Translating Potential into Performance: Assessing Compliance Costs and Policy Improvements to Maximize Building Performance Standards

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ABSTRACT

Washington state has long been a leader in energy efficiency policy and utility programs, resulting in efficient buildings and informed building owners. Yet, the state's building sector emissions have increased nearly 50% since 1990. In 2019, the Washington state Legislature enacted the groundbreaking Clean Buildings Law to reduce building emissions by establishing performance standards for large buildings. The law has been widely praised, but also met with resistance from some building owners concerned with the upfront costs to comply, among other concerns. To better understand cost constraints, identify the lowest cost, most strategic solutions for compliance, and recommend policy improvements, the state facilitated a workgroup including a diverse mix of stakeholders representing the building sector. This paper presents the analysis and recommendations developed by the workgroup to help address barriers. This paper highlights the critical role of policy and collaboration in achieving climate justice through deep emissions reductions in buildings. It presents 15 recommendations, created through a deeply participatory process, which are designed to ensure the success of the Clean Buildings Law through consideration of innovative, strategic, and equitable approaches. A key finding of the financial analysis is that buildings owners face costs close to $4.50 per square foot to comply with the law, above and beyond the costs spent on energy saving measures.

Introduction

Washington has long been a leader in energy efficiency policy and utility programs, resulting in more efficient buildings and informed building owners. Yet, the state's building sector emissions have increased by nearly 50% since 1990. In 2019, the Washington State Legislature (2019a) enacted a first-in-nation building performance law to reduce building emissions by establishing performance standards for large buildings. The law has been widely praised, but also met with resistance from some building owners concerned with the upfront costs to comply, among other barriers. To maximize the effectiveness of the energy efficiency-based law to better align with the State's statutory 2050 emissions targets, the standard provides building owners with actionable pathways to reduce energy use, emissions, and operating costs.

To better understand cost constraints, identify the lowest cost and most strategic solutions for compliance, and recommend policy improvements, the state facilitated a workgroup including a diverse mix of stakeholders from urban and rural parts of Washington. Workgroup participants included representatives from healthcare, education, state social and health services agencies, commercial building owners and operators, and local governments. The Clean Buildings Workgroup was tasked with generating information for the Legislature, including but not limited to (Washington State Legislature 2024):

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

Policy Context

Washington is required by law to meet state statutory emissions limits, including milestones such as a 45% reduction from 1990 levels by 2030, and net zero emissions and a 95% reduction from 1990 by 2050 (Washington State Legislature 2020). The 2021 Washington State Energy Strategy lays out an economy-wide approach to meet the emissions limits in multiple sectors (Washington State Department of Commerce 2020), while transitioning Washington to an electricity supply free of greenhouse gas emissions by 2045 (Washington State Legislature 2019b). According to the State Energy Strategy, to meet the economy-wide emissions limits, essentially all residential and commercial buildings must decarbonize and significantly reduce energy use by 2050. The Strategy emphasizes that decarbonizing the building sector requires the state to:

- Maximize electrification
- Maximize energy efficiency
- Optimize buildings as grid resources, and
- Minimize embodied carbon and refrigerant emissions

Clean Buildings Performance Standard Overview

Table 1: Overview of Tier 1 Compliance

Compliance Dates	220,000 sq. ft.+	June 1, 2026
	90,000 – 220,000 sq. ft.	June 1, 2027
	50,000– 90,000 sq. ft	June 1, 2028
Compliance Pathways	Exemption	Tier 1 covered buildings may submit an Application for Exemption Certificate where the building meets at least one of the exemption criteria outlined in section Z4.1 of the standard.
	Meet EUIt	Demonstrate that the building meets the required EUIt.
	Investment Criteria	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	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.

The Clean Buildings Performance Standard (CBPS) is one of the primary policies used to implement the buildings recommendations in the State Energy Strategy, and thereby meet state emissions limits by improving energy efficiency in the existing commercial building stock. The Washington state Department of Commerce (Commerce) was charged with establishing and implementing the CBPS through rulemaking and developing the administrative framework for building owners to document compliance with the law. Commerce established the CBPS energy use intensity targets (EUIt) in 2020 (Department of Commerce n.d). EUIts and compliance dates have been established for Tier 1 buildings for the first CBPS cycle (2025 CBPS). Commerce is required to update the CBPS targets by 2029 and then every five years thereafter. According to this schedule, the 2030 CBPS targets will be established by 2029 with compliance dates between 2031 and 2033.

