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California Energy Commission

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RE: Comments on Senate Bill 48 Implementation Report - Draft California Building Energy Performance Strategy Report - July 2026

Submitted by:

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California Energy Commission Docket Comment

Dear Commissioners,

The Western States Council of SMART (WSC) appreciates the opportunity to provide comments on the Draft California Building Energy Performance Strategy (BPS) prepared pursuant to Senate Bill 48. We support the Commission's overall direction and commend staff for developing a thoughtful framework that recognizes the importance of benchmarking, technical assistance, workforce development, equitable implementation, and long-term accountability. We also appreciate that several WSC recommendations submitted during the Commission's 2024 stakeholder process appear to have informed the Draft Report, particularly those related to workforce development, building benchmarking, occupant benefits, and long-term building performance.

SMART represents nearly 25,000 sheet metal workers throughout California, Arizona, Nevada, and Hawaii. Our members fabricate, install, start-up, Testing Adjusting and Balancing (TAB), service, and maintain Heating, Ventilation, and Air Conditioning (HVAC) systems in residential, commercial, institutional, and industrial buildings. In California, we partner with more than fifteen apprenticeship training centers to prepare the next generation of HVAC technicians, TAB professionals, commissioning specialists, and heat pump installers. Our members work throughout the entire life cycle of mechanical systems and therefore understand that true building performance extends well beyond equipment installation or energy consumption alone.

Overall, we believe the Draft Report establishes a strong foundation for California's Building Energy Performance Strategy. We respectfully offer the following recommendations to strengthen implementation by emphasizing operational performance, healthy buildings, qualified verification, and long-term accountability.

The Western States Council recommends that the Commission:

1. Expand the definition of building performance to include occupant health, indoor environmental quality, ventilation, filtration, thermal comfort, installation quality, equipment maintenance, and workforce competency alongside energy efficiency and greenhouse gas reductions.
 2. Connect benchmarking with operational verification of HVAC Systems (Ventilation Verification) so that significant benchmarking anomalies lead to appropriate investigation, corrective action, and continuous improvement.
 3. Utilize existing nationally recognized technical standards, including ANSI/ASHRAE Standard 62.1-2025 Section 8 and Table 8-1, where applicable, to verify that ventilation systems continue operating as designed throughout the life of the building.
 4. Build upon California's existing Mechanical Acceptance Testing (MAT), TAB, Ventilation Verification, and workforce infrastructure rather than creating duplicative systems.
 5. Continue strengthening High-Road workforce policies by establishing a clear and thoughtful definition recognizing workforce quality as an essential component of building performance and a means of maximizing California's return on public investments.
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Recommendation 1 – Expand the Definition of Building Performance

The Draft Report appropriately identifies benchmarking as the foundation of California's Building Energy Performance Strategy. However, building performance should not be defined solely by energy consumption and greenhouse gas emissions. A high-performing building should also provide healthy indoor environments, maintain proper (design) ventilation and filtration, deliver thermal comfort, operate reliably, and protect occupant health.

Buildings themselves do not consume energy. The systems operating within buildings consume energy. Energy consumption is an important performance indicator, but it does not, by itself, demonstrate whether a building is operating as intended. Mechanical systems can consume less energy while simultaneously providing insufficient outdoor air ventilation, reduced

filtration effectiveness, or degraded thermal comfort. Such conditions may improve benchmarking metrics while diminishing occupant health and comfort.

Accordingly, we recommend expanding California's definition of building performance to include components of HVAC Ventilation Verification:

- Indoor Air Quality (IAQ) & Thermal comfort
- Ventilation performance & Filtration performance
- Controls functionality & Equipment reliability
- Installation quality & Workforce competency
- Occupant health outcomes
- Non-energy benefits

Because building systems consume energy, improving system performance—not simply replacing equipment—is fundamental to successful Building Performance Standards. Building Performance Standards should ultimately evaluate whether buildings achieve the outcomes California Codes intends to deliver, not simply whether equipment has been installed or benchmarked. This outcome-based approach was also recommended during the Commission's 2024 stakeholder process and remains an important opportunity to strengthen the final Strategy.

