



ENERGY • WATER • EFFICIENCY

Memorandum

FROM: Faith DeBolt and the rest of the SBW team

TO: Anneka McDonald

DATE: December 14, 2023

RE: Preliminary Financial Analysis of WA State Building Energy Performance Standard

CC: Emily Salzberg, Liz Reichart

Executive Summary

In 2023, the Washington State Legislature passed a proviso¹ directing the Washington State Department of Commerce (Commerce) to convene a workgroup to analyze the financial investments required for owners of Tier 1 covered buildings—commercial buildings greater than 50,000 square feet—to comply with the state’s Clean Building Performance Standard (CBPS) and to make recommendations to the legislature to assist building owners in attaining compliance.

The CBPS is designed to secure energy efficiency and reduce greenhouse gas emissions from Washington state’s existing large building stock. It is a key policy to meet the state’s statutory emissions limits established in 2020² and to implement the Washington 2021 State Energy Strategy³.

The 2023 proviso (excerpted below) requires Commerce to submit two deliverables to the legislature, including an analysis of financial investments must be submitted by December 15, 2023, and a final report with recommendations must be submitted by September 1, 2024.

- (i) Analyze the financial investments required for owners of tier 1 covered buildings to comply with the state energy performance standard under RCW 19.27A.210; and
- (ii) Make recommendations to the legislature to assist building owners in attaining compliance, which must include, but are not limited to
 - (A) Identifying energy efficiency investments or other strategies and related timelines for increasing energy efficiency in the buildings sector;

¹ <https://lawfilesexternal.wa.gov/biennium/2023-24/Pdf/Bills/Senate%20Passed%20Legislature/5200-S.PL.pdf?q=20230516094055>

² <https://apps.leg.wa.gov/rcw/default.aspx?cite=70A.45.020>

³ <https://www.commerce.wa.gov/growing-the-economy/energy/2021-state-energy-strategy/>

(B) Providing a cost-benefit analysis of options, including energy efficiency, to meet the goal of reducing greenhouse gas emissions from the buildings sector; and

(C) Recommendations to balance financial investments while maximizing clean energy benefits for the state, including statutory changes that may be necessary for this purpose.

Commerce contracted with SBW Consulting in partnership with Unrooz Solutions and 2050 Institute (“SBW team”) in September 2023 to facilitate the Clean Buildings workgroup and conduct associated analyses. This memo addresses the requirements for the December 15, 2023 deliverable.

Preliminary analysis of financial investments was conducted to better understand costs and other barriers to compliance with the CBPS. It provides insight into the landscape of Tier 1 building types in Washington state, the percentage of buildings that likely already comply with the CBPS energy use intensity targets (EUI_t), and the financial investments required by non-complying buildings to meet their EUI_ts.

The financial analysis conducted for this memo is limited to the costs and benefits of efficiency measures which occur throughout the measure’s lifetime. For example, costs include first-costs, operations and maintenance, interest expense, and other related costs for each energy efficiency measure. The analysis results provide a baseline estimate of the financial investments required to comply with the CBPS EUI targets. They show the impact of the measures themselves before analyzing the effect of additional cost considerations that may increase the costs for some building types.

Highlights from the quantitative analysis:

- **A majority of buildings already meet the target.** 67% of benchmarked Tier 1 buildings in Seattle already have EUIs below their CBPS targets and do not need to apply any measures to further reduce their EUI. Further work next year will explore how representative the Seattle Tier 1 building stock is of all Tier 1 buildings in the state.
- **Lifetime benefits exceed costs.** On average, for the buildings that can achieve compliance by meeting the EUI_t (not by using the investment criteria pathway), we estimate an initial investment of \$2 per square foot of floor area. The average lifetime costs for these measures (20 years) are approximately \$2.75 per square foot; however, the average lifetime benefits are almost \$4 per square foot. This yields an *average net present value of the investment at approximately \$1 per square foot, which indicates that on average benefits exceed costs.*
- **Benefits found across size cohorts.** Benefit-cost (B/C) ratios greater than 1 mean benefits exceed costs. The higher the B/C ratio, the more economically attractive a measure is from the building owner’s perspective. The benefits exceed costs for the 2026 and 2027 cohorts with average B/C ratios greater than 1, but the 2028 cohort on average has benefits slightly less than costs with a B/C ratio of 0.9.

- **Public buildings.** Public buildings have higher first costs than private buildings and lower B/C ratios, though the average is still greater than 1.

The memo also explores other potential costs and barriers that building owners may face when trying to bring their buildings into CBPS compliance and to meet other requirements such as the energy management plan and the operations and maintenance program.

Additional costs and considerations include:

- Sub-metering, audits, and data gathering and management.
- Near-term inflation spikes if supply chains and labor markets are tightened due to the CBPS.
- Limited internal capacity and human resource costs associated with compliance.
- Coordination with other policies and initiatives and potential synergies or conflicts.
- Access to capital, high lending interest rates, and occupancy rates affecting real estate values.

By estimating the baseline financial investments for efficiency measures and identifying an initial list of important additional cost considerations, this memo lays the groundwork to better account for real-world cost barriers. The 2024 analysis will build on the estimates in this memo to help identify how to target support for building owners.

High-impact opportunities for support could include changes to CBPS administrative requirements and the Early Adopter Incentive program, more coordination across related policies and codes, additional technical assistance, guidance on retrofit best practices and high-performance solution sets, and investment in market capacity building and training to streamline compliance and reduce costs. We will explore these topics with the workgroup in the next phase of work. The 2024 report will include the results of the expanded analysis and a set of prioritized recommendations for how the legislature can support building owners while maximizing the effectiveness of the Clean Buildings Law to reduce energy use and emissions in Tier 1 buildings.

Disclaimer: This memo reflects the work of SBW, not the opinions of the workgroup. Timeline constraints prevented the SBW team from getting comprehensive feedback from workgroup members on this first deliverable, but this will be the primary focus of the 2024 deliverable.

Introduction

This memo presents preliminary analysis of financial investments conducted to better understand barriers to compliance with the Washington Clean Buildings Performance Standard (CBPS) and to inform more in-depth analysis and workshop discussions with the stakeholder workgroup in 2024.

The CBPS for existing buildings is designed to secure energy efficiency and reduce greenhouse gas emissions from the Washington state's existing large building stock. The standard was one

of several pillars of Governor Jay Inslee’s 2019 climate package and is the first of its kind in the nation.

In 2023, the Washington State Legislature passed a proviso directing the Washington State Department of Commerce (Commerce) to convene a workgroup to analyze the financial investments required for owners of Tier 1 covered buildings—commercial buildings greater than 50,000 square feet—to comply with the CBPS and to make recommendations to the legislature to assist building owners in attaining compliance.

The proviso requires Commerce must submit to the appropriate committees of the legislature:

- Analysis of financial investments as required by this section by December 15, 2023; and
- A final report with recommendations by September 1, 2024.

The 2024 final report with recommendations to the legislature to assist building owners in attaining compliance must include, but are not limited to:

1. Identifying energy efficiency investments or other strategies and related timelines for increasing energy efficiency in the buildings sector;
2. Providing a cost-benefit analysis of options, including energy efficiency, to meet the goal of reducing greenhouse gas emissions from the buildings sector; and
3. Recommendations to balance financial investments while maximizing clean energy benefits for the state, including statutory changes that may be necessary for this purpose.

In September 2023, Commerce contracted with SBW Consulting in partnership with Unrooz Solutions and 2050 Institute (collectively, “SBW team” or “team”) to facilitate the Clean Buildings workgroup and conduct associated analyses. This memo addresses the requirements for the December 15, 2023 deliverable directed by the proviso. It includes an overview of the CBPS, the methodology the project team used to analyze financial investments, and the data analysis and key findings. It also discusses the limitations of the analysis and how the project team plans to expand it with the workgroup in 2024.

The findings in the memo provide preliminary insight into the landscape of Tier 1 building types in Washington state, the percentage of buildings that likely already comply with the CBPS energy use intensity targets (EUI_t), and the financial investments required by non-complying buildings to meet their EUI_ts. The memo also explores the fuller picture of potential costs and other barriers that building owners may face when trying to bring their buildings into CBPS compliance and to meet other requirements such as the energy management plan and the operations and maintenance program.

In October 2023, Commerce convened the workgroup directed by the proviso to analyze financial investments. The workgroup reviewed the draft analysis methodology and participated in a workshop to discuss findings. Workgroup members provided input on the draft methodology and findings. They expressed some concerns about the limitations of the methodology used for this 2023 deliverable to the legislature and provided suggestions for how to address their concerns. They also provided input on the additional barriers that may increase

costs for some building types and owners. This discussion will help guide the work of the workgroup in 2024.