Initially, the CBPS applied to commercial buildings greater than 50,000 square feet, excluding multifamily buildings. These buildings are referred to as Tier 1 buildings. Tier 1 compliance reporting dates for the 2025 CBPS are based on Tier 1 building size cohorts and begin in 2026 and continue through 2028, as shown below.

- 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.

A subsequent expansion to the Clean Buildings Law extended it to include *Tier 2* buildings, which includes all multifamily buildings and commercial buildings between 20,000 and 50,000 square feet. Tier 2 buildings do not have to meet energy use targets at this time, but they must benchmark and meet other reporting requirements.

Tier 1 buildings must complete energy benchmarking, develop and implement an energy management plan and an operations and maintenance (O&M) program, and comply with one of four compliance paths by the above listed deadlines:

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

When the energy use intensity target (EUIt) for a Tier 1 building is not met, or the energy use intensity (EUI) or EUIt 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 EUIt or through the investment criteria. An ASHRAE Level 2 energy audit is required for buildings pursuing 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.

There are a number of existing resources and incentives to support CBPS compliance, including cost-free technical assistance from Commerce, utilities, and building industry partners. Commerce also offers several funding opportunities, a dedicated online document library, ongoing workshops, and more. Commerce has worked with stakeholders throughout the rulemaking process to address their concerns while maintaining the integrity of the law (Department of Commerce n.d). Despite these supports, building owners still face compliance barriers. These barriers vary significantly depending on factors such as ownership (public versus private) and property type. This paper presents the analysis and recommendations developed by the Clean Buildings Workgroup to help address these barriers.

Collaboration: The Clean Buildings Workgroup

Individuals directly impacted by a policy are often the most aware of the opportunities and challenges therein (Morshedzadeh et al. 2022). Effective stakeholder engagement in policy design can ensure that "policies are crafted thoughtfully and with full consideration of local circumstances and concerns. Effective stakeholder engagement can also help foster goodwill and cooperation between the implementing body and the regulated parties, creating the best environment for maximizing mutual benefit and future compliance" (City Energy 2018, 5). While participatory strategy development in clean energy is often a tool for increasing equity (Ayala et al. 2021), the purpose of undertaking stakeholder engagement around the CBPS was to challenge assumptions and develop stakeholder-driven recommendations to support compliance success.

The SBW Team facilitated the Clean Buildings Workgroup from November 2023 through July 2024. Workgroup members represent a variety of perspectives in the building sector, including the Office of the Superintendent of Public Instruction; the K-12 Maintenance and Operation Administrators Association; of each of the state's public four-year institutions of higher education; the State Board for Community and Technical Colleges; the Department of Social and Health Services; the Department of Corrections; the Department of Enterprise Services; a health care organization; a local government; an organization representing privately owned tier 1 covered buildings; a business specializing in performance contracting for energy services; a nonprofit specializing in clean energy; and two representatives of a national association for industrial and office parks. By asking stakeholders about their experiences with the CBPS, the SBW Team was able to learn about the realities of implementation. This uncovered several assumptions, unexpected challenges, and resource gaps.

What is unique about these results is the participatory approach that was employed to develop the recommendations. These results were developed by a group of affected stakeholders in a jurisdiction with an active Building Performance Standard who are in the process of attempting or supporting compliance. The Workgroup directed the development of a series of

recommendations through every step, from outlining the key barriers, to adjusting the methodology of the financial analysis, through to generating and prioritizing the strategies and recommendations. Several organizations and reports suggest that participatory work is key to developing effective Building Performance Standards (Downy 2021; City Energy Project 2021; Di Lauro et al. 2022). "When implementing a building performance standard (BPS), jurisdictions must prioritize community collaboration and ownership" through stakeholder engagement processes (Di Lauro et al. 2022, 1). This paper builds upon the findings from Boston's own inclusive Building Emissions Reduction and Disclosure engagement process, the results of which largely focused on equity considerations (C40 Cities 2021). This paper complements the results of community engagement in Boston by using an explicitly participatory approach to develop technical and policy recommendations to support compliance with building performance standards.

The process for developing recommendations within the Workgroup consists of three stages, as displayed in Table 2.