Recommendation 2 – Connect Benchmarking with Verification

Benchmarking provides valuable information about building energy use but should be viewed as the beginning of the performance improvement process rather than its conclusion.

The Draft California Building Energy Performance Strategy appropriately recognizes that abnormal energy use identified through benchmarking can reveal equipment malfunction and create opportunities to reduce energy waste. The report specifically notes that benchmarking allows building owners to identify unusual changes in energy consumption that may be caused by malfunctioning equipment, making equipment performance a central component of long-term building performance.

However, the Draft Report should more explicitly recognize that HVAC systems represent one of the largest sources of avoidable energy waste in existing buildings and that benchmarking alone will not identify all of the issues. California Energy Commission research found that more than 50 percent of newly installed HVAC systems and 85 percent of replacement systems were not operating correctly because of poor installation practices, increasing energy consumption by an estimated 20 to 30 percent¹. Likewise, the U.S. Department of Energy's review of 44 field studies concluded that duct leakage, airflow deficiencies, and refrigerant charge faults are pervasive, with most systems operating below their rated efficiency². These findings demonstrate that achieving building performance goals requires not only installing efficient

equipment but also ensuring that HVAC systems continue to function as designed throughout their service life through qualified verification, maintenance, and ongoing performance assessment.

When benchmarking identifies unusual changes in building energy use, the appropriate next step is operational verification.

Benchmarking identifies symptoms. Operational verification identifies causes. Corrective action restores performance.

Where applicable, California should build upon ANSI/ASHRAE Standard 62.1-2025 Section 8 and Table 8-1, which establish nationally recognized requirements for inspection, verification, and validation of ventilation system performance throughout a building's service life.

The Building Energy Performance Strategy should encourage risk-based operational verification whenever benchmarking indicates persistent or significant performance anomalies. This approach provides building owners with practical flexibility while ensuring that buildings continue delivering the energy efficiency, IAQ, and occupant health benefits intended by California's investments.

Operational verification should also leverage California's existing Mechanical Acceptance Testing, TAB (2025 CMC, Section 403.10), and Ventilation Verification programs wherever appropriate, creating a continuous performance framework rather than a series of isolated compliance activities. This recommendation builds upon concepts first submitted during the Commission's 2024 stakeholder process.

Building performance rarely declines because of a single catastrophic equipment failure. More commonly, performance gradually changes as sensors drift, controls are modified, occupancy changes, maintenance practices vary, and equipment ages. This gradual decline, commonly referred to as performance drift, represents one of the greatest opportunities for Building Performance Standards to improve long-term building performance through operational verification and corrective action.

This recommendation becomes increasingly important as California accelerates deployment of heat pumps and advanced building controls. High-efficiency equipment cannot deliver expected energy savings or occupant benefits unless it is properly installed, commissioned, verified, operated, and maintained throughout its service life.

Recommendation 3 – Qualified Verification

The Draft Report appropriately recognizes the importance of data quality and notes that independent third-party verification can improve the accuracy and consistency of benchmarking information while reducing future administrative burdens. We strongly support this direction and recommend expanding the concept of qualified verification beyond benchmarking data alone.

Building performance is ultimately determined through the operation of mechanical systems, many of which require specialized technical knowledge to evaluate. Ventilation Verification activities such as TAB, airflow measurement, controls verification, ventilation testing, and filtration verification involve different technical competencies and should be performed by personnel qualified for the specific scope of work being evaluated. A one-size-fits-all credential is unlikely to ensure the technical expertise required across these diverse disciplines.

Where Building Performance Standards require field measurements or operational verification, California should rely upon existing nationally recognized qualifications and California workforce standards rather than developing new certification systems. California has already established qualification requirements for several building performance activities through the California Mechanical Code, Title 24 Mechanical Acceptance Testing (MAT), and nationally accredited personnel certification programs. Building upon these existing frameworks will improve consistency, reduce implementation costs, and leverage an experienced workforce already serving California's buildings.

The Commission should also recognize that operational verification of HVAC Systems (Ventilation Verification) differs from simple inspection. Inspections generally determine whether required components are present and appear functional. Operational verification evaluates whether systems continue performing as intended under actual operating conditions. Validation activities involving airflow measurements, balancing, controls operation, ventilation performance, or other quantitative testing should be performed by qualified professionals using calibrated instruments and established procedures consistent with recognized industry standards.