The Other Cost Considerations section in this memo summarizes key themes from the workgroup input. The project team used workgroup input to make several adjustments to the methodology, which are reflected in the findings presented in the memo. The financial investments quantified here, along with the additional cost considerations, provide a baseline perspective on potential CBPS compliance costs for Tier 1 buildings. The memo summarizes how the baseline costs may be influenced by a number of other factors, and how these factors will inform additional changes to the methodology in 2024 as well as the funding or statutory changes the workgroup considers for the 2024 report and recommendations to the legislature.

Overview of WA State Clean Buildings Performance Standard

Buildings are the most rapidly growing source of greenhouse gas emissions in Washington state. The buildings sector is the state's second-biggest carbon polluter behind transportation, accounting for 27% of statewide emissions.

The Washington State Legislature passed the Clean Buildings Law in 2019 (SHB 1257; Chapter 285, Laws of 2019) to create an energy performance standard for existing large buildings in Washington State. The purpose of the law is to improve energy efficiency in new and existing buildings and to maximize reductions of greenhouse gas emissions from the building sector. The Clean Buildings Law is a key policy to meet Washington state's statutory emissions limits established in 2020 and to achieve the building energy and emissions reductions required to implement the Washington 2021 State Energy Strategy.

Commerce was charged with establishing the standard through rulemaking and developing the administrative framework for building owners to document compliance with the law. Commerce established the Clean Building Performance Standard (CBPS) energy use intensity targets (EUI_t) in 2020. The initial CBPS applied to commercial buildings greater than 50,000 square feet. These buildings are now referred to as Tier 1 buildings. Subsequent expansions to the Clean Buildings Law extended it to include Tier 2 buildings, which includes multifamily buildings and smaller commercial buildings. The analysis and findings in this memo only apply to Tier 1 buildings.

Tier 1 compliance dates are based on Tier 1 building size cohorts and begin in 2026 and continue through 2028. Energy use intensity used for compliance must be measured in a 12-month period not to exceed two years prior to the compliance deadline. Compliance is a building owner's responsibility and must be documented on a five-year compliance cycle. Commerce is required to update the CBPS targets every five years. According to this schedule, the second cycle of CBPS targets will be updated in 2029 with compliance dates between 2031 and 2033.

Tier 1 buildings reporting schedule for the first CBPS cycle is:

- **June 1, 2026:** More than 220,000 sq. ft.

- **June 1, 2027:** More than 90,000 sq. ft. but less than 220,001 sq. ft
- **June 1, 2028:** More than 50,000 sq. ft. but less than 90,001 sq. ft

The CBPS includes exemptions under certain circumstances. Building owners seeking an exemption must submit an application for exemption one hundred eighty days prior to the compliance date to receive exemption approval prior to the compliance date.

Exemptions include:

- No certificate of occupancy
- At least 50% of conditioned floor area is unoccupied
- Less than 50,000 square feet of conditioned space
- More than 50% of floor area designated as Factory Group F or High Hazard Group H by the Washington state edition of the International Building Code (WA IBC)
- Agricultural structures
- Building is pending demolition
- Buildings meeting certain conditions of financial hardship

Tier 1 buildings must complete energy benchmarking, develop and implement an energy management plan and an operations and maintenance program, and comply with one of four compliance paths:

1. Compliance through exemption
2. Compliance by meeting the EUI_t
3. Compliance through investment criteria
4. Conditional compliance granted by the compliance date

When the energy use intensity target (EUI_t) for a Tier 1 building is not met, or the energy use intensity (EUI) or EUI_t cannot be calculated, compliance with the CBPS must be demonstrated through the investment criteria pathway. Buildings complying under the investment criteria must complete a life-cycle cost analysis and implement an optimized bundle of energy efficiency measures that provide maximum energy savings without resulting in a savings-to-investment ratio of less than one.

Conditional compliance is a temporary compliance method that demonstrates the implementation of energy use reduction strategies required by the CBPS, but full compliance with the CBPS has not been verified. Conditional compliance allows applicants additional time to verify and document compliance with the CBPS, either through meeting the EUI_t or through the investment criteria. An ASHRAE Level 2 energy audit is required for compliance through conditional compliance. Conditional compliance through the investment criteria allows for the delay of energy efficiency measures (EEM) through phased implementation for any EEM deemed to be cost effective but has not reached the end of its useful life.

Commerce has made some adjustments to the CBPS requirements to support efficient, lower cost compliance. For example, buildings now have an option to comply at the connected building level and may not need to submeter individual buildings. Further options will be codified in 2024 for district energy systems as a result of the passage of House Bill 1390, 2023.

The CBPS has an Early Adopter Incentive program which began July 1, 2021 and applies to non-residential, hotel, motel and dormitory buildings greater than 50,000 sq. ft and multi-family buildings over 50,000 square feet. An eligible building owner that demonstrates early compliance with the Clean Buildings Standard may receive a one-time base incentive payment of \$0.85 per gross square foot of floor area, excluding parking, unconditioned, or semi-conditioned spaces. Incentive funds are limited to \$75 million. Half of this funding, \$37.5 million is available via reservation system for buildings meeting certain equity criteria, such as the highest energy using buildings, buildings in rural communities, affordable multifamily buildings and buildings located in census tracts with a risk score of 9 or 10 on Department of Health's Environmental Health Disparities Map.

Quantitative Analysis

We have completed this analysis of CBPS financial impact using the best available data on Tier 1 buildings and the costs and benefits of efficiency investments available to those buildings. More than three-quarters of these buildings either meet the CBPS target in their current condition or can meet the target by implementing improvements that have larger benefits than their costs. Our analysis assumes the balance of the Tier 1 buildings will comply via the investment criteria path. There is no reliable information yet on the costs and benefits of that path, thus, our analysis and results do not include them.

Our methodology for this analysis and more detailed results follows.

Methodology

The goal of this analysis is to estimate the financial impacts of CBPS compliance for Tier 1 building owners. Based on the way targets were established, it is expected that at least half of Tier 1 buildings in the state already have EUIs below their EUIt. Their owners will still incur the cost of reporting building energy use and floor area, but this cost is not included in our analysis. Owners of all other buildings must implement changes in operations or improvements to their buildings or the systems and equipment contained in those buildings, which reduce the building's energy use (efficiency measures). The best possible estimate of financial impact would be based on the results of an energy audit for each building. These would detail the costs and benefits for the most economical package of changes that would comply with CBPS.

Unfortunately, this data does not exist. We adopted the following methodology as the best available alternative for estimating costs and benefits, which could be carried out in the period allowed for this analysis.

Data Sources

Our methodology uses data from the following sources:

- 1. City of Seattle Energy Benchmarking.** 2019 data was provided by the Seattle Office of Sustainability and Environment (OSE). This data covered benchmarked buildings with floor area greater than 50,000 square feet of floor area. These buildings are defined as Tier 1 in the CBPS. Data for each of 752 buildings, included floor area by type of use, energy use by fuel, and the applicable EUI assigned by OSE staff. We used data for 2019 as it was prior to building changes caused by Seattle's Building Tune-ups Ordinance, before the COVID pandemic modified building operations, and consistent with the period for other data used in our methodology.
- 2. 2021 Northwest Power Plan (Council Plan).** The Council Plan was prepared by the Northwest Power and Conservation Council (Power Council). Data from this source included: costs and benefits for electric energy efficiency measures and the applicability of each measure to relevant types of use, e.g., office or hospital. In addition, we relied on Council Plan estimates of regional and WA state electric energy savings potential for these measures and corresponding estimates of floor area. The plan also included total estimated fuel consumption by fuel type which helped us convert PSE's local measures to regional measures.
- 3. Puget Sound Energy - 2023 Integrated Resource Plan (PSE IRP).** Puget Sound Energy published this plan including detailed supporting documentation. Data from this source included: costs and benefits for gas energy efficiency measures and the applicability of each measure to relevant types of use, e.g., office or hospital. In addition, we relied on estimates from this plan of regional gas energy savings potential for these measures.
- 4. Wall Street Journal (WSJ).** We used the trailing twelve-month (TTM) average estimated by WSJ for our private financing rate. Publicly owned buildings had an assumed 4.14% interest rate on financed first costs which is the default in the 2021 power plan analysis. Privately owned buildings had an 8.5% interest rate on first costs.
- 5. ProCost.** The Power Council developed and maintains this software which estimates lifetime costs and benefits for efficiency measures. We used it to estimate costs and benefits for electric measures provided by the Council Plan and gas measures provided by the PSE IRP. Inputs to the model were adjusted to reflect the economic perspective of building owners.

Identification of Tier 1 Buildings not Compliant with BPS

We processed the Seattle Benchmarking data to identify Tier 1 Buildings and further identify those whose EUIs exceed their assigned CBPS EUI. Figure 1 shows the number of Tier 1 Buildings that do and do not meet the EUI and the total floor area associated with each of these groups of buildings. A substantial majority of buildings comply with CBPS. This result is for buildings located in Seattle. We investigated available data for buildings throughout WA but

could not find a reliable source that had floor area by type of building use, building energy use, and EUI. Until such data becomes available, the data from Seattle is the best representation of Tier 1 buildings in WA.