Table 2: Steps for recommendation development

Step Timeline	**Focus**	**Question to Answer**
November 2023 – January 2024	Barriers	What challenges are making CBPS compliance difficult?
February – April 2024	Strategies	What do building owners and managers need to be able to overcome these barriers?
May – July 2024	Recommendations	How can the State mobilize the needed resources to support building owners and managers with compliance?

Barriers

The Workgroup facilitation process began with one-on-one interviews with each of the Workgroup members. These interviews were to develop trust, explain what to expect from the Workgroup process, and begin learning about the perceived barriers to compliance. The barriers were compiled into an initial list which was further developed through in-meeting discussions, written feedback, and surveys. A summary of the resulting list of barriers is displayed in Table 3. The barriers represent a comprehensive list of the concerns raised by the Workgroup members listed in order of the frequency at which they were expressed in the initial one-on-one interviews. While many of the barriers represent very real challenges to compliance, some arose due to misunderstanding the legislation, while others have existing programs and supports designed to address them. This list is not meant to present a definitive list of compliance challenges, but rather to understand the *perceived* barriers.

Table 3: Perceived barriers to compliance developed by the Workgroup

Barrier	**Explanation**
Data	Buildings are not all sub-metered so cannot use the EUIt compliance pathway and/or lack the needed data to guide their energy efficiency work
Timelines	Completing all the work necessary for compliance in the existing timeline is unrealistic
Awareness	Many building owners are still unaware that the legislation exists. Reaching the right decision maker is challenging
Budgeting Process	Public institutions have specific budgeting requirements that make it difficult to access capital quickly
Costs	The costs of compliance are unreasonable for building owners and managers
Legislative Overlap	Multiple pieces of legislation regulate building energy use and emissions, and building owners are unsure how they interact
Unreliable Savings	Buildings may not reach the required EUIt, even after a retrofit. The costs of compliance and O&M may negate energy cost savings
Value Proposition	Leadership may not see the value of compliance due to competing internal priorities
Internal Capacity	Many institutions lack the internal capacity required to understand and implement the upgrades and ongoing
Deferred Maintenance	Many public institutions are managing long lists of deferred maintenance which also require significant resources
Grant Challenges	It may be too difficult to access grants and incentives
Supply Chains / Inflation	There are concerns about long wait times for equipment, rising prices and a lack of workforce capacity
Grid Concerns	If electrification is required, there are concerns about grid capacity
Old/Unique Buildings	Unique and/or old buildings will be very difficult to bring into compliance
Unreliable Audits	Some building owners and managers expressed concerns that they are unable to access impartial and reliable energy audits
Regional Differences	The prescriptive legislation may not align with Washington's varied geography

Success Factors

The second phase of the collaboration process encouraged the Workgroup to reflect on the most pressing compliance challenges, while exploring existing resources and supports.

Representatives from Commerce, utilities, and local governments were invited to present their support programs to the Workgroup. The facilitation team also undertook additional research to discover available resources. The barriers were then sorted into seven key compliance success factors. Each success factor is presented in Table 4, along with an example of existing resources. The facilitation team led a workshop focused on each success factor to brainstorm compliance strategies. The workgroup developed nearly seventy possible strategies associated with the seven success factors, including adjustments to existing resources, expansions of programs, and innovative new solutions.

Table 4: Compliance success factors and examples of associated resources

Success Factor	**Explanation**	**Example of Existing Resources**
Awareness & Leadership Buy-in	Decision makers are aware of the legislation, see the value in compliance, and are supportive of the compliance journey.	City of Bellevue - Clean Building Incentive Program
Benchmarking & Audits	Building owners and managers can benchmark their buildings and access audits affordably, on-time, and in a way that meets the needs of the legislation.	OSPI - Small District Energy Assessment Grant
Financing	Building owners/managers can access loans, grants, bonds, and other sources of funding to cover the costs of compliance.	HB 1777 - 2023-24 Authorizing the use of performance-based contracting for energy services and equipment
Retrofits & Capital Planning	Building owners/managers can plan for and implement energy efficiency measures in order to meet compliance requirements on time.	Puget Sound Energy - Clean Buildings Accelerator
Sustained Savings	Once buildings are compliant with the CBPS, building owners and managers can sustain the savings long term.	ArchEcology - Templates for Energy Management Plans
Staff & Market Capacity	Building owners/managers have an appropriate level of staffing to achieve and maintain compliance. There is enough capacity in the market to meet both workforce demands and supply equipment.	Department of Commerce - Directory of Qualified Persons
Overall Resource & Legislative Alignment	The various resources and legislation that impact building energy use in Washington are aligned and easy to access and understand.	Department of Ecology – Climate Commitment Act

