From Policy to Practice: Implementing Colorado's Building Performance Standards

Kudret Ütebay, ICF
Ben Goldstein, Colorado Energy Office

ABSTRACT

This paper examines the evolution and early implementation of the Building Performance Colorado (BPC) program, a statewide policy that assesses building energy performance using ENERGY STAR® Portfolio Manager® (Portfolio Manager) and provides performance targets for large existing buildings. Established under House Bill 21-1286 (Colorado General Assembly 2021), BPC applies to commercial, multifamily, and public buildings 50,000 square feet and larger and sets sector-wide greenhouse gas reduction targets of 7 percent by 2026 and 20 percent by 2030, relative to 2021 levels. Drawing on early program experience, the paper describes how benchmarking, compliance pathways, and owner support mechanisms translate statutory requirements into practice.

Using six years of whole-building benchmarking data, including onsite renewable electricity generation where present (EPA 2026), the analysis examines trends in energy use intensity and greenhouse gas emissions intensity across property types and community contexts. Results show that improvements in carbon intensity reflect both reductions in delivered energy use and the contribution of onsite renewable generation, with the relative influence of these factors varying by building type and operating profile. The paper also reflects significant program evolution following the enactment of House Bill 25-1269 in 2025, which extended performance standards to 2040, authorized alternative compliance mechanisms, aligned enforcement with air-quality regulations, and established a Building Decarbonization Enterprise to provide technical and financial assistance to covered building owners (Colorado General Assembly 2025). Drawing on early reporting cycles and post-season implementation review, the paper identifies key data, coordination, and sequencing challenges and distills transferable best practices for jurisdictions designing or scaling statewide building performance standard programs.

Introduction

Building performance standards (BPS) have emerged as a central policy tool for reducing greenhouse gas emissions (GHG) from existing buildings by pairing energy transparency with enforceable performance targets. Unlike voluntary programs, BPS establish clear, outcome-based expectations for large buildings while preserving flexibility in how owners achieve compliance. As these policies expand beyond major cities to statewide applications, program experience increasingly shapes how ambition, feasibility, and equity are balanced in practice.

The Building Performance Colorado (BPC) program provides a prominent statewide example of this policy approach. Enacted through House Bill 21-1286 in 2021 (Colorado General Assembly 2021), BPC requires owners of covered commercial, multifamily, and public buildings 50,000 square feet and larger to annually benchmark energy use and demonstrate progress toward sector-wide greenhouse gas reduction targets of 7 percent by 2026 and 20 percent by 2030, relative to a 2021 baseline (Colorado General Assembly 2021). The statute paired

benchmarking with the development of building performance standards through rulemaking and required utilities to provide aggregated energy-use data to support whole-building reporting (Colorado General Assembly 2021).

The BPC sets weather-normalized energy use intensity (WNSEUI or EUI) and location-based greenhouse gas intensity (GHGi) targets by property type. It also establishes a timeline for building owners to select a target and comply within the required timeframe (CEO 2024). Building water use reporting is not required. Certain property types such as data centers, mixed-use buildings, and buildings that have manufacturing components do not have published targets and receive tailored targets based on their specific circumstances.

Early implementation of BPC revealed both the strengths and challenges of applying a uniform statewide performance framework across a diverse building stock. These lessons informed substantial legislative refinement through House Bill 25-1269, enacted in 2025 (Colorado General Assembly 2025). The amendments preserved the program's core emissions-reduction objectives while extending performance standards to 2040, authorizing alternative compliance mechanisms, updating penalty structures, and establishing a Building Decarbonization Enterprise (BDE) to deliver dedicated technical and financial assistance. Collectively, these changes expanded BPC's implementation framework by pairing longer-term performance expectations with additional flexibility and owner support.

While the BPC relies on web-based owner support infrastructure, including BEAM-hosted Knowledgebase and portal resources that centralize building-specific information and program workflows (ClearlyEnergy 2025), this paper examines Colorado's transition from policy design to on-the-ground implementation using both program experience and empirical benchmarking data. The observations draw on the authors' direct program roles: Kudret Ütebay manages the BPC Help Center at ICF, and Ben Goldstein oversees BPC implementation at the Colorado Energy Office. It draws on six years of whole-building ENERGY STAR® Portfolio Manager® data (EPA 2026) to assess trends in EUI and GHGi across a stable cohort of buildings, including differences between properties located in disadvantaged community zip codes and those elsewhere. In parallel, the paper documents program challenges related to data quality, compliance sequencing, system coordination, and technical assistance demand observed during early reporting cycles. By integrating quantitative performance trends with operational insights, this paper identifies practical lessons and best practices relevant to other jurisdictions designing or scaling statewide building performance standard programs.

Background: Evolution of the Building Performance Colorado Program

Colorado Air Quality Control Commission (AQCC) adopted Colorado's BPS rules on August 17, 2023, and the rules took effect October 15, 2023 (AQCC 2023). Colorado Energy Office (CEO) oversees program implementation. Colorado's BPC program includes two linked policy components: (1) an annual benchmarking requirement via ENERGY STAR Portfolio Manager data submission and (2) BPS that require covered buildings to meet property type EUI or GHGi targets compared to one of the 2019 or 2021 baseline periods. This paired structure reflects a common policy logic: benchmarking provides building-level information needed to understand energy use and identify opportunities, while a performance standard provides the accountability mechanism to ensure progress over time (AQCC 2023; CEO 2024).

Legislative Evolution and Policy Intent

Initial experience with the implementation of HB 21-1286 revealed practical challenges related to baseline selection, capital planning timelines, data quality, and uneven access to technical and financial resources. House Bill 25-1269 (2025) preserves the core emissions-reduction objectives while adding mechanisms intended to make compliance more practical for owners and strengthen long-term implementation for the state (Colorado General Assembly 2025). Table 1 summarizes key differences between the original BPC statute and the 2025 amendments.