Matching qualifications to the work performed will improve confidence in reported building performance while ensuring building owners receive technically sound recommendations for corrective action when deficiencies are identified.

Recommendation 4 – Build Upon Existing California Programs

California has already invested substantial resources in developing programs that improve building performance throughout the design, construction, and operation of buildings. The Building Energy Performance Strategy should build upon these existing programs whenever practical rather than creating parallel administrative structures.

Existing programs that provide a strong foundation include:

- Energy benchmarking.
- Building permitting and inspections.
- Title 24 Mechanical Acceptance Testing (MAT).

- Testing, Adjusting and Balancing (TAB).
- Utility incentive and technical assistance programs.
- Existing apprenticeship and workforce development infrastructure.
- Existing enforcement and compliance mechanisms.

These programs each address different stages of a building's life cycle. Mechanical Acceptance Testing verifies that newly installed systems initially meet California's Energy Code requirements and confirms that systems operate according to the owner's project requirements and design intent. TAB verifies airflow and hydronic performance.

Ventilation Verification of HVAC systems leverages the existing objectives and technical principles of TAB and Mechanical Acceptance Testing (MAT) programs. While MAT verifies performance at project completion, Ventilation Verification applies similar methodologies to existing buildings to confirm that ventilation systems continue to satisfy minimum code requirements and operate as originally designed throughout the building's operational life. Benchmarking evaluates long-term energy consumption. Together, these programs provide complementary information that can support a comprehensive Building Energy Performance Strategy.

The Commission should also consider improving coordination among these existing programs to reduce duplication while improving accountability. For example, benchmarking results that identify significant or persistent performance anomalies could be used to prioritize operational verification, while findings from operational verification could inform future technical assistance, corrective actions, and incentive opportunities.

Similarly, California should continue exploring opportunities to improve permit compliance and statewide accountability. Existing permitting systems provide valuable information regarding building improvements and code compliance. Better integration of MAT and operational verification would provide building owners, jurisdictions, and the Commission with a more complete understanding of building performance throughout a building's service life.

Building upon existing California programs will reduce implementation costs, simplify compliance, and maximize the value of previous public investments while creating a more coordinated Building Energy Performance Strategy.

Recommendation 5 – Workforce Quality and Public Investment

The Western States Council strongly supports the Draft Report's recognition that workforce development is essential to California's Building Energy Performance Strategy. We particularly

appreciate the emphasis on High-Road workforce practices, registered apprenticeships, equitable access to careers, prevailing wages, and investments that create long-term economic opportunity.

We recommend expanding this discussion to recognize workforce quality as a fundamental building performance strategy rather than solely a workforce development strategy.

We also encourage the Commission to more clearly define what constitutes a High-Road workforce for purposes of Building Energy Performance Strategy implementation. Simply referencing the term "High-Road" without identifying the workforce standards and family sustaining benefits that support it creates the potential for inconsistent interpretation. Organizations with substantially different training models and workforce practices may all characterize themselves as "High-Road," even though their ability to consistently deliver high-quality building performance outcomes may vary significantly.

To ensure that public investments achieve their intended energy, health, and equity objectives, the Commission should clearly identify the measurable characteristics of a High-Road workforce. These may include participation in state-approved registered apprenticeship programs, prevailing wage requirements, industry-recognized certifications where appropriate, ongoing continuing education, family-sustaining careers, and demonstrated competency in the scope of work performed. Clearly defining these expectations will help ensure that High-Road workforce policies consistently support qualified workers, high-quality installations, and long-term building performance rather than serving as a general label applied to fundamentally different workforce models.

California is making historic investments in building decarbonization, electrification, heat pumps, energy efficiency, and healthy buildings. Whether these investments achieve their intended outcomes depends largely upon the quality of installation, TAB, controls integration, maintenance, and ongoing operational verification performed by the workforce implementing these projects.

The Commission has correctly recognized that successful Building Energy Performance Standards require long-term accountability. That same principle applies to workforce investments. Public investments should support workforce models that consistently deliver measurable building performance outcomes, including improved energy efficiency, greenhouse gas reductions, Indoor Environmental Quality (IEQ), ventilation performance, occupant comfort, and equipment reliability.