Recommendations

From this stage, the facilitation team grouped the strategies into 15 high level recommendations. The recommendations were further developed through collaboration with Commerce, external stakeholders, and individual Workgroup members. The resulting list was then brought to the Workgroup to finalize the list and to assess the support for each item. The resulting list of recommendations is presented in Table 5 and presents a roadmap of stakeholder informed recommendations which other jurisdictions can consider in the development of their building performance standards. A prioritized list of the recommendations, including all Workgroup endorsed strategies, will be submitted as a report to Commerce in 2024.

Table 5: Workgroup recommendations

Recommendation	**Goal**	**Example Strategies**
Increase the funds available in existing CBPS funding programs.	Ensure adequate public funding is available to support building owners and managers with compliance.	The Workgroup supports the Climate Commitments Act, and sees the benefits of using CCA revenue to support CBPS compliance.
Explore creative ways to unlock financing for all sectors.	Unlock creative capital opportunities to fund compliance efforts.	Develop the market for energy as a service for privately owned buildings
Ensure public institutions have the human resources necessary for ongoing compliance.	Ensure public institutions have the staff, capacity, and internal expertise needed to achieve compliance.	Increase pay scales in public institutions to be competitive with private sector compensation.
Develop a comprehensive CBPS program to holistically support all aspects of compliance.	Develop a holistic program that supports all aspects of compliance.	Increase funding available to support building owners and managers with metering
Adjust CBPS to better match the needs of building owners and managers	Make changes to rulemaking to better align CBPS with the needs and capabilities of building owners and managers, especially in the first cycle.	Cap measure life at 10 years for cost-effectiveness calculations for investment criteria pathway.
Align and create more clarity on energy efficiency and GHG reduction goals	Encourage building owners and managers to consider emissions reductions alongside efficiency goals.	Allow buildings to address GHGs and not just energy efficiency for compliance
Provide broad leadership in and deep investments in commercial sector market development to meet statutory emissions limits, implement the state energy	Stimulate the private market to encourage and support energy efficiency goals.	Fund market development in the finance and real estate sectors to standardize and integrate performance reporting into real estate valuations, transactions, and leasing agreements.

Recommendation	Goal	Example Strategies
strategy, and ensure a clean energy future.		
Ensure alignment between various pieces of between existing legislation and the CBPS	Eliminate legislative overlap and confusion.	Develop a process for mutual review between the Department of Commerce and the Code Council to encourage alignment between the state energy code and CBPS.
Develop the market capacity needed to deliver a low-energy, decarbonized, grid integrated commercial building stock	Address workforce development and supply chain shortcomings.	The State should fund energy fellows across the state.
Boost utility support and make sure there are consistent program offerings	Support utilities to offer and enhance support programs for building owners and managers.	The State should establish a utility grant to establish revolving door loan/financing options.
Incentivize and enable grid-interactive and inter-building energy planning.	Recognize the need for longer term grid resilience and creative energy efficiency solutions.	Launch a working group between the Department of Commerce, UTC, and other key stakeholders to develop a strategy for grid resilience through interactive and inter-building energy planning (through local power generation, energy storage and load flexibility).
Develop comprehensive and interactive support tools.	Simplify compliance by clarifying the legislation and making support resources more accessible.	Create a more robust and comprehensively staffed Help Desk.
Develop new compliance pathways.	Offer additional pathways to compliance that meet the goals of the legislation while easing compliance challenges.	Allow an extension/conditional compliance if waiting for equipment with long lead times
Expand outreach about CBPS and explore new outreach strategies.	Reach building owners and managers who may still be unaware of the legislation.	Expand Commerce's physical presence for outreach.
Make energy audits easier and more cost effective	Develop the market for energy audits and reduce the cost burden for building owners and managers.	Make the cost of energy audits tax deductible.

These resources (barriers, success factors, and recommendations) were developed through a stakeholder-driven and collaborative approach spanning several months. The Workgroup determined the barriers, informed the methodology for the financial analysis, generated strategies for success, and adjusted and prioritized the final recommendations. The results, as well as the methodology used to develop them, may be useful to other jurisdictions who are interested in implementing their own Building Performance Standard, and are seeking community-driven practices to support compliance.