Table 1 Comparison of BPC Policy before and after 2025 Amendments

Policy Element	**HB 21 1286 (2021): Original statute**	**HB 25 1269 (2025): Amendment**	**Benefit to the State**	**Benefit to building owners**
Long Term Performance Standards	No explicit standards beyond 2030	Authorizes adoption of BPS extending to 2040	Establishes long term policy certainty and planning horizon	Enables alignment with major capital cycles and retrofit timing
Compliance Pathways	Compliance tied to meeting sector-wide performance targets	Authorization of alternative compliance mechanisms	Encourages flexible pathways to emissions reduction	Allows owners to choose least cost or least disruptive strategies
Baseline Flexibility	2021 baseline required for performance evaluation	Allows alternative baselines (e.g., pre pandemic years)	Improves data integrity and credibility of performance tracking	Avoids distorted baselines from atypical operating years
Penalty Structure	Civil penalties authorized but limited in scale	Penalties aligned with air quality statutes; inflation adjusted	Strengthens deterrence and legal consistency	Predictable, transparent enforcement framework
Support Infrastructure	Limited statutory support mechanisms; reliance on guidance and recommendations	Establishes BDE to deliver technical and financial assistance	Converts fees into measurable decarbonization outcomes	Access to funding, technical assistance, and on bill repayment options
Funding Mechanism	Program supported through existing energy funds	Annual BDE funds enterprise activities	Creates a self-sustaining program funding model	Dedicated resources tied to compliance needs
State–Local Coordination	State requirements do not supersede local standards	Enables state recognition of local compliance where equivalent	Reduces duplicative oversight and administrative burden	Streamlined compliance for buildings subject to multiple policies

Source: Colorado General Assembly 2021; Colorado General Assembly 2025.

Benefits to Owners and the State

Taken together, the 2025 updates show how Colorado adjusted BPC based on early implementation experience while preserving its GHG goals.

For building owners, the transition reduces compliance risk by extending planning horizons, expanding pathway options, and improving access to support. Extended planning horizons and alternative compliance pathways reduce uncertainty and enable more strategic sequencing of energy efficiency, electrification, and emissions-reduction investments. Enterprise-supported resources can lower upfront barriers to action, particularly for owners facing capital constraints or complex building portfolios. Improved coordination between state and local performance standards further reduces administrative burden by minimizing duplicative reporting and compliance requirements (CEO 2025).

From a state perspective, the amendments strengthen implementation by extending the planning horizon, aligning enforcement with air-quality regulations, and dedicating fee revenue to technical and financial assistance. By reinvesting fees into building decarbonization assistance, Colorado creates a policy structure that supports continuous improvement.

The evolution of the BPC program demonstrates how BPS policies can mature over time, balancing ambition with administrative realism and enforcement with enablement. Colorado's experience offers a replicable model for jurisdictions seeking to pair enforceable performance targets with support mechanisms that can be sustained over multiple compliance cycles.

Regulatory Framework and Compliance Pathways

Benchmarking Requirements

Energy benchmarking is defined as tracking and reporting a building's energy use and is a critical step for understanding energy consumption and improving performance. Under BPC, owners of covered buildings must submit an annual benchmarking report and pay annual benchmarking and BDE fees (CEO 2025). For the 2026 reporting season cycle, covered building owners will need to submit their complete and accurate 2025 benchmarking data between July 1, 2026, and November 1, 2026 (CEO 2025).

Utilities support benchmarking by providing aggregated energy use data, a requirement discussed further in the implementation section below (Colorado General Assembly 2021).

Building Performance Standards: Targets and Rule Adoption

BPC establishes mandatory BPS that require covered buildings to meet property-type-specific EUI or GHGi targets published in the Technical Resource Guide (TRG) (CEO 2024).

While the statute sets sector-wide emissions-reduction goals over a 2021 baseline (with 2019 permitted as an alternative baseline starting in 2026), compliance is implemented through building-level targets that vary by property type and selected compliance pathway. CEO established distinct WNSEUI targets and GHGi targets for individual property types, as codified in Regulation 28 and published in the BPC TRG (AQCC 2023; CEO 2024).

For property types listed in the TRG, BPC specifies two sets of targets: one that applies during the 2026–2029 compliance period, and a more stringent set that applies during 2030–2050. Buildings may comply through either an Energy Efficiency pathway, which uses weather-normalized site EUI as the compliance metric, or a Greenhouse Gas Reduction pathway, which uses GHGi as the compliance metric. Property-type targets differ across building

categories to reflect inherent differences in building function and energy intensity, rather than applying a uniform reduction requirement across all buildings.

Certain property types, such as mixed-use buildings, partial manufacturing and industrial facilities (less than 50% of total floor area), data centers, and other specialized uses, do not have predefined property-type targets. CEO assigns individualized targets for these property types based on their operational characteristics. These buildings default to a standard percent reduction pathway or owners may request individualized targets based on submitted documentation and energy audits. Data centers are treated separately and are assigned Power Usage Effectiveness (PUE) targets rather than EUI or GHGi targets (CEO 2024).

Interaction with Local Policies

The BPC program operates alongside several local building performance policies. State law does not supersede or replace local requirements; therefore, covered buildings located within local jurisdictions that also adopted building performance standards must comply with both state and local programs unless a formal exemption applies (CEO 2025).

Recent legislative updates introduced the option of "deemed compliance," under which buildings regulated by a qualifying local performance standard may be considered compliant with BPC if CEO determines that the local program's emissions reduction requirements are reasonably similar to the State's standards (CEO 2025). For example, CEO has reviewed the Energize Denver performance standard and deemed it acceptable for deemed-compliance eligibility and compliance with BPC.

Currently, this process remains under development, and buildings subject to both BPC and a qualifying local performance standard are not exempt from BPC requirements. Regardless of deemed-compliance status, such buildings must continue to meet all applicable BPC obligations, including fee payment and submission of benchmarking data to CEO. Where deemed compliance is available, a building may be found in compliance with BPC requirements by meeting approved local program standards; however, failure to comply with those local standards may result in enforcement under both State and local programs (CEO 2025).