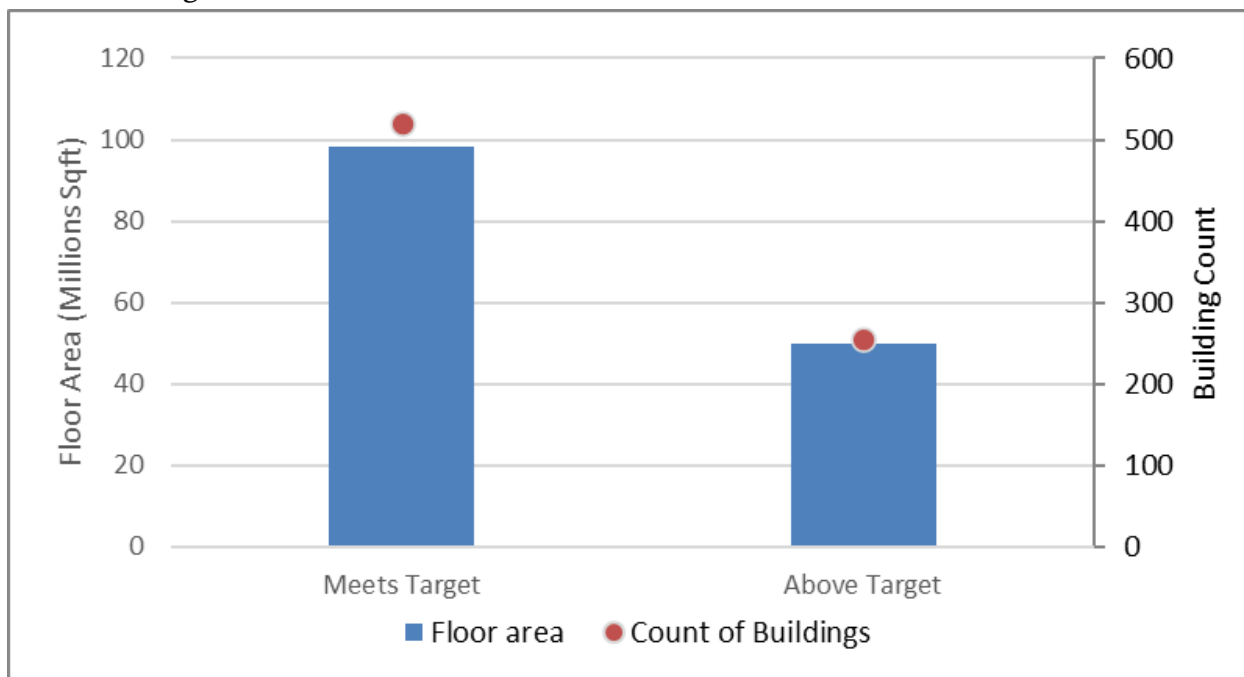


Figure 1: Buildings that Currently Meet BPS EUI Target (EUI)

Efficiency Supply Curve

If we had energy audits for each Tier 1 building that does not comply with CBPS, we could list for each building the efficiency measures that could be implemented to reduce energy use. The audits would provide estimates of lifetime costs and benefits and we could sort the measure by the ratio of benefits to costs (B/C ratio). The higher the B/C ratio, the more economically attractive a measure is from the building owner’s perspective. We refer to a list of measures applicable to a building, which is sorted by B/C ratio, as the building’s efficiency supply curve. Costs and benefits are estimated so they are additive, and the building owner can plan to implement the portion of the curve that is needed to comply with CBPS. For projecting lifetime costs and benefits, we made the simplifying assumption that all buildings comply in 2026 regardless of size.

As noted earlier, we do not have building-specific audit data. Instead, the best data available data comes from the Council Plan and PSE IRP. The Council Plan provides costs and benefits for electric measures while gas measures come from the PSE IRP. Both sources estimate average costs and benefits for applicable types of building use, e.g., office or hospital. Some measures only apply to certain types of building use, while some measures apply to all types of building use. The same measure can have different costs and benefits for different types of use.

The Power Council supply curve includes some elements that are applicable to the regional power planning analysis but not this financial analysis from the building owner perspective such

as grid losses, Transmission and Distribution (T&D) benefits, carbon benefits, and a 10% Regional Act credit for conservation. We zeroed those out in our version of the supply curves. In addition, we used retail consumer rates for energy prices instead of mid-market bulk rates.

We only used “retrofit” measures provided by the Council Plan and PSE IRP. These measures assume an existing condition baseline in estimating savings, i.e., the measures replace the existing inefficient conditions found in a building. These measures also apply the full cost of the measure. These measures are not applicable to new construction or any renovations that trigger the Seattle or Washington State Energy Codes. For new construction, the baseline would be Energy Code compliance and measure costs would be the difference between meeting the code and a more efficient alternative. Some of the Seattle benchmarked buildings might comply with CBPS as new construction, but our analysis ignores that possibility.

Figure 2 shows the efficiency supply curve for office buildings. Energy savings have been converted to a common unit kBTU so that the curve can include both electric and gas measures. Many buildings use both types of energy⁴ and we have assumed that building owners are energy type agnostic and implement measure applicable to the energy used by their building in the order of B/C ratio to comply with CBPS.

Apply Supply Curve to Benchmarking Buildings

The next step is to apply the supply curve to each of the benchmarked Tier 1 Seattle buildings that do not comply with CBPS. We create a supply curve for each building based on the types of use present in the building. For example, a building with restaurant and office floor area is assigned all the measures that apply to those types of use. The curve always has the applicable electric measures and will also contain gas measures if the building is served by that type of energy. We know the floor area of each building and can scale the costs and benefits of each measure to match each building’s floor area.

Measures are applied to each building as needed to meet the EUI. We add measures to the building in the order of highest to lowest B/C ratio and stop when the EUI is satisfied, or we have used all the measures in the curve. This generates a list of the most economically attractive measures available to each building. Given the limitations of the supply curves, it is not possible to meet the EUI for all buildings. We have assumed that those buildings would comply via the investment criteria path. We could not find any data available in the period allowed for work on this preliminary analysis that could be the basis for a credible estimate of costs and benefits associated with investment criteria compliance.

Data Analysis and Findings

We applied the methods described above in analyzing 776 Tier 1 buildings included in the Seattle benchmarking data for 2019.

⁴ Some Seattle buildings use steam from the district heating system operated by Centrio. These buildings have been treated as if they used gas for heating.

We found that most of these buildings meet their CBPS EUI. As shown in Figure 1, 67% of the buildings, containing 66% of the floor area, meet their CBPS targets. Figure 3 shows that 19% of these buildings (14% of floor area) have EUI more than twice the target. However, 20% of buildings (17% of floor area) have EUIs that exceeded the target by 10% or less, which may require little to no capital investment to reduce energy use to meet the target.