Financial Analysis

In parallel with the recommendation development, the workgroup informed and contributed to the SBW Team's financial analysis of the costs of compliance. A preliminary financial analysis utilized available data and industry resources to estimate the costs and benefits associated with achieving CBPS compliance. Due to limited statewide data, the preliminary analysis leveraged Seattle's 2019 building energy benchmarking data, encompassing about 750 Tier 1 buildings, one-third of which exceed their Energy Use Intensity target (EUIt). The composition of the Seattle Tier 1 building stock has more high-rise office buildings, and likely some other building types such as laboratories and large hospitals, than other parts of the state, particularly outside of the greater Seattle metropolitan area. The second phase of the financial analysis recruited six buildings into case studies, all but two of which are located outside of the greater Seattle metropolitan area, to identify energy efficiency measures for helping the buildings lower energy use closer to their EUIt and estimate associated measure costs and savings. Additionally, the preliminary analysis focused on costs associated with implementing efficiency measures to reduce energy use in the building. The Clean Buildings Workgroup provided feedback that there are significant other costs incurred for compliance such as benchmarking, developing O&M programs and Energy Management plans, audits, and the ongoing costs for sustaining performance over time. The SBW team refers to these as "operational costs" for the purpose of this work and conducted additional data collection and analysis to assess them.

Preliminary Financial Analysis Methodology

Regional power planning sources provide estimates of costs and benefits of energy efficiency measures based on building and end use system types, normalized by floor area. The Northwest Power Plan contains supply curves of electric measures and Puget Sound Energy's Integrated Resource Plan (IRP) contains supply curves of gas measures. For each of Seattle's benchmarked Tier 1 buildings that exceeded their EUIt (~250 buildings), the analysis stacked the applicable measures based on property use types and existing fuel use types in order of increasing measure cost until enough savings were met to reduce the building's energy use to its target.

Expanded Financial Analysis Methodology

In response to workgroup feedback, the SBW team developed a questionnaire to survey Tier 1 building owners about the costs they are incurring to comply with the CBPS. The respondents to the survey formed the pool of buildings to recruit into case studies for further data collection. First, the SBW team compiled a list of Tier 1 buildings that had sufficient necessary information to characterize the buildings by floor area, property type, location, and EUI relative

to EUIt. In order to represent buildings outside of Seattle, the study sought Tier 1 building data from Commerce and energy utilities around the state. Commerce shared Energy Star Portfolio Manager data for buildings that have begun the compliance process by benchmarking. Puget Sound Energy (with service territories in western Washington) and Avista (with service territories in parts of eastern Washington) provided anonymized data for buildings participating in their Clean Buildings Accelerator programs[1]. Data provided from these sources yielded a list of approximately sixty Tier 1 buildings that the SBW team sent the compliance cost survey to.

Operational Costs Study

The SBW Team received twelve unique responses to the cost survey. Many of the respondents had not yet determined costs for conducting benchmarking, developing Energy Management plans and O&M programs, and conducting audits, so many of the cost questions were sparsely answered. As a signal of the complexity of the work and the level of progress being made by building owners and managers, a "no" answer was also considered valuable data. The compliance cost survey was also distributed to the Clean Buildings workgroup members. Workgroup members provided robust data, and also shared the survey with their colleagues. Table 6 summarizes the count of organizations that responded to the survey by ownership type, primary property type and location in Washington state[2].

Table 6: Compliance cost survey disposition

Ownership Type	Primary Property Type	Eastern Washington	Central Puget Sound	Rest of Western Washington
Public	Assembly/Recreation	1		
Private	Assembly/Recreation	1	1	1
Public	College/University	5	10	2
Private	Hospital/ Medical Office/ Assisted Living	Two organizations with multiple locations across the state		
Public	K-12 School	3	2	
Private	Office		1	
Private	Warehouse		1	1

Case Studies

From the twelve initial survey responses, four buildings were recruited into case studies which would audit the buildings and develop energy savings and cost estimates for three measures per building. All four were located in western Washington. There were few survey responses from buildings in eastern Washington and recruiting these buildings was unsuccessful. To include buildings from eastern Washington, two additional buildings were recruited from

[1] The Clean Buildings Accelerator provides free technical support for building owners and managers to assist them with meeting the Washington state CBPS requirements.