This parallel structure reflects Colorado's effort to maintain a consistent statewide framework while recognizing and supporting more ambitious local policies. Once finalized, the deemed-compliance process is expected to reduce duplicative reporting burdens for owners subject to both programs while preserving performance integrity across jurisdictions.

Implementation Methods: Translating Policy into Practice

Implementation of BPC relies on a combination of regulatory requirements, online tools, and structured support resources aimed at reducing compliance friction, including the BPC Technical Resource Guide, Knowledgebase, Building Owner Portal, Help Center, and program forms (CEO 2024; CEO 2025). Together, these support elements form an administrative backbone that connects policy requirements to owner actions such as data collection, reporting, fee payment, compliance pathway selection, and compliance planning. Figure 1 summarizes this sequencing by showing how data access, reporting, fee payment, pathway selection, and documentation connect within a typical compliance cycle.

Figure 1 Simplified BPC compliance sequencing for covered building owners. The sequence illustrates the typical order of owner actions (CEO 2025).

Program Supports for Building Owners

From an implementation standpoint, guidance usability and clarity affect whether regulated entities understand obligations and meet deadlines. Training opportunities and a dedicated Help Center are provided, and BPC Knowledgebase centralizes program requirements and dates, submission and fee instructions, program forms, training resources, compliance roadmap, and a compliance map (CEO 2025). The Building Owner Portal (BOP) consolidates building-specific information, including benchmarking reports and compliance status, which can reduce administrative uncertainty and improve continuity across reporting years. Each building owner has their own BOP accounts and can check the compliance status of their properties (CEO 2025).

Data Access and Utility Coordination

Benchmarking depends on obtaining whole-building energy data, which can be challenging in multitenant settings. CEO states that utilities are required to provide aggregated energy use data to building owners, supporting benchmarking reporting and compliance. By pairing this requirement with data access guidance and workshop materials, CEO signals a strategy that addresses data access barriers through standardized processes and shared learning (Colorado General Assembly 2021).

Technical Guidance for Compliance Planning

The BPC technical guidance document helps owners and industry professionals understand BPS rules, compliance options, and strategies to reduce energy use and carbon emissions (CEO 2024). In practice, technical guidance can clarify terminology and metrics, outline documentation expectations, and support consistent interpretation across building types, which is essential when scaling a statewide program.

Supporting Compliance Through the Large Building Decarbonization Showcase

To operationalize the support-oriented framework established by HB 25-1269, the Colorado Energy Office launched the Large Building Decarbonization Showcase Grant Program (CEO 2026). The program provides reimbursement-based grants covering a substantial share of planning and retrofit costs for emissions-reduction projects in covered buildings.

By linking grant eligibility to BPC compliance, the Showcase program intends to accelerate progress toward statutory targets while generating real-world examples of cost-effective decarbonization strategies. For building owners, the program is expected to reduce financial risk and shorten payback periods. For the state, it produces replicable case studies that inform future policy design and market adoption.

Data Analysis Framework: Methods and Data Limitations

Methods

This analysis draws on six years of whole-building ENERGY STAR Portfolio Manager benchmarking data (2019–2024) for buildings covered under Colorado's Building Performance Colorado (BPC) program (EPA 2026). The dataset includes reported whole-building energy

consumption, onsite renewable electricity generation where present, and resulting weather-normalized energy use and GHGi metrics. Location-based GHGi values reflect both grid-supplied electricity and onsite renewable electricity used within the building, consistent with Portfolio Manager accounting conventions (EPA 2026).

Data cleaning removed records with missing, non-positive, or implausible values for EUI, location-based GHGi, and gross floor area. Buildings with multiple submissions each year were deduplicated by retaining the most complete entry. Property types for which standard EUI metrics are not meaningful—Drinking Water Treatment and Distribution, Wastewater Treatment Plants, and Data Centers—were excluded from aggregated medians but retained in the cleaned dataset for transparency (and further analysis for data centers).

To evaluate longitudinal performance, the analysis constructs a stable cohort of buildings that reported complete and valid EUI and GHGi data for every year in the data set, resulting in 2,394 buildings across 14 property types after all data cleaning criteria are applied. Longitudinal comparisons, equity comparisons, and compliance assessments in this paper are based on this stable cohort.

Annual statewide medians for EUI and GHGi were calculated directly from cleaned records. Changes between 2019 and 2024 were computed as the difference between end-year and baseline medians, with negative values indicating improvement.

$$\Delta\text{Metric} = \text{Metric}_{(2024)} - \text{Metric}_{(2019)}$$

Data Limitations

Several limitations affect interpretation of these results. Many buildings lacked complete benchmarking records across all six reporting years, requiring the analysis to exclude properties with missing EUI or GHGi values; this may bias results toward buildings with greater administrative capacity. Participation rates and data completeness also vary geographically, particularly in disadvantaged communities, potentially understating equity gaps. Pandemic-related operational disruptions, most notably the 2020 decline in occupancy and activity, further complicate year-to-year comparisons. As a result, findings should be interpreted as indicative trends rather than precise statewide performance estimates.

A Look Inside Collected Data

The dataset shows a sustained decline in both energy and carbon intensity across the stable cohort. Median EUI declined gradually over the six-year period (Figure 2), while median greenhouse gas intensity (GHGi) fell more sharply over the same period (Figure 3).

