DOCKETED	
Docket Number:	24-BPS-01
Project Title:	Building Energy Performance Strategy Report
TN #:	262944
Document Title:	Energy Solutions Comments - Energy Solutions Comments - 24-BPS-01
Description:	N/A
Filer:	System
Organization:	Energy Solutions
Submitter Role:	Public
Submission Date:	5/7/2025 11:12:48 AM
Docketed Date:	5/7/2025

Comment Received From: Energy Solutions
Submitted On: 5/7/2025
Docket Number: 24-BPS-01

Energy Solutions Comments - 24-BPS-01

Additional submitted attachment is included below.

May 7, 2025

California Energy Commission
Docket Unit, MS-4
Docket No. 24-BPS-01
715 P Street
Sacramento, California 95814

Re: California Building Energy Performance Strategy Report, Docket No. 24-BPS-01

Introduction

Energy Solutions is a mission-driven organization specializing in the market transformation of the energy sector towards clean energy technologies. We support the development, implementation, and passage of environmentally beneficial public policies, particularly as they concern the built environment. The following comments are submitted on behalf of Energy Solutions.

Thank you for the opportunity to offer input to inform California's Building Energy Performance Strategy Report. This proceeding is important because mandatory Building Performance Standards (BPS) are a key mechanism to reduce greenhouse gas (GHG) emissions in existing buildings, which are collectively one of the state's largest GHG sources. According to the California Air Resources Board existing buildings account for 25 percent of GHG emissions in the state, second only to transportation.[1] There are many compelling reasons to invest in a future where buildings are evaluated based on how they perform, and there is a system in place to ensure buildings continue to perform well over time.

These comments are structured with our general comments on the proceeding first, followed by responses to select questions from the Request for Information (RFI) that was released May 19, 2024. As a means of introduction, see response to RFI question 1 below.

1. Please provide the following information about you and/or your organization:

1.1. Names & email addresses of public contacts for you and your organization.

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[1] https://ww2.arb.ca.gov/our-work/programs/building-decarbonization#:~:text=Residential%20and%20commercial%20buildings%20are,neutrality%20by%202045%20or%20earlier.

1.2. What are your areas of interest in this report development process?

Energy Solutions' primary interest is in California developing a thoughtful strategy that enables existing buildings to achieve the energy savings and GHG reductions that are necessary to meet statewide goals. We support a strategy that employs emerging technology and incentive programs to prepare the market for pragmatic regulations. We also support building upon the existing frameworks such as the consensus-based *ASHRAE Standard 100-2024 Energy and Emissions Building Performance Standard for Existing Buildings* (ASHRAE 100).

Our specific interests are:

- Encourage investments to **prepare the market** for an equitable and evidence-based mandatory BPS.
- Develop a **secure statewide data infrastructure** that will minimize administrative costs and provide reliable data to support continuous improvement.[2]
- Create an **effective compliance verification and enforcement mechanism** that creates accountability for meeting mandatory requirements.
- **Support workforce development** so the state has the human resources to implement a whole-building performance strategy.

1.3. Description of your organization and the constituency you represent.

Energy Solutions is an organization with an interest in achieving equitable energy savings and GHG reductions. We achieve our mission by thoughtfully supporting market transformation using all means available including research on emerging technologies, incentive programs, and regulations. Energy Solutions has decades of experience with all building-related efficiency programs and clean energy technologies. Since 2001, we have successfully advocated for the adoption of more than 150 revisions to the California Energy Code (Title 24, Part 6) and more than 60 revisions to the California Appliance Standards (Title 20), participated in proceedings for ASHRAE standards and for the International Energy Conservation Code (IECC), and contributed to over 75 federal appliance standards and test procedure rulemakings. These codes and standards will save electricity equivalent to the annual generation of 85 power plants in the United States in 2030.[3]

The constituency we represent is industry professionals who are interested in seeing California succeed in decarbonizing existing buildings. We represent ourselves as a mission-driven organization and offer our insights to help achieve the stated goals of Senate Bill 48. Specifically, our staff have expertise in the following areas:

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[2] See our response to RFI questions 6 and 10 for more information on the value of a secure statewide data infrastructure.

[3] Energy Solutions estimates electricity savings using a bottom-up stock rollover model, drawing upon analysis conducted by the California Public Utilities Commission and the U.S. Department of Energy. To convert electricity savings to avoided power plants, Energy Solutions uses the standard definition of a "Rosenfeld:" 3 TWh of annual electricity savings.

- **Data science:** Our Data Team is skilled in collecting, cleaning, storing, and analyzing data to enable strategic data-driven decisions. Designing and maintaining the necessary data infrastructure will be an essential element to successfully implementing a mandatory BPS.
- **Software development:** Energy Solutions has 70 software developers. There are many existing and unintegrated software tools that could support a successful existing building strategy. Software improvements are needed to enable seamless processes for all market actors.
- **Emerging technologies deployment:** Our staff have experience identifying and evaluating emerging technologies and shepherding promising technologies along to the next phase in the market transformation curve. Generally, the energy industry is on the right track to develop the technologies that are needed to improve existing buildings to meet energy and climate goals. Investments are needed to create seamless software and data infrastructure that will allow the industry to continuously evaluate whole-building performance.
- **Program implementation:** Energy Solutions has been designing and running incentive programs for thirty years. In that time, we have established ourselves as a leader of innovation in program design.
- **Policy advocacy:** We have extensive expertise developing regulations that are effective at reducing energy use and GHG emissions in buildings, including developing and updating building codes and appliance standards.
- **Codes and standards compliance:** We support efforts to improve compliance with building codes and appliance standards. Any regulation is only effective if compliance is high; and there are many compliance challenges, particularly for buildings.