[2] The SBW team split Washington state into three geographic regions, based on climate and population density. The Cascades mountain range as boundary between eastern and western parts of the state and the Central Puget Sound area comprising the greater Seattle metropolitan area in western Washington. Some organizations have buildings in different regions so get counted more than once on this table.

Clean Buildings Workgroup members for secondary data collection and review. These two buildings were able to provide audit reports that include costs and energy savings for measures that, when implemented, should reduce their EUIs to their respective EUIts.

The disposition of the case study buildings is shown in Table 7. While this selection for the case studies is not intended to be a statistically representative sample, the study aimed to represent a diverse selection of buildings. This included two buildings from each of three geographic regions, two buildings per building size cohort (compliance year), and two buildings per each range of EUI over EUIt. Additionally, the study aimed to have six unique common building types and unique organizations represented.

Table 7: Case Study Buildings Disposition

Size Cohort	**Eastern Washington**	**Central Puget Sound**	**Rest of Western Washington**	
>220k Sq Ft	Hospital*	Office		
90k-220k Sq Ft		Assembly		
50k-90k Sq Ft	K-12 School *		Medical Office	College/University

* Site is review only

Two design-build firms, Ecotope and UMC, conducted primary data collection at the four sites selected in western Washington. The SBW Team collaborated to interview facility managers, visit sites, identify energy efficiency measures, and estimate measure costs and energy savings for up to three measures per site. The team focused on identifying measures with the biggest bang for the buck, i.e., get the most savings for the least cost. SBW engineers reviewed the audit reports for the other two sites to verify that the identified measures and associated cost and energy savings estimates were reasonable.

Overall Financial Analysis Results

The results of the case studies are shown in Table 8. With the exception of lighting measures at the hospital, all measures related to HVAC system improvements, and many involved retrocommissioning activities. Of note, the case study costs include constructability and abatement for retrofit measures while the supply curve measures in the preliminary analysis do not include these costs. A life cycle cost analysis found that most of the projects identified in the case studies were not economically favorable and would likely require financial assistance such as incentives and tax credits to overcome that barrier.

Table 8: Case Study Results

Building	**Energy Efficiency Measures**	**Savings Estimate (kBtu/sq ft)**	**Cost Estimate ($/sq ft)**
Office, 269k SF	EMS Upgrade, HVAC system VFDs, Heat Recovery Ventilation	17	$43
Assembly, 58k SF	Kitchen hood controls and night setback, Controls RCx	81	$3.1
Medical Office, 86k SF	VAV night setback, High-performance VAV, Boiler to ASHP	38	$50

Building	Energy Efficiency Measures	Savings Estimate (kBtu/sq ft)	Cost Estimate ($/sq ft)
College Science, 52k SF	Controls RCx, Lab fume hood VFDs, Lab DCV	40	$7.4
Hospital, 297k sq SF	VAV conversion/optimization, LED lighting and controls retrofit	69	$8.6
K-12 School, 54k sq SF	Boiler upgrade, building controls retrofit	14	$9.3

The chart below overlays the results of the case study measures on the Power Plan supply curve measure costs and savings. There is greater savings potential in the case study measures as in the supply curve measures for similar cost ranges.