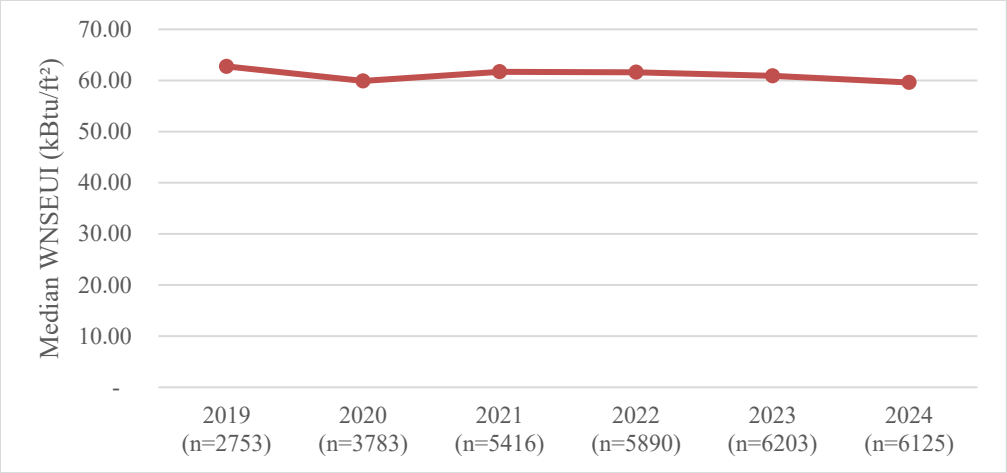

Figure 2 Median EUI for the BPC stable cohort, 2019–2024. (EPA 2026).

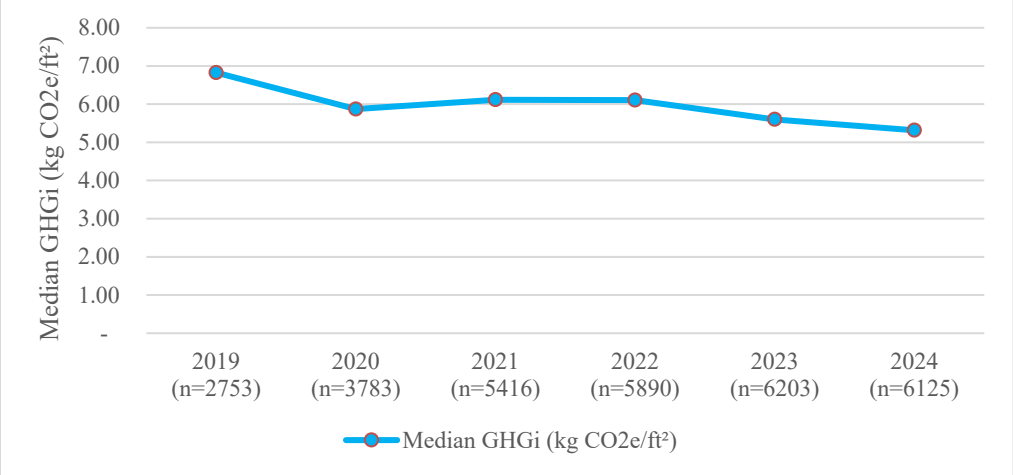

Figure 3 Median GHGi for the BPC stable cohort, 2019–2024. (EPA 2026).

Viewed together, Figures 2 and 3 show that median EUI and median GHGi declined from 2019 to 2024, but GHGi declined more sharply than EUI. This divergence reflects the combined influence of efficiency improvements, fuel mix changes, grid emissions factors, and onsite renewable electricity generation. In the subset of buildings with onsite generation, reductions in GHGi are driven not only by changes in delivered energy use but also by displacement of grid-supplied electricity with zero-emissions electricity generated and consumed onsite.

Conversely, buildings without onsite renewable generation show GHGi trajectories that more closely track changes in delivered energy use and grid emissions factors. These patterns demonstrate that accounting for onsite renewable electricity is essential for interpreting carbon-intensity outcomes under building performance standards and for distinguishing between efficiency-driven and supply-driven emissions reductions.

Across the cohort buildings, the median EUI decreased 5.0% from 62.75 kBtu/ft² in 2019 to 59.60 kBtu/ft² in 2024, while median GHGi declined 22.1% from 6.825 $kgCO_2e/ft^2$ in 2019 to 5.315 $kgCO_2e/ft^2$ in 2024, reinforcing the pattern shown in Figures 2 and 3. The drop observed in 2020 reflects widespread COVID-19 shutdowns, during which offices, retail, and education spaces experienced greatly reduced occupancy and operating hours, while a few sectors, particularly healthcare and multifamily housing, remained active or intensified operations. This

produced a temporary, portfolio-wide suppression of EUI, followed by partial rebounds in 2021–2022 as buildings repopulated, and resumed improvements in 2023–2024 (EPA 2026).

Data centers represent a notable exception: their efficiency metric, PUE, increased from 1.675 in 2019 to 1.810 in 2024, peaking at 1.885 in 2022, indicating rising infrastructure overhead despite improvements elsewhere in the cohort (Figure 4) (EPA 2026). These high-level patterns set the stage for deeper property-type analysis and reveal how operational dynamics, technology, and grid changes jointly shape energy and emissions outcomes across the portfolio. In addition, this divergence reflects unique operational and cooling demands and reinforces the need for sector-specific pathways rather than universal EUI-based compliance expectations.

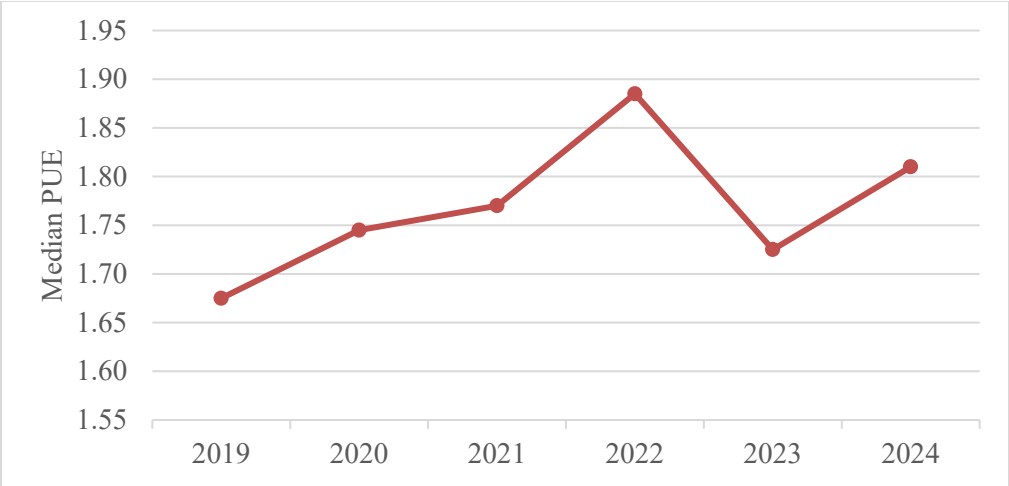

Figure 4 Data Center PUE trends (n=8). *(EPA 2026)*.