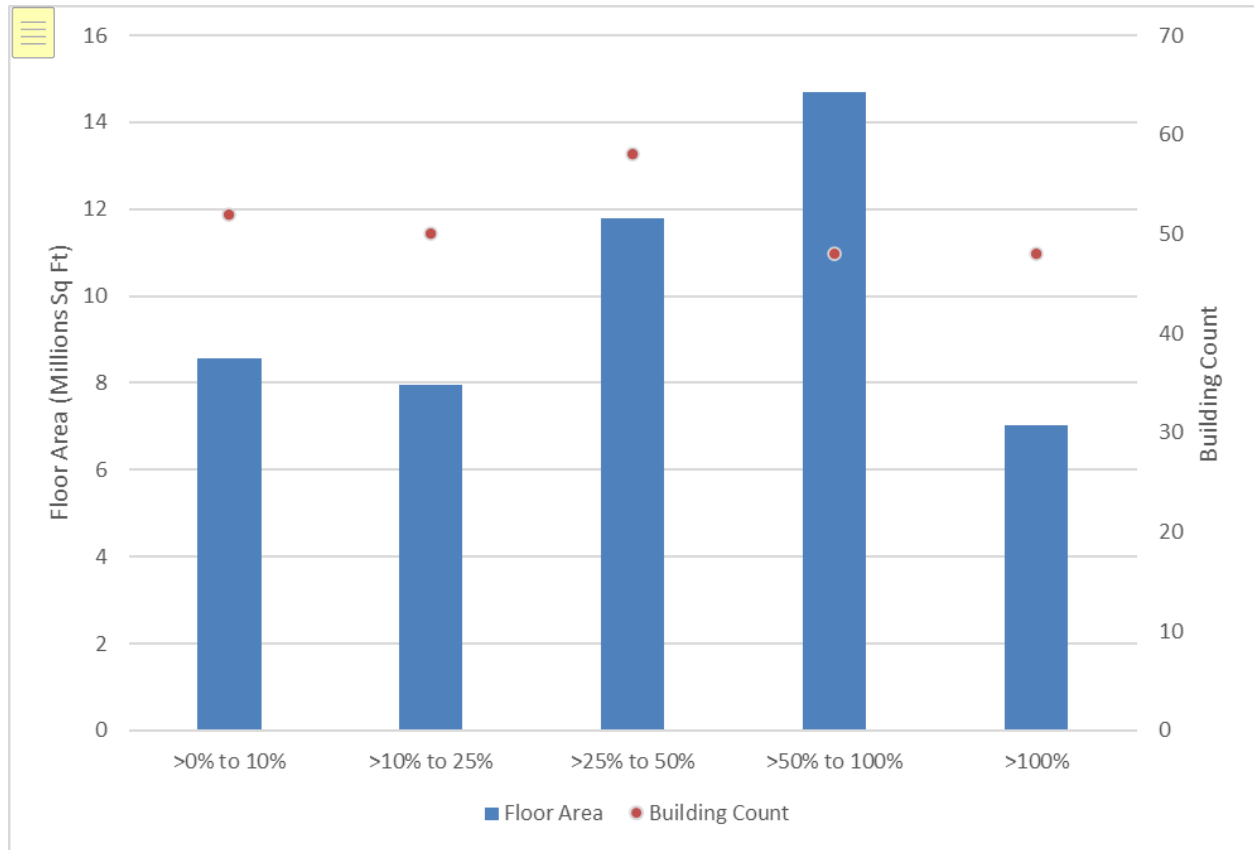


Figure 2: Reduction in EUI Required for Compliance

Which Buildings can Achieve the Target?

Measures were applied to each building until the EUI was achieved or the measure list exhausted. Buildings that meet the target or can meet it with supply curve measures account for more than three-quarters of all buildings. Figure 4 shows the total floor area and building count by compliance path. For the purposes of this analysis, we have assumed that the remaining buildings will follow the investment criteria path to compliance, which requires implementation of all cost-effective measures identified in an energy audit of the building. We do not know what measures will be implemented by those buildings and cannot estimate their costs or benefits. Therefore, the balance of this analysis focuses on the group of buildings that can achieve the target by applying the efficiency supply curve measures.

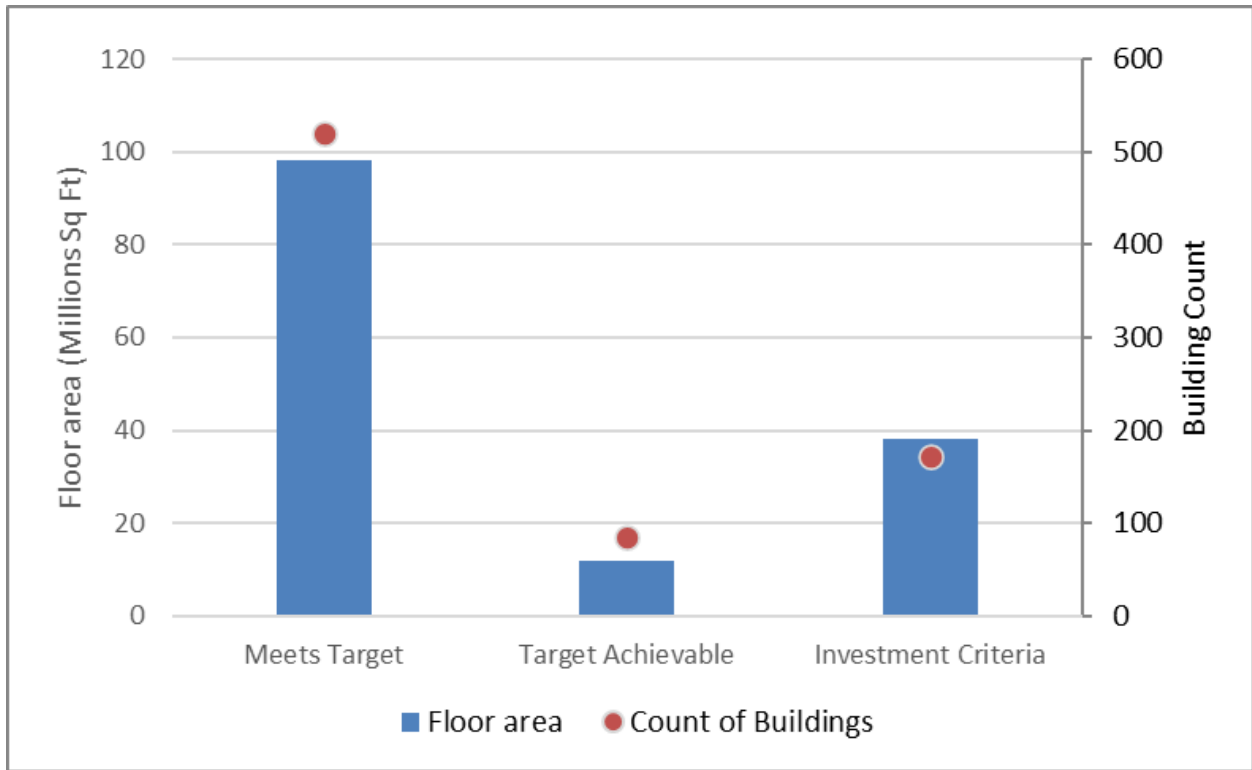


Figure 3: Buildings by Compliance Path

Among the buildings that exceed their targets, Figure 5 shows the number of buildings and total floor area for each primary building use by compliance path. Buildings with Office as primary use dominate in the “Target Achievable” path (blue bar). Offices, Lodging, and Universities have the largest share of floor area in the “Investment Criteria” path (orange bar). Note, we found that no Hospitals, Retail, and Large Retail buildings could reduce the energy savings enough to achieve their targets with only the measures from the Power Plan supply curves. Figure 6 charts the average amount these buildings exceed their target by compliance path and reveals the strong correlation between high EUI and compliance path, i.e., building types with very high EUI over target have higher likelihood of being assigned the investment criteria path in our analysis because their EUIs could not be reduced enough with the supply curve measures.

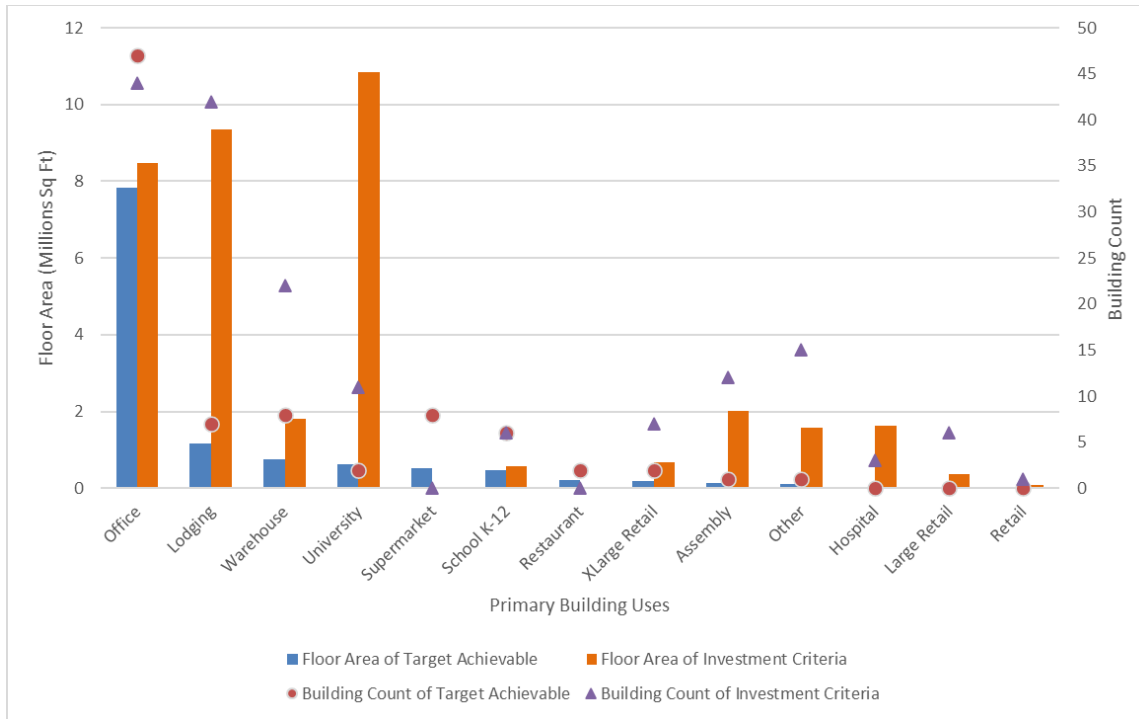


Figure 4: Total Floor Area and Building Count by Primary Building Use and Compliance Pathway