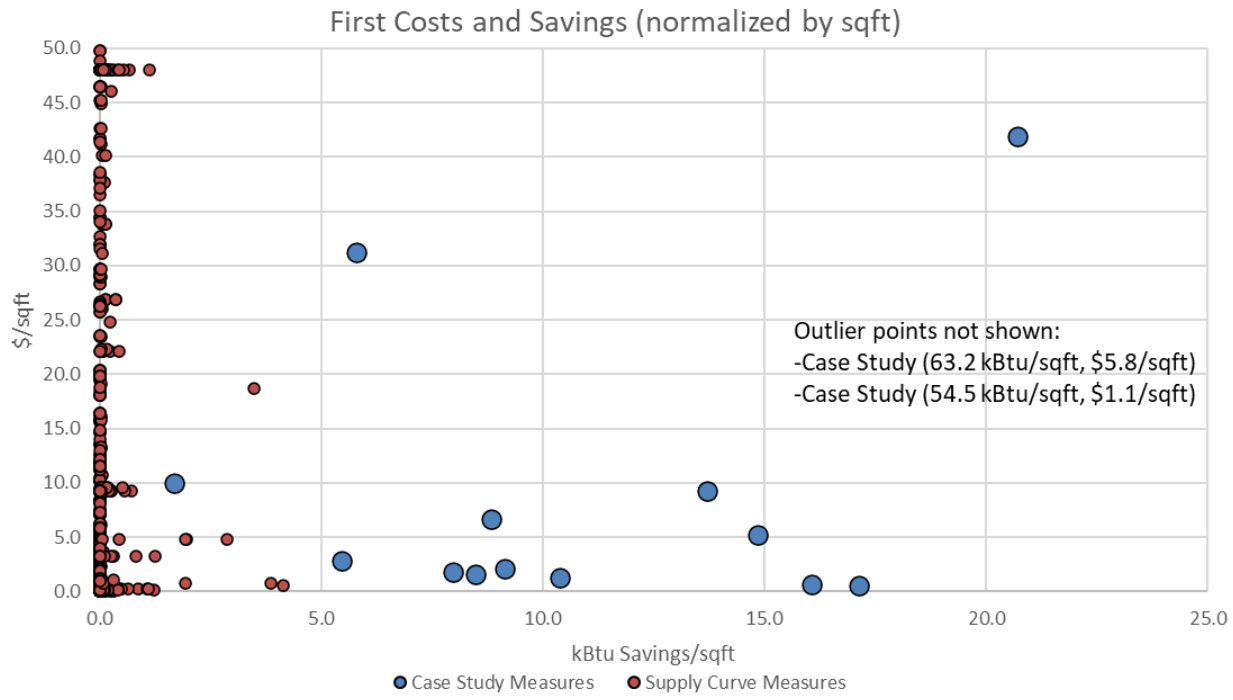

Figure 1 Cost vs Savings Comparison of Case Study Measures and NW Power Plan Supply Curve Measures

The results from the survey of compliance operational costs are summarized in Table 9. The responses covered about 300 buildings representing over 43 million square feet. According to the survey responses, buildings owners face costs close to $4.50 per square foot to comply with the law, above and beyond implementing the energy efficiency measures that would directly reduce energy use in their buildings.

Table 8: Summary of Operational Costs

Cost Type	Response Count[1]	Building Count	Total Floor Area (MM SF)	Average Cost ($/SF)
Benchmarking	20	293	42.7	$1.83
Energy Management Plan	20	299	43.0	$0.42
O&M Program	20	299	43.0	$0.43

Cost Type	Response Count[1]	Building Count	Total Floor Area (MM SF)	Average Cost ($/SF)
Audits	15	277	40.7	$0.74
Other	15	197	30.8	$1.56
Overall	**22**	**301**	**43.2**	**$4.45**

1 Approximately half of these responses are from community colleges, so these costs are biased to that building type. Also, not all responses provided costs for every cost type.

The chart below shows measure costs from the case studies and supply curves as well as the operation costs from the survey. We observe that the operational costs are in the same ballpark as the measure costs.