Figure 5 highlights differences in performance across building sectors in the cohort of buildings. Medical offices and hotels show the largest median EUI reductions, while Supermarket/Grocery Stores show the highest GHGi reduction. Conversely, distribution centers and K-12 schools show net increases in median EUI between 2019 and 2024.

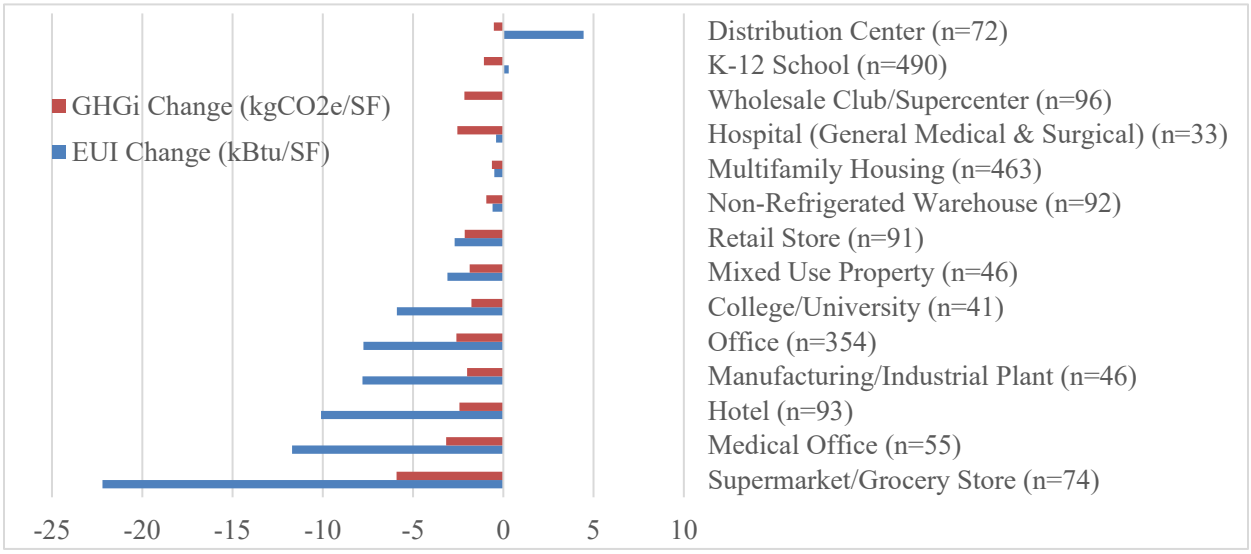

Figure 5 Absolute change by property type (2019–2024). (EPA 2026).

Relationship Between EUI and GHGi Target Proximity

Figure 6 compares 2024 WNSEUI for stable-cohort property types with their long-term (2030–2050) EUI targets, highlighting substantial differences in how close various building categories are to required performance levels. Medical offices are closest to their long-term EUI target based on 2024 performance, with K-12 schools and multifamily housing also relatively near their targets compared with other property types. By contrast, wholesale clubs/supercenters are farthest from their EUI target by a wide margin, followed by hospitals and colleges/universities, reflecting both high baseline EUI and large remaining efficiency gaps. Property types without established EUI targets, such as manufacturing/industrial facilities and mixed-use buildings, which receive tailored targets, are excluded from this comparison. Overall, while some property types are approaching long-term EUI targets, the largest efficiency challenge remains concentrated in the energy-intensive retail and institutional building categories.

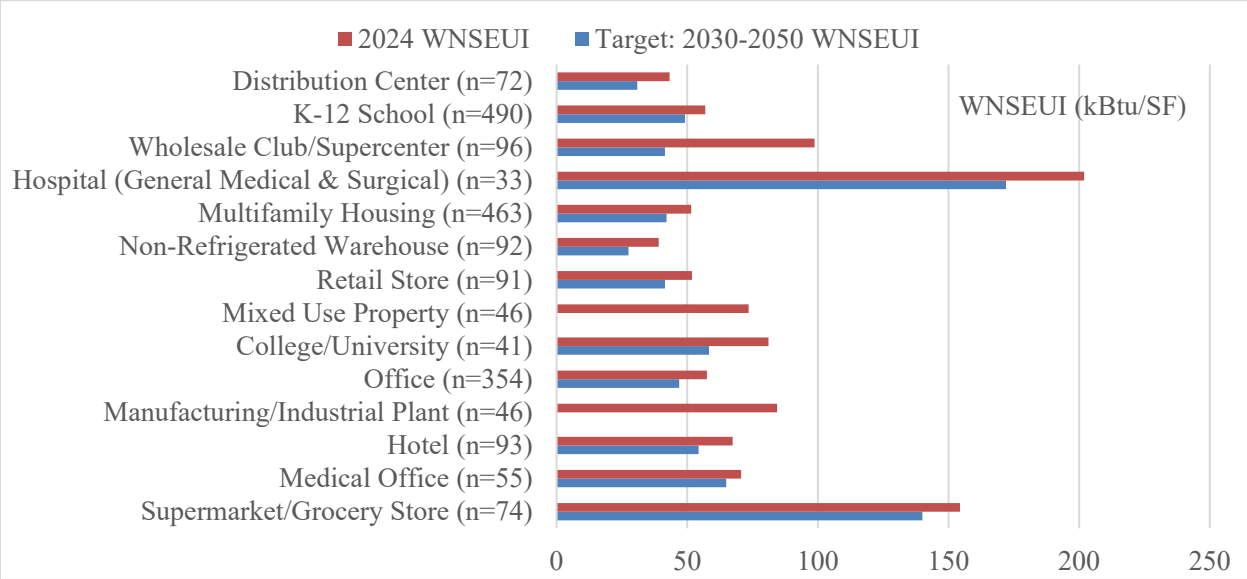

Figure 6 2024 WNSEUI by property type vs. 2030–2050 target (CEO 2024; EPA 2026). Distances to targets are shown in absolute terms (difference between observed values and targets), not as percentage differences.