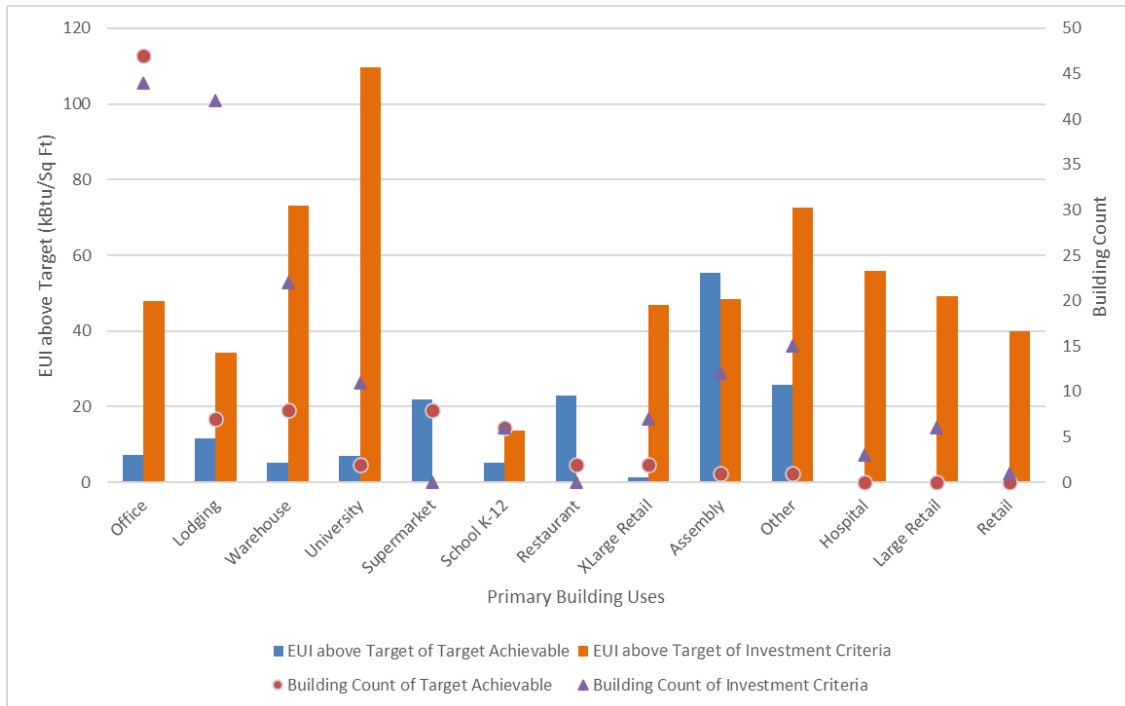


Figure 5: Average EUI above Target and Building Count by Primary Building Use and Compliance Pathway

Costs and Benefits of Compliance

The efficiency supply curve provides estimates of costs (first-cost, operations and maintenance, interest expense, and others) for each measure, which occur throughout the measure's lifetime. We assume that all measures remain in service for 20 years, with replacements as needed as they wear out. First-costs include project management, design, materials, labor, and other items required to implement a measure. We assume that 100% of the first costs are financed, at rates based on the type of owner (public or private). The supply curves also provide a lifetime stream of benefits, primarily energy bill savings. In some cases, operations and maintenance costs are reduced compared to existing conditions and these negative costs provide additional benefits.

From the list of the most economically attractive measures for each building, we sum up the first cost of these measures to determine the building owner's initial investment. In addition, we sum up the lifetime costs and benefits of the measures and compute the net present value for each building, which is lifetime benefits minus lifetime costs. The lifetime costs and benefits are each present values of the cost incurred, or the benefits realized over the next 20 years. We use the "Real discount rate" in ProCost of 3.75%, which assumes an average of ~2% inflation per year over a 20 year period in estimating the present value of these investments.

On average, for the buildings that can achieve the target, we estimate an initial investment of \$2 per square foot of floor area, as shown in Figure 7. This is an average for 84 buildings that cover a wide variety of building uses, including both publicly and privately owned buildings. The average present value of the lifetime costs (20 years) for these measures is approximately \$2.75 per square foot. However, the average present value of the lifetime benefits are almost \$4 per square foot yielding an average net present value of the investment at approximately \$1 per square foot. The benefit to cost (B/C) ratio is lifetime benefits divided by lifetime costs. For the 84 "Target Achievable" buildings, the average B/C ratio equals 1.3, which indicates that on average benefits exceed costs.

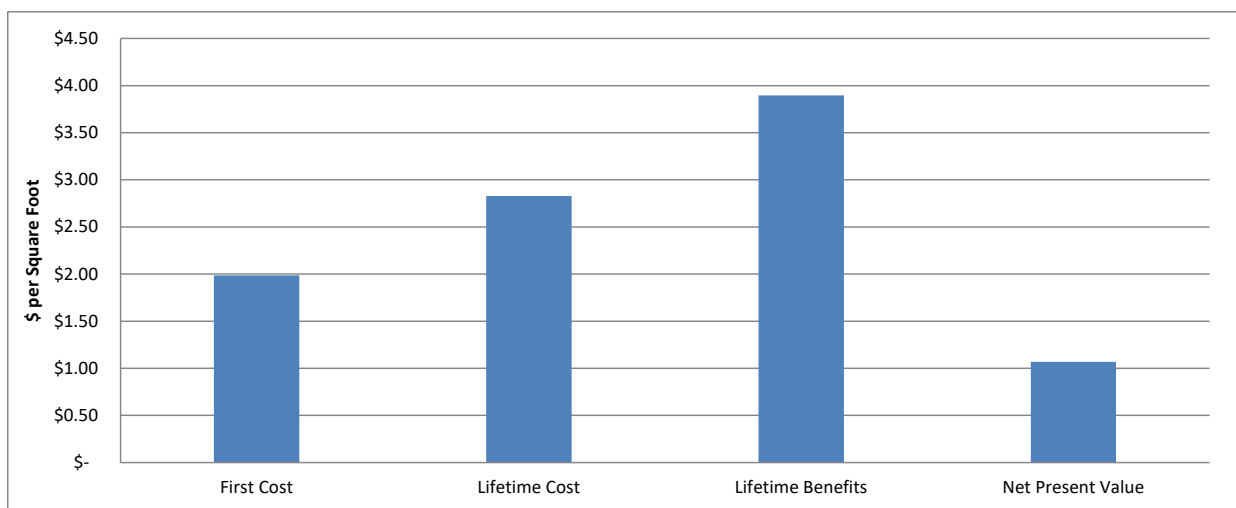


Figure 6: Costs and Benefits of Compliance

We observed that the average B/C ratio for Offices is 1.1 while warehouses have an average B/C ratio of 0.7. The remaining building types have too few “Target Achievable” buildings to draw meaningful conclusions, though all types had average B/C ratios greater than 1 except the one building with “Other” primary building use. Overall, 62 of the 84 buildings, nearly 75%, have B/C ratios greater than 1.

The CBPS divides Tier 1 into three cohorts, based on building floor area. The first cohort is for buildings larger than 220,000 square feet. The second is for buildings between 90,000 and 220,000, and the third is for buildings 50,000 to 90,000. The first Cohort of buildings must comply in 2026 with second and third in 2027 and 2028, respectively. As shown in Figure 8 the first cohort has the fewest buildings but accounts for the most floor area, while the last cohort has the most buildings but claims the least total floor area.

