness for future performance instead of simply demonstrating code compliance.

While these recommendations address the policy design dimension of the lifecycle discontinuity, fully integrating energy codes and building performance policies like BPS will also require broader changes, including stronger coordination among the agencies responsible for codes, BPS, and climate policy, as well as mechanisms for using measured performance to inform future code development and performance targets. These represent important priorities for future research and policy development.

Better policy design can substantially reduce the lifecycle discontinuity between construction and operation. Through implementing these strategies, the energy code evolves from a construction-phase regulation into the first element of a continuous regulatory system that connects design requirements with long-term performance across the building lifecycle.

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