Figure 7 compares 2024 GHGi values by property type with long-term (2030–2050) targets, revealing clear differences in remaining distance to carbon-intensity goals. Non-refrigerated warehouses and distribution centers are closest to their GHGi targets, with K-12 schools and multifamily housing also exhibiting relatively small remaining gaps. Retail stores, offices, hotels, colleges/universities, and medical offices fall in the middle of the distribution, showing measurable progress but still several kilograms of CO_2e per square foot above their targets.

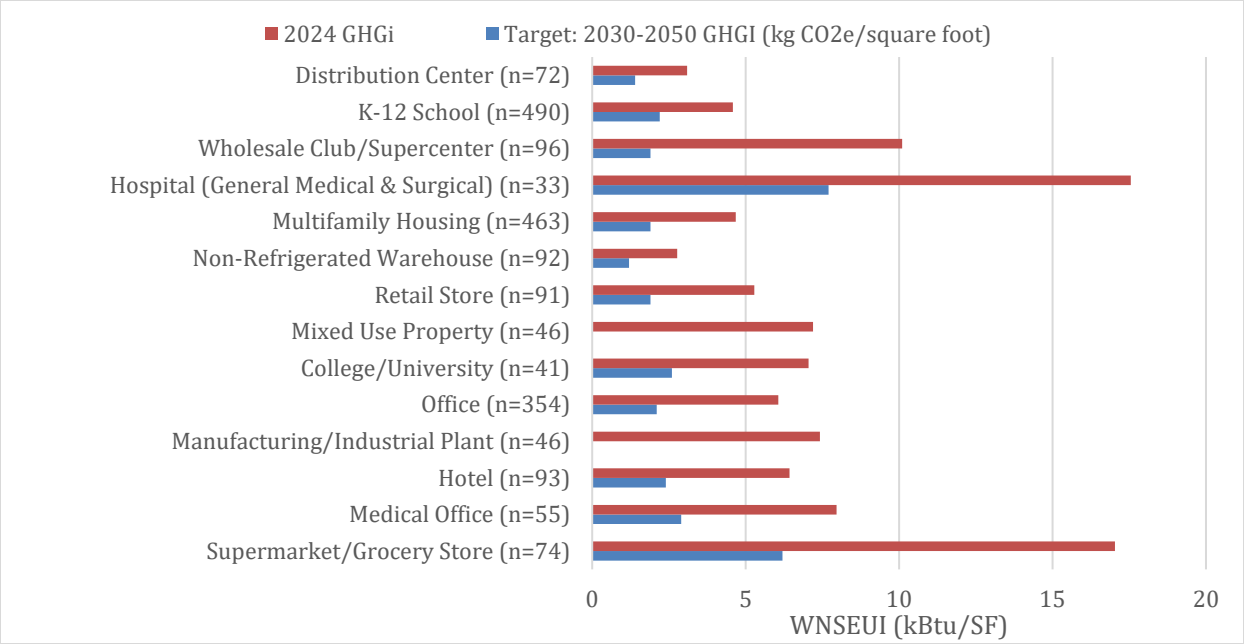

Figure 7 2024 GHGi vs. 2030–2050 target by property type (CEO 2024; EPA 2026). Distances to targets are presented as absolute differences; percentage gaps may suggest a different relative ordering of progress across property types.

Overall, the EUI- and GHGi-target comparisons highlight that property types differ not only in overall performance, but also in which compliance pathway shows the smaller absolute gap to its target. Several property types that remain far from long-term EUI targets, particularly highly energy-intensive retail and institutional uses, do not always show the same relative distance from GHGi targets, potentially reflecting progress driven by fuel switching, electrification, grid decarbonization, or onsite renewable electricity rather than large reductions in delivered energy use (here, "closer" refers to smaller absolute gaps between observed values and targets, not percentage differences).

Conversely, lower-intensity building types that are nearer to their EUI targets tend to show less divergence between energy- and carbon-based performance. These patterns suggest that, for some property types, carbon-based compliance pathways may be more immediately attainable than energy-intensity pathways, while for others the reverse may be true. This supports BPC's dual-metric framework, which accommodates multiple decarbonization strategies across a heterogeneous building stock.

Equity Considerations: Performance Trends in Disadvantaged Communities

To examine whether buildings located in disadvantaged communities experience different performance outcomes, benchmarking records for the stable cohort were merged with zip-code–level socioeconomic indicators from the DOE LEAD Tool (DOE 2026). In this analysis, disadvantaged communities (DACs) are defined as zip codes with both elevated household energy burden and lower median household income. All equity comparisons are restricted to the stable cohort of buildings reporting complete and valid data to ensure consistency over time.

All equity findings here use the longitudinal cohort. After merging these properties with LEAD socioeconomic data, 2,317 buildings could be assigned a DAC status, consisting of 271 DAC buildings (12%) and 2,046 non-DAC buildings (88%). The remaining 77 buildings could not be matched to LEAD due to missing data and are excluded from subgroup comparisons.

Buildings located in DAC areas begin the analysis period with higher median EUI and GHGi than buildings in non-DAC areas. Over the six-year period, both groups show improvement, indicating that buildings in DACs are participating in benchmarking and achieving emissions reductions under BPC. However, DAC-located buildings exhibit smaller median reductions in EUI, while reductions in GHGi are more comparable between DAC and non-DAC buildings.