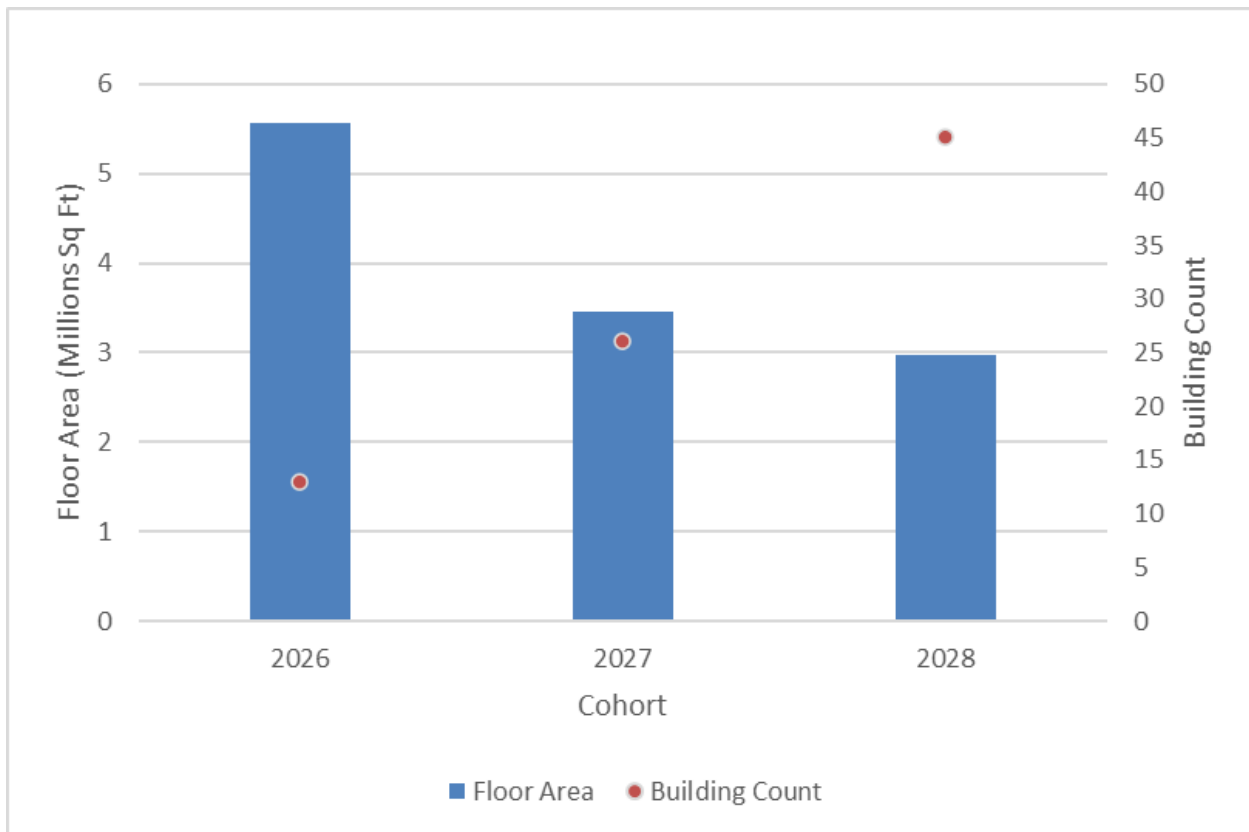


Figure 7: Total Floor Area and Building Count by Compliance Cohort

Figure 9 shows our estimated average First Cost per square foot and associated average B/C ratio for each cohort of buildings. The largest buildings, those in the 2026 Cohort, require the smallest average investment and have the highest average B/C ratio.

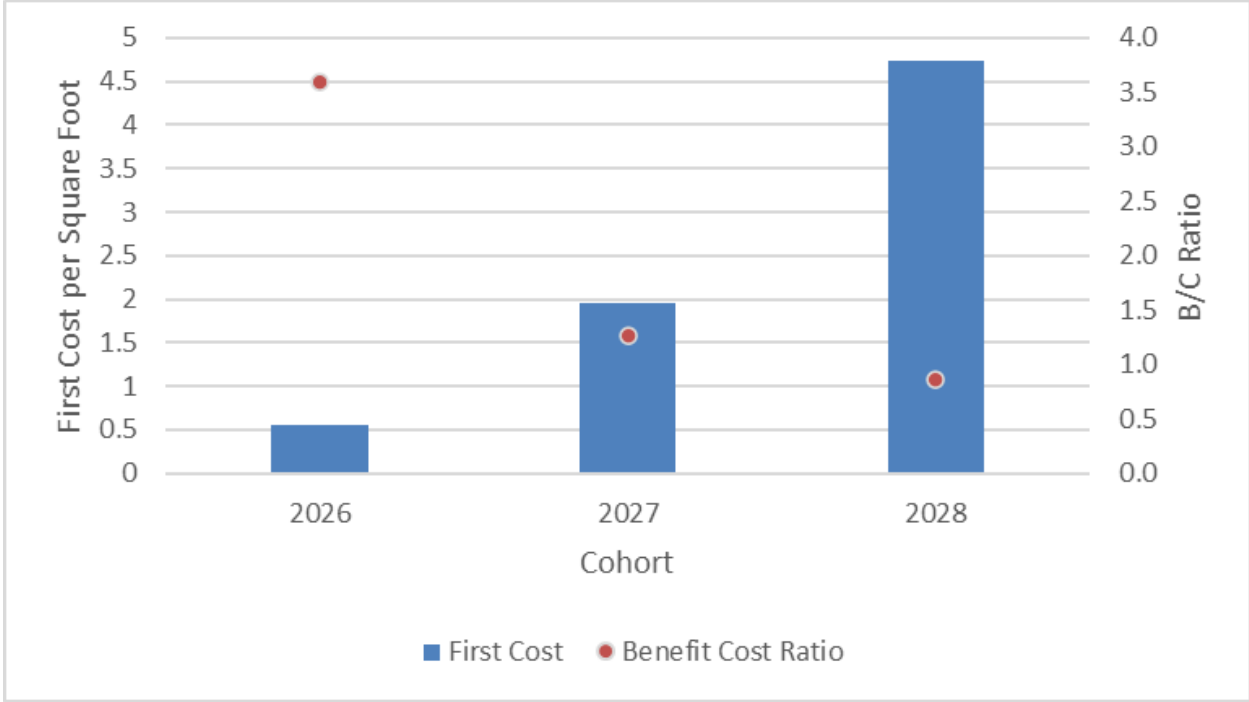


Figure 8: Costs and Benefits by Compliance Cohort

The more a building’s EUI is over its target, typically the more investment is needed to meet the target. As we progress farther into the efficiency supply curves, measures are less economically attractive. In other words, their B/C becomes less. This can be seen in Figure 10, which shows that the 2026 Cohort has the smallest average EUI overage, i.e., on average their EUI is very close to the EUI_t, and most only need the most cost-effective measures from the efficiency supply curve. The average EUI overage increases for the other cohorts and the average B/C ratio decreases, averaging at 0.9 for the smallest cohort of Tier 1 “Target Achievable” buildings. For buildings with a benefit-cost ratio less than 0.9, the investment criteria pathway allows buildings to only implement cost-effective energy efficiency measures to be in compliance.⁵

⁵ [CBPS 002 Compliance through the Investment Criteria \(wa.gov\)](https://www.wa.gov/cbbs/002/Compliance-through-the-Investment-Criteria)

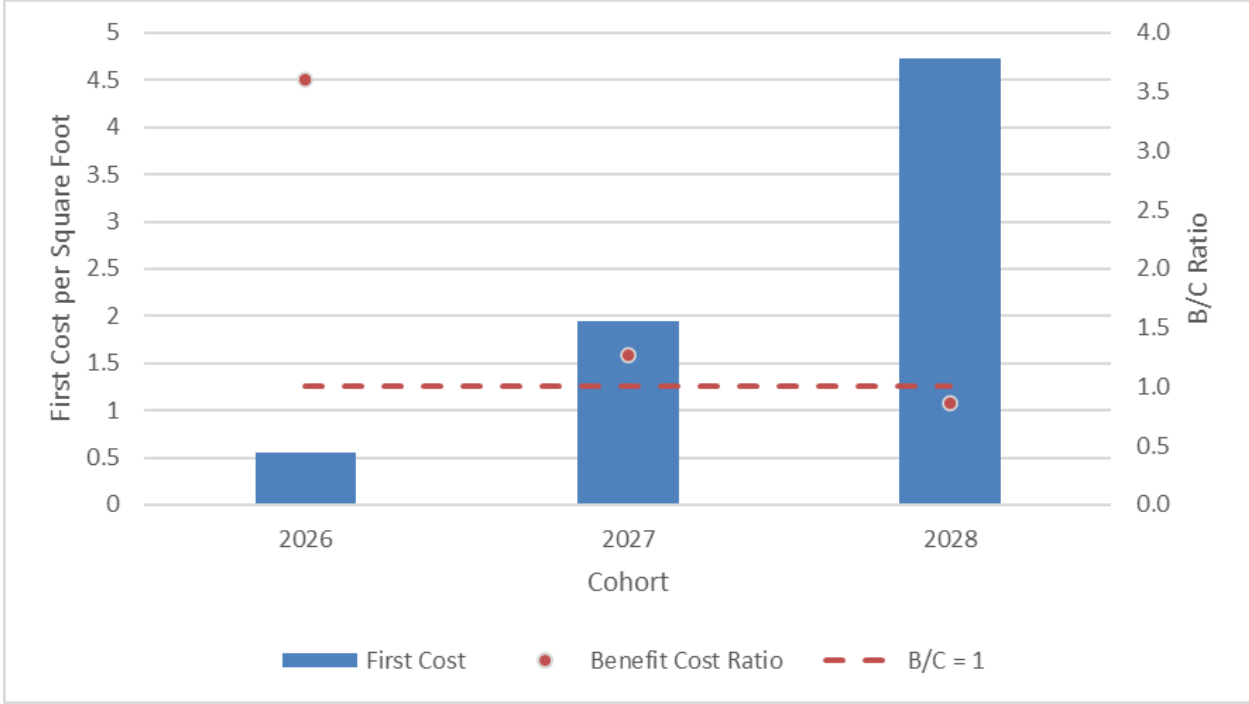


Figure 9: EUI Overage by Compliance Cohort

Another factor is the share of buildings that have public or private owners. As can be seen in Figure 11, among the 84 Target Achievable Tier 1 buildings in our analysis, the vast majority are privately owned, both by total floor area and building count.