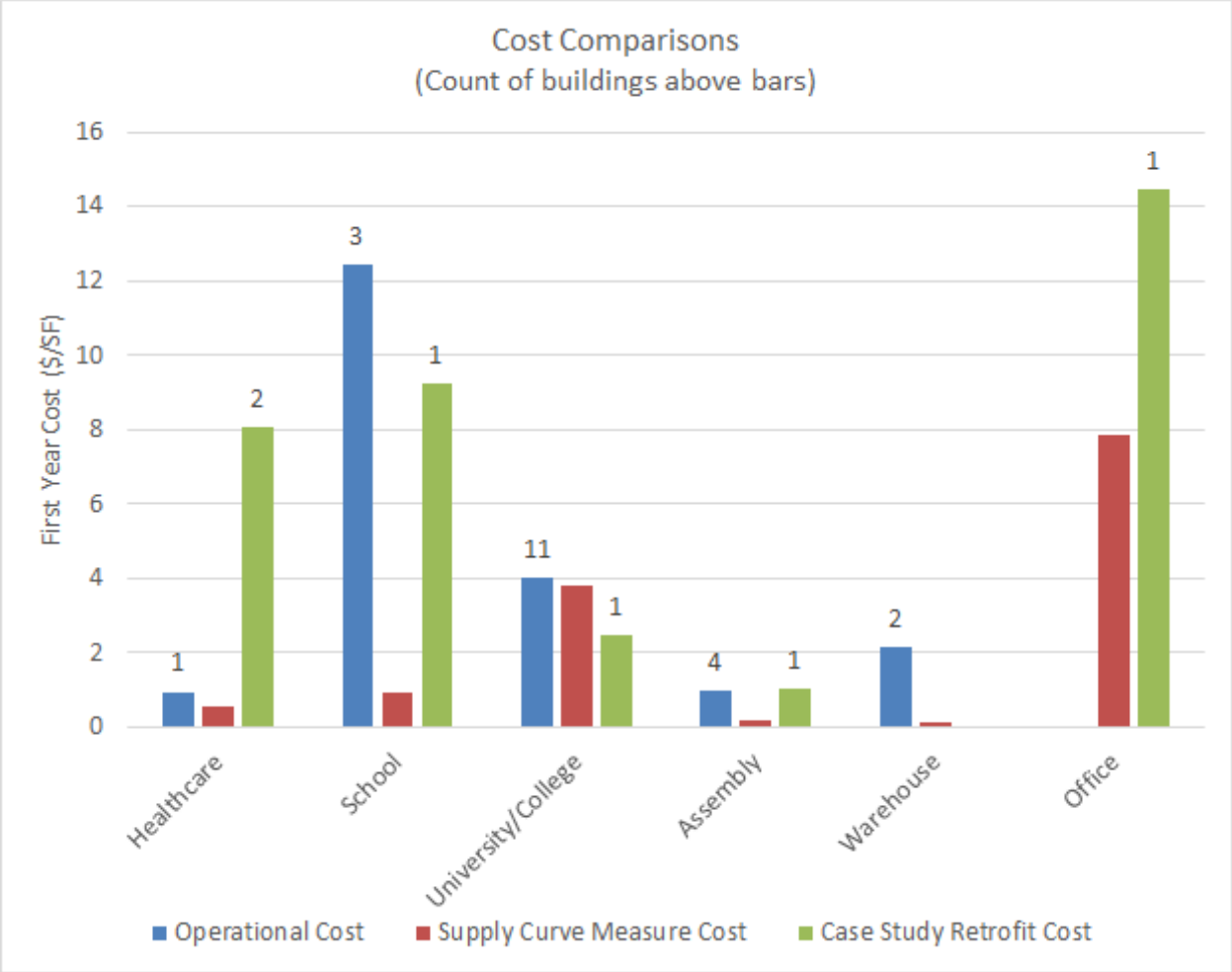

Figure 2 Comparison of Capital and Operational Costs

Key Findings

In conclusion, Washington State's Clean Buildings Law represents a significant step forward in addressing the rise in building sector emissions and aligning with the state's ambitious 2050 emissions limits. This study underscores the importance of a holistic and collaborative

approach to policy implementation, ensuring that diverse stakeholder voices contribute to the development of practical, cost-effective solutions. By fostering an inclusive workgroup and leveraging federal funds and financing mechanisms, the state can support building owners in navigating compliance challenges while achieving substantial emissions reductions. The key findings of the collaboration process and financial analysis are summarized below.

- There are significant costs to compliance which do not lead directly to energy savings, and some of these costs will continue indefinitely as compliance cycles continue and compliance targets need to be maintained.
- Longstanding challenges in the built environment which precede the legislation, such as understaffing and underinvestment, present significant challenges to compliance.
- Building performance standards create market development opportunities, which governments can capitalize on through well timed interventions that both ease compliance challenges and create thriving energy efficiency markets.
- The operational costs are on the same order of magnitude as the capital retrofit costs, thus are significant yet do not come with direct energy savings to help offset the costs.
- The largest buildings that must comply first in 2026 generally require lower investments when normalized by floor area and exhibit higher B/C ratios compared to the smaller size cohorts. The more a building's EUI is over its target, typically the more investment is needed to meet the target.
- The preliminary financial analysis found actions to comply with CBPS yields a positive financial return on investment, while most of the projects identified in the case studies were not economically favorable and would likely require financial assistance such as incentives and tax credits to overcome that barrier.

The workgroup's input significantly shaped the financial analysis, leading to recommendations that balanced feasibility and impact. Their diverse perspectives provided insights into the unique challenges and opportunities faced by different stakeholder groups, which would otherwise have been overlooked. This collaborative effort not only enriched the analysis but also ensured that the recommendations that would be impactful in the successful implementation of the Clean Buildings Law.

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