Interpreting these differences requires caution. Direct comparisons of EUI between DAC and non-DAC buildings may not fully reflect differences in operational performance, because EUI is highly dependent on building function. Differences in the mix of property types across communities such as a higher concentration of energy-intensive uses (e.g., supermarkets), can result in systematically higher EUIs even when buildings are operated efficiently. As a result, higher baseline EUIs or smaller EUI reductions in DAC areas (Figure 8) should not be interpreted as evidence of poorer management or lower compliance effort.

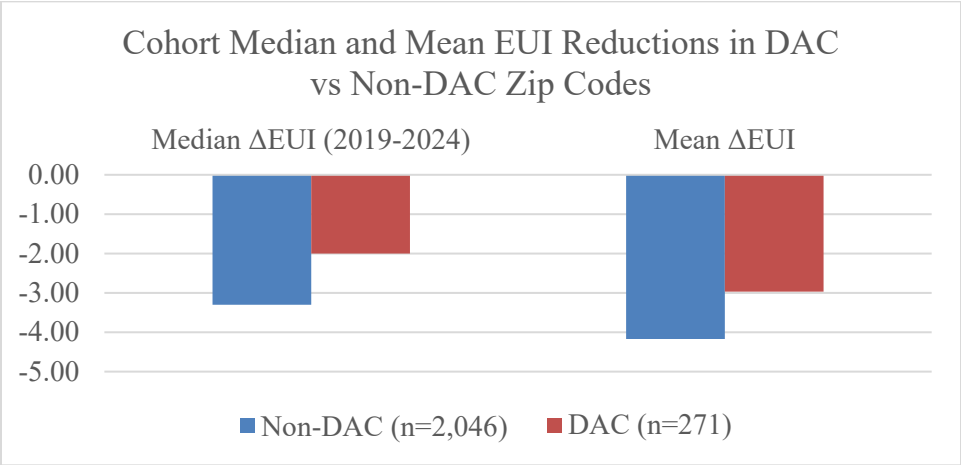

Figure 8 2019–2024 changes in EUI and GHGi for DAC and non-DAC. (EPA 2026; DOE 2026).

By contrast, GHGi (Figure 9) provides a complementary perspective that is less sensitive to building activity levels and more directly reflects fuel mix, electrification, and the use of lower-carbon electricity. The finding that DAC and non-DAC buildings achieve similar magnitudes of GHGi reduction suggests that carbon-focused outcomes under BPC may be more evenly distributed than energy-intensity outcomes alone would imply.

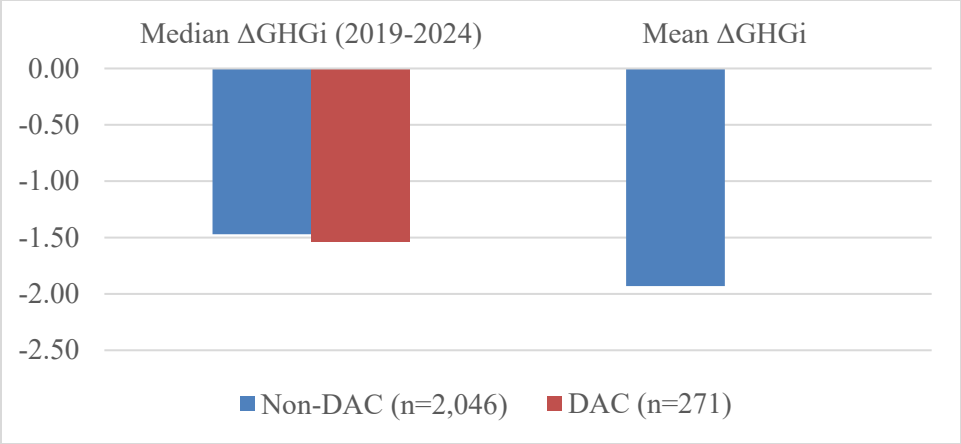

Figure 9 Cohort Median and Mean* GHGi Reductions in DAC vs Non-DAC Zip Codes (EPA 2026; DOE 2026).
*Note: Mean ΔGHGi for DAC zip codes could not be calculated because building-level GHGi deltas could not be consistently derived for all DAC-identified buildings.

These results indicate that while buildings in disadvantaged communities continue to face structural barriers such as constrained capital, aging infrastructure, and limited access to technical resources, they are engaging with the program and reducing emissions over time. The persistence of higher baseline intensities underscores the importance of targeted technical assistance and financial support, particularly for building types that are both energy-intensive and more prevalent in underserved areas. Addressing these structural factors will be critical to ensuring that BPC implementation narrows, rather than reinforces, existing disparities in building performance.

Lessons Learned and Implementation Challenges

Initial stages of BPC reveal a set of recurring challenges that are typical for large-scale benchmarking and BPS programs, particularly during initial reporting cycles. These challenges reflect the interaction between regulatory design, data systems, and building owner capacity rather than deficiencies in the policy's underlying objectives. The observations below draw on the authors' direct involvement in BPC implementation, including Help Center management, owner-support operations, and state program oversight.

Data quality and continuity are persistent implementation risks

The 2025 reporting season demonstrated that benchmarking accuracy depends on consistent building identifiers, reliable transfer of historical data across reporting cycles, and timely access to aggregated utility data. Issues such as invalid building identifiers, mismatched records between systems, and incomplete energy use data contributed to elevated help desk demand and delayed compliance for some owners. These challenges highlight the importance of pre-season data validation and clear guidance on resolving common data errors.

Staged compliance requirements increase the importance of sequencing and clarity

BPC requires owners to complete multiple interrelated actions—obtaining whole-building energy data, submitting benchmarking reports, paying required fees, and selecting a compliance pathway—within defined timeframes. Help Center activity clustered around these decision points, indicating that even when requirements are documented, owners benefit from reinforced

guidance on what must happen first, what can occur in parallel, and which actions trigger later compliance obligations. Without clear communication, program updates or new forms can unintentionally increase administrative burden.