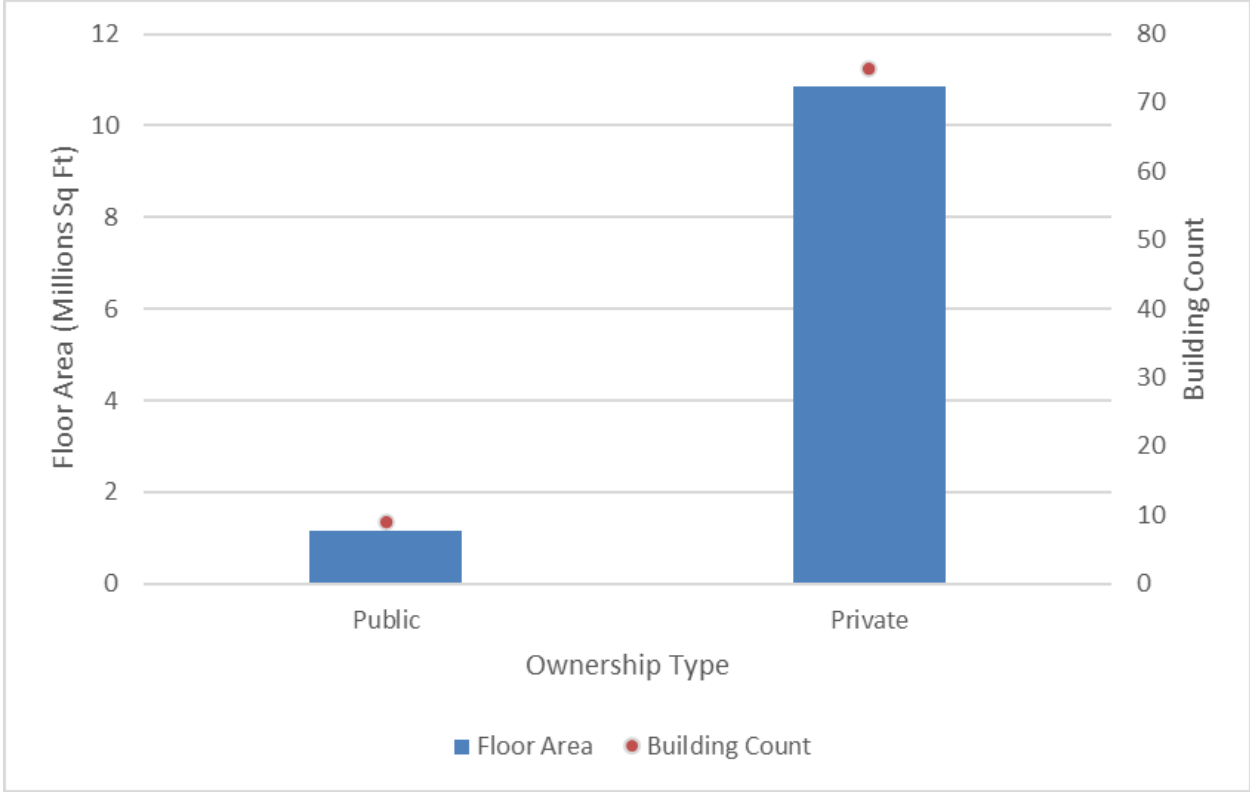


Figure 10: Floor Area and Building Count by Ownership Type

Even though we used a higher interest rate for private owners, the public buildings exceed their targets significantly more than the private buildings so require deeper investment and have on average a lower B/C ratio, as can be seen in Figure 12 and Figure 13.

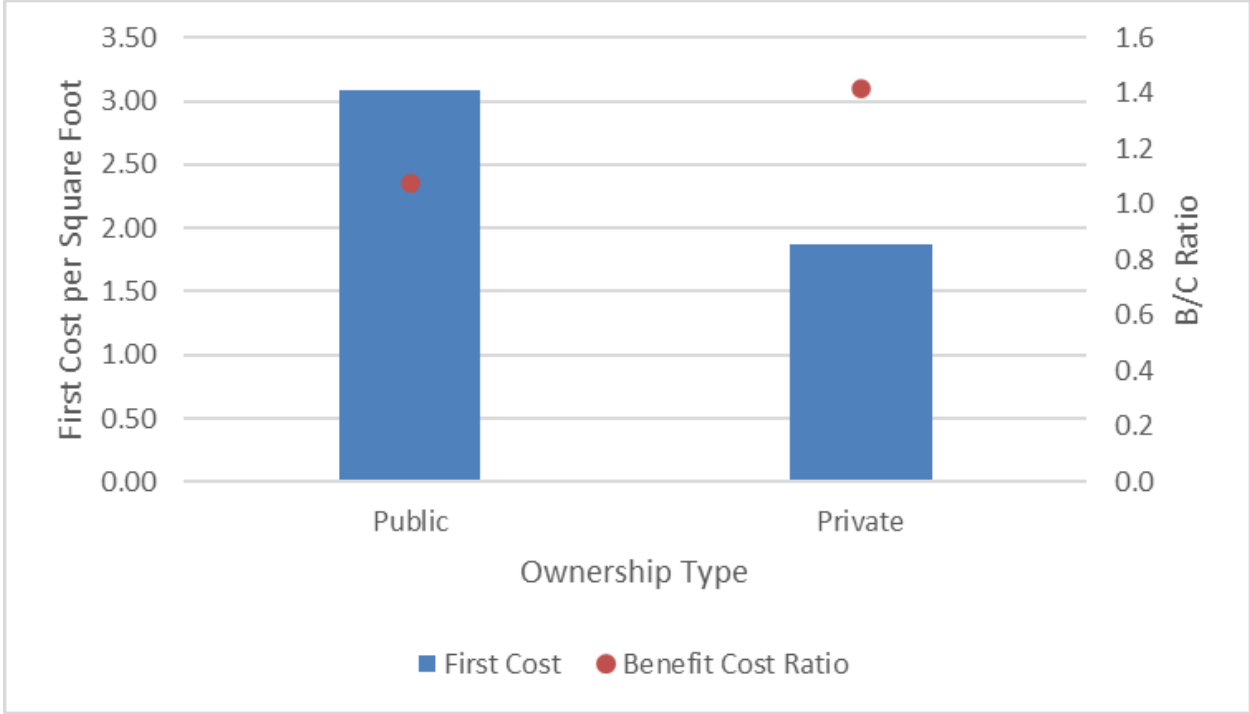


Figure 11: Costs and Benefits by Ownership Type

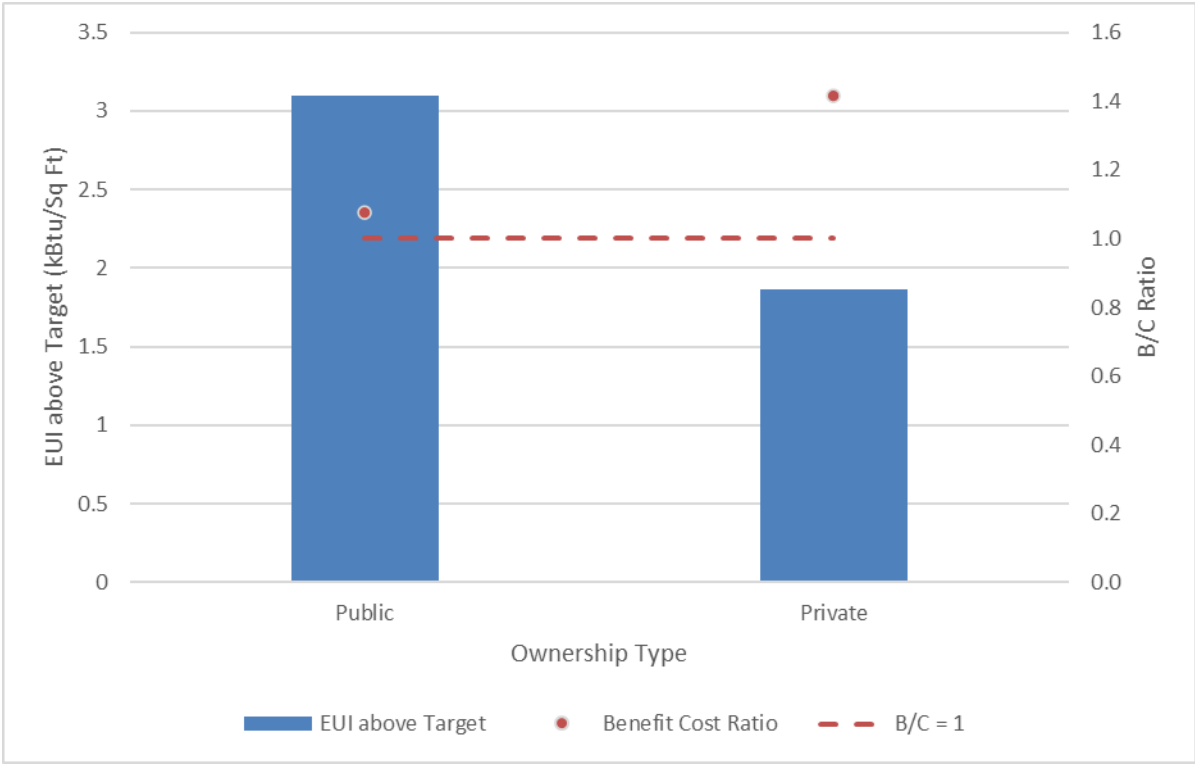


Figure 12: EUI above Target and B/C Ratio by Ownership Type

Limits of the Preliminary Analysis

Although our analysis is based on the best available data, we recognize it has the following limitations:

- Only modeling 2019 Seattle benchmarked buildings
 - ▣ Statewide building population may have different characteristics
 - ▣ Energy use characteristics are different in other climate zones
- Only retrofit measures from Power Council / PSE IRP supply curves
 - ▣ Excludes new construction and major remodel
 - ▣ Average measure cost and savings for Washington state applied to all applicable building use types.
 - ▣ Excludes energy saving electrification measures such as converting inefficient fossil-fuel equipment to high-efficiency electric equipment such as heat pumps.
 - ▣ Excludes customized, building-specific measures and whole-building design strategies.
 - ▣ Supply curve measures not sufficient to meet targets for most buildings. Buildings that are unable to reach their target with supply curves are assumed to comply via the investment criteria path and not included in this preliminary impact estimate.
- Does not consider compliance with future CBPS cycles
 - ▣ Future EUIt reductions have not been established, as Commerce is not required to update EUI targets until 2029, leaving uncertainty in how much to invest to reduce energy use now versus in the future. Decisions building owners make now to comply with the first cycle may have a significant impact on their costs for complying in the future.
- Credits, Incentives and Grants
 - ▣ Measure costs and benefits do not account for investment tax credits, utility incentives or grants from local, state or federal agencies.

Other Cost Considerations

The SBW team shared the methodology and results of our preliminary financial analysis with the Washington State Clean Buildings Workgroup on November 29th, 2023 at a two hour meeting. The workgroup membership was outlined in the proviso and represents a variety of stakeholders across Washington's diverse building sector, including but not limited to: public sector, private sector, local government, financing, and utilities. Below is a summary of additional financial considerations we heard from the workgroup members during, before and after the meeting. The workgroup's feedback encompassed both the procedural and substantive aspects of the preliminary financial assessment. The building owner representatives of the

workgroup called for a more comprehensive analysis that considers a broader range of impacts and more representative set of buildings, as well as adequate time to familiarize themselves with the analysis and provide more deeply-considered feedback. We agree with them and look forward to expanding on and improving our analysis through further engagement with the workgroup in 2024.

Cost Estimation Accuracy

The following is a summary of additional costs and other considerations that many workgroup members anticipate and feel are not fully represented in the analysis:

- Significant expenses relating to sub-metering, audits, and data gathering and management.
- Prioritizing application of limited funds between deferred maintenance and CBPS compliance.
- Limited internal capacity and human resource costs associated with compliance. While some larger institutions may possess in-house expertise, most building owners face the need for learning about the legislation, paperwork, funding applications, and project management.
- Workgroup members raised concerns about potentially high labor costs and some may need to hire consultants for additional support.

In response to the additional cost concerns expressed by the workgroup, we revised our analysis to increase costs by 20% to cover administrative, planning, and related costs. Another modification to our analysis after the workgroup presentation was to apply a higher interest rate for private capital financing. These two adjustments increased overall costs and thus lowered B/C ratios, but as noted above, most building owners will still see net positive benefits from investing in their buildings to comply with CBPS.

Policy Considerations and Alternative Compliance Paths

Some members of the workgroup described the need to consider coordination with other policies and initiatives and potential synergies or conflicts. For example, some building owners and managers will use compliance measures as an opportunity for fuel switching and decarbonization, which could increase their costs.

Financial Barriers and Funding Challenges

Discussions with the workgroup centered around challenges related to accessing capital, high lending interest rates, and occupancy rates affecting real estate values. Concerns were raised about the difficulty of obtaining funding for compliance, especially for smaller building owners, and the potential impact on compliance choices.

Next Steps

In 2024, the SBW team plans to further engage with the workgroup to expand and improve the preliminary financial analysis. The planned improvements will address many of the limitations of the preliminary analysis, including:

1. Add building-specific measures, focusing on building types least represented in the preliminary analysis
 - a. Sample 6-9 buildings that represent diverse conditions to do case studies that will provide cost and benefit estimates of building-specific measures
 - b. Collect other estimates of building-specific measures, e.g. BOMA study.
6. Adjust supply curves
 - a. Add building specific measures to supply curves
 - b. May increase the number of buildings that reach target.

As we continue this engagement with the workgroup, we will continue to collect input on barriers to compliance and ultimately formulate recommendations to the legislature for how the state can provide further assistance to ensure building owners can successfully comply with CBPS and reduce building emissions.

Conclusions and Recommendations

The analysis presented in this memo quantifies the financial investments required for Tier 1 buildings to comply with the CBPS. It is limited to the costs and benefits of efficiency measures which occur throughout the measure's lifetime. For example, costs include first-costs, operations and maintenance, interest expense, and other related costs for each energy efficiency measure. The analysis results provide a baseline estimate of the financial investments required to comply with the CBPS EUI targets. They show the impact of the measures themselves before analyzing the effect of additional cost considerations that may increase the costs for some building types.

This baseline estimate answers some important initial questions such as how many buildings already comply with the 2026-2028 CBPS targets, how much do non-complying buildings need to reduce their EUIs to comply, what are the initial and life-cycle costs of the efficiency measures required to comply, and are the retrofit packages cost-effective? These results do not provide a full picture of the potential financial investments, but they provide early insight into the range of retrofit costs and are a foundation for the workgroup to contrast the retrofit costs with possible total compliance costs for individual buildings, including additional work required to implement the retrofit measures.

Summary of quantitative analysis:

- **Buildings that already meet target.** 67% of benchmarked Tier 1 buildings in Seattle already have EUIs below their CBPS targets and do not need to apply any measures to further reduce their EUI.
- **Buildings that do not meet target.** Of the buildings with EUIs greater than their targets, about 20% can meet the target by applying the Council Plan’s efficiency supply curve measures. The remaining 80% of the buildings needing to reduce EUI to meet their target were assumed to need to take the investment criteria path.
- **Building types not represented.** Buildings with key primary uses including hospitals have such high EUIs that application of the available efficiency supply curve measures were insufficient to meet their targets. Our analysis assumed these buildings would take the investment criteria path and thus are not represented in our financial impact results.
- **EUI reductions required.** 19% of the Seattle Tier 1 buildings have EUI more than twice their target, while 20% of Seattle Tier 1 buildings have an EUI that exceeds the target by 10% or less.
- **Costs per square foot.** On average, for the buildings that can achieve the target, we estimate an initial investment of \$2 per square foot of floor area. The average lifetime costs for these measures (20 years) is approximately \$2.75 per square foot. However, the average lifetime benefits are almost \$4 per square foot, yielding an average net present value of the investment at approximately \$1 per square foot, which indicates that on average benefits exceed costs.
- **Benefits across size cohorts.** The benefits exceed cost for the 2026 and 2027 cohorts with average B/C ratios greater than 1, but the 2028 cohort on average has benefits slightly less than costs with a B/C ratio of 0.9.
- **Public buildings.** Public buildings have higher first costs than private buildings and lower B/C ratios, though the average is still greater than 1.

Summary of additional costs and other considerations:

- Sub-metering, audits, and data gathering and management.
- Near-term inflation spikes if supply chains and labor markets are tightened due to the CBPS.
- Limited internal capacity and human resource costs associated with compliance.
- Coordination with other policies and initiatives and potential synergies or conflicts.
- Access to capital, high lending interest rates, and occupancy rates affecting real estate values.

By estimating the baseline financial investments for efficiency measures and identifying an initial list of important additional cost considerations, this memo lays the groundwork to better account for the real-world cost barriers the workgroup has raised. The 2024 work will build on the estimates in this memo and will help identify how to target support for building owners. For example, what are the biggest additional cost barriers, how do they apply across various

building types and owners, and what type of additional support would most benefit building owners?

High-impact opportunities for support could include changes to CBPS administrative requirements and the Early Adopter Incentive program, more coordination across related policies and codes, additional technical assistance, guidance on retrofit best practices and high-performance solution sets, and investment in market capacity building and training to streamline compliance and reduce costs. The 2024 report will include the results of the expanded analysis and a set of prioritized recommendations for how the legislature can support building owners while maximizing the effectiveness of the Clean Buildings Law to reduce energy use and emissions in Tier 1 buildings.