Investments in state-approved apprenticeship programs, labor-management training partnerships, community colleges, and continuing education provide California with a sustainable workforce capable of adapting to future technologies while maintaining high standards of workmanship throughout the life of a building. Comprehensive state accredited apprenticeship programs prepare technicians to understand complete building systems rather than individual technologies, enabling them to effectively install, maintain, diagnose, and optimize increasingly complex HVAC systems.

Workforce quality also protects California's public investment. Proper installation and verification reduce callbacks, improve equipment longevity, maximize first-time performance, and increase the likelihood that buildings will achieve the energy savings and occupant benefits anticipated by state programs. Conversely, poor installation quality can substantially diminish the performance of even the most efficient equipment.

Recognizing workforce quality as a building performance strategy aligns California's climate objectives with its workforce development objectives and helps ensure that investments in people and technology produce lasting public value.

Consideration of Prior Stakeholder Recommendations

The Western States Council appreciates the Commission's willingness to engage stakeholders throughout development of the Building Energy Performance Strategy. We recognize that many concepts submitted during the November 2024 stakeholder process appear to have informed the current Draft Report, including greater emphasis on workforce development, equitable implementation, benchmarking, occupant benefits, and long-term building performance. We appreciate the Commission's thoughtful consideration of those recommendations.

We also note that several substantive recommendations submitted during the 2024 stakeholder process do not appear to have been incorporated into the current Draft Report or are only partially addressed. These include recommendations to:

- Evaluate actual building performance outcomes in addition to compliance activities.
- Integrate California's existing Mechanical Acceptance Testing program into long-term Building Energy Performance implementation.
- Strengthen permit compliance and improve coordination among existing compliance programs.
- Build upon existing permitting and performance data systems to improve statewide accountability.
- More explicitly recognize workforce quality and installation quality as essential components of building performance.

We respectfully request that the Commission discuss whether these recommendations were considered but determined to be outside the scope of the current Draft Report, remain under consideration for future implementation, or were not adopted for other reasons. Understanding the Commission's rationale will help stakeholders provide more informed and constructive recommendations as the Building Energy Performance Strategy continues to evolve.

The Western States Council believes the Draft California Building Energy Performance Strategy establishes a strong and thoughtful framework for improving the performance of California's

existing building stock. We support the Commission's emphasis on benchmarking, technical assistance, equity, workforce development, and long-term accountability and believe these recommendations can further strengthen the final Strategy.

California has an opportunity to establish one of the nation's most comprehensive Building Performance Strategies by defining building performance not only through reductions in energy consumption and greenhouse gas emissions, but also through verified improvements in IEQ, ventilation, filtration, thermal comfort, equipment reliability, occupant health, and workforce quality.

By integrating energy benchmarking with operational verification through Ventilation Verification, utilizing nationally recognized standards such as ANSI/ASHRAE Standard 62.1-2025 where appropriate, and requiring verification by qualified technicians in accordance with California Mechanical Code Section 403.10, the Commission can leverage California's existing high-road workforce infrastructure to build upon proven programs. Physical verification by qualified professionals is fundamental to achieving long-term building performance and ensuring that public investments deliver the intended energy savings, indoor air quality, occupant health, and decarbonization outcomes.

The Western States Council appreciates the Commission's continued collaboration with stakeholders and respectfully requests consideration of these recommendations as the Building Energy Performance Strategy is finalized. We look forward to continuing to work with the California Energy Commission to develop practical, technically sound, and equitable policies that deliver healthier buildings, stronger communities, measurable energy savings, and lasting public value for all Californians (Just Transition).

California has already demonstrated national leadership by measuring building energy performance. The next opportunity is to ensure that benchmarking leads to verified building performance.

By connecting benchmarking with operational verification, indoor air quality, qualified workforce standards, and California's existing quality-assurance infrastructure, the Commission can create a Building Energy Performance Strategy that not only measures buildings, but helps them perform better throughout their operational life.



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 2. Residential HVAC Installation Practices: A Review of Research Findings. (n.d.). . US Department of Energy.
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