System reliability directly affects compliance outcomes

The reporting season underscored how disruptions in one program component—such as the payment portal, automated emails, or compliance status labels—can cascade across the broader system. When system issues occur, building owners frequently seek clarification through the help desk, increasing response volumes and potentially delaying compliance. Coordinated system testing and contingency planning prior to reporting seasons are therefore critical to maintaining program credibility and efficiency.

Demand for technical assistance is predictable but uneven

Training attendance and inquiry volume increased sharply near reporting deadlines and following legislative or program updates. This pattern suggests that technical assistance resources must be scalable and aligned with anticipated peaks in demand. Static staffing or ad hoc support models are less effective in programs with defined reporting windows and evolving requirements.

Best Practices and Recommendations for Other Jurisdictions

Statewide BPS success depends not only on target design, but also on operational readiness and owner-facing implementation.

Sequence benchmarking before performance enforcement. Establishing recurring benchmarking requirements before enforcing performance targets allows programs to build a reliable data foundation, identify systemic data issues such as missing data or erroneous building IDs, and familiarize building owners with reporting tools. Early program indicators show that initial benchmarking cycles function as a learning period for both regulators and regulated entities, reducing longer-term compliance risk once performance targets take effect.

Treat compliance support as core infrastructure. Compliance support should be designed as permanent program infrastructure, not as a temporary launch function. In BPC, recurring questions about data access, fee payment, pathway selection, and portal status showed that owners need support throughout each reporting cycle, especially when program requirements or forms change.

Plan explicitly for peak support demand. Help Center activity and training participation in 2025 were not evenly distributed throughout the year; they increased near reporting deadlines, compliance pathway selection periods, and major program updates and related announcements. Jurisdictions should plan staffing, communications, and system testing around these predictable peaks rather than assuming steady support demand across the year.

Design flexibility mechanisms with clear guardrails. Waivers, timeline adjustments, and alternative compliance pathways can preserve program credibility while accommodating real-world constraints. Colorado's experience underscores that flexibility is most effective when paired with standardized documentation, clear eligibility criteria, and transparent timelines that maintain performance integrity.

Recognize that different building types progress through different pathways. Observed differences in proximity to EUI versus GHGi targets across property types suggest that a single compliance metric may not reflect feasible decarbonization pathways for all buildings. Programs that allow owners to select between energy- and carbon-based targets are better positioned to

accommodate heterogeneous building stocks while maintaining overall emissions-reduction goals.

Conclusion

Early benchmarking and performance data indicate that buildings are achieving measurable reductions in GHGi, with carbon-intensity improvements generally outpacing reductions in EUI. These results underscore the importance of evaluating both energy- and carbon-based metrics when assessing BPS outcomes.

The establishment of the BDE positions BPC to move beyond compliance toward implementation at scale. By providing technical assistance, funding for audits and projects, and potential on-bill financing mechanisms, the enterprise is expected to lower barriers to action, particularly for owners facing capital constraints or complex retrofit decisions. Future evaluation should focus on how owners select compliance pathways, how assistance resources influence investment decisions, and whether performance improvements accelerate as support mechanisms mature.

BPC illustrates how a state can translate sector-wide emissions goals into building-level action by pairing annual benchmarking, property-type-specific targets, flexible compliance pathways, and sustained owner support. The early data show reductions in both EUI and GHGi, with variation across property types reinforcing the value of multiple compliance pathways.

BPS success depends on more than setting targets. Data systems and the payment portal must function reliably, owners must understand the order of required actions, and support resources must be ready when demand peaks. For jurisdictions considering statewide BPS policies, these operational details are not secondary to policy design; they are what allow the policy to function in practice.

Acknowledgments

The authors thank the CEO for making BPC guidance, benchmarking resources, and implementation materials publicly available.

AI-assisted tools used: Microsoft Copilot and ICF's Copilot Agent, Analyst. Used for: editing, structure review, citation checks, formatting support, and assistance summarizing author-provided analysis. Extent: limited drafting support and iterative editing. Findings and recommendations were reviewed, revised, and verified by the authors and subject matter experts.

References

AQCC (Colorado Air Quality Control Commission). 2023. *Regulation Number 28: Building Benchmarking and Performance Standards*. Denver: Colorado Department of Public Health and Environment, Air Quality Control Commission.

Colorado General Assembly. 2021. Energy Performance for Buildings (House Bill 21-1286). Denver: State of Colorado. Signed June 24, 2021. https://leg.colorado.gov/bills/hb21-1286.

CEO (Colorado Energy Office). 2024. Building Performance Colorado Technical Resource Guide. Denver: Colorado Energy Office. https://energyoffice.colorado.gov/bpc

Colorado General Assembly. 2025. Building Decarbonization Measures (House Bill 25-1269). Denver: State of Colorado. Signed May 20, 2025. https://leg.colorado.gov/bills/hb25-1269.

Colorado Energy Office (CEO). 2025. Building Performance Colorado: Benchmarking and Building Performance Standards. Denver: State of Colorado. https://energyoffice.colorado.gov/bpc.

Colorado Energy Office (CEO). 2025. *Building Performance Colorado Knowledgebase and Building Owner Portal resources*. Hosted on ClearlyEnergy BEAM platform. Denver: State of Colorado.

CEO (Colorado Energy Office). 2026. *Large Building Decarbonization Showcase Grant Program*. Denver: Colorado Energy Office.

ClearlyEnergy. 2025. *BEAM Platform*. ClearlyEnergy.

DOE (U.S. Department of Energy). 2026. *Low-Income Energy Affordability Data Tool*. Washington, DC: DOE.

EPA (United States Environmental Protection Agency). 2026. ENERGY STAR Portfolio Manager. Washington, DC: EPA. https://www.energystar.gov/benchmark.