1.4. What is the best way to outreach and engage with your constituency?

We invite CEC staff to communicate directly with Energy Solutions staff. We are also encouraged to see that CEC is convening technical advisory groups to seek input. One working group should be tasked with defining data needs and design specifications for the secure statewide data infrastructure. Other groups could identify workforce development needs, provide input on effective compliance verification and enforcement, and define metrics for a mandatory BPS.

It is Energy Solutions' mission to achieve energy and GHG goals equitably. While Energy Solutions itself does not represent environmental or social justice communities, we are strong advocates of both procedural and distributional equity. CEC should prioritize procedural equity in its public process for this strategy and follow best practices for engaging environmental and social justice communities to ensure they are aware of and have an opportunity to share their input. Similarly, in the process of developing a mandatory BPS, equity should remain at the forefront. Care should be given to create a strategy that proactively delivers the support that is needed to award buildings with low and medium-income occupants, and buildings in disadvantaged communities, the benefit of high-performance buildings at the same time as the rest of population.

Launch Incentive Programs to Address Barriers to Mandatory BPS

We suggest that CEC collaborate with the California Public Utilities Commission (CPUC), utilities, community choice aggregators (CCAs), and regional energy networks (RENs) to develop incentive programs that are specifically designed to overcome key technical, market, and administrative challenges to implementing a fair and evidence-based mandatory BPS. Voluntary programs can play a valuable role in preparing the market for mandatory regulations, helping to navigate the many uncertainties tied to regulating building performance. In particular, these voluntary incentive programs could be used to address the following issues:

- **Establishing Baselines and Targets**: Voluntary programs can help establish and test methods to establish baselines and set appropriate, equitable, and achievable performance targets for all building types.
- **Impacts Assessments:** Reliable data on the effect of performance targets on markets should be gathered before mandatory requirements are established. Voluntary programs can include tailored data collection to support research on specific concerns such as impacts on housing affordability, energy bills, and the health and safety of buildings.
- **Workforce Training:** Preparing a knowledgeable workforce is essential. Incentive programs can include workforce training to prepare the workforce before regulations take effect.
- **Building Owner and Manager Motivation and Support:** building owners and managers need motivation and support to meet targets. Incentive programs can identify barriers and build accessible support to overcome each barrier.
- **Data Infrastructure**: as mentioned in our response to Question 10, a secure statewide system for collecting, storing, and analyzing performance data is key to effective implementation. This data infrastructure could be developed for voluntary incentive programs.
- **Compliance Verification:** Voluntary programs provide an opportunity to design and test reliable methods for verifying compliance with performance standards.
- **Evaluation and Improvements:** Since BPS implementation will evolve over time, voluntary programs can serve as a testing ground for continuous evaluation and improvement mechanisms.

The incentive programs could initially focus on a single building type, serving as proof-of-concept to demonstrate how data can effectively inform a CEC proceeding on the feasibility of a mandatory BPS for that category. Ideally, voluntary programs would be implemented for each building type and vintage several years in advance of any corresponding mandatory BPS taking effect. Over time, more building types would be included in the incentive program and then be considered for mandatory BPS. These programs should encourage early adoption though market awareness and outreach. Establishing a long-term roadmap with a clear timeline for transitioning from voluntary programs to regulations will help guide market transformation in a structured and manageable way.

We prefer a statewide program over programs that serve a portion of the state. A statewide program ensures:

- equitable access to prepare markets in all regions in preparation for future mandatory requirements;
- collection of comprehensive data on how buildings throughout California meet performance targets, including the specific improvements or operational practices used and their associated costs;
- consistent workforce development throughout the state;
- establishment of a secure, centralized data infrastructure which is essential for reducing administrative burdens, supporting compliance efforts, and ensuring effective enforcement (see our response to RFI Question 10 for more on the significance of secure statewide data systems); and
- study of all relevant market actors across the state, allowing the CEC to design compliance support that is responsive to the diverse needs of different stakeholders.

While a statewide program is preferred, creating such a program will require thought and innovation and it may be easier for an individual utility, CCA, or REN to create and pilot a program design before bringing to the other utilities and CPUC for consideration as a statewide program. If a pilot is cost effective, achieves energy savings, and prepares the market for mandatory BPS, the pilot program design could become the framework for a statewide program.

Some existing programs already include aspects that would be essential for a BPS-readiness program, so the program design would not be entirely new. For example, the Normalized Metered Energy Consumption (NMEC) programs[4] such as Market Access Program (MAP)[5], the Commercial Energy Efficiency Program (CEEP)[6], and the Metered Energy Program[7] provide incentive payments based on actual metered energy savings. Strategic Energy Management (SEM)[8] programs offer participants coaching and technical assistance to save energy with a focus on operational improvements and behavioral changes that could be used to achieve BPS targets.

Finally, when considering how incentive programs will interact with a mandatory BPS, it is recommended that incentives are available to buildings that are subject to mandatory requirements. While incentives are not available for equipment that is minimally compliant with California's Title 20 or Title 24, Part 6 requirements, a different strategy is needed for mandatory BPS. The improvements that are needed to California's existing buildings will require significant financial investments. Financial incentives should be part of the solution to funding the necessary performance improvements.

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[4] CPUC's Rulebook for Programs and Projects Based on Normalized Metered Energy Consumption, version 2.1 is available here: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M520/K881/520881077.PDF

[5] https://aesc-inc.com/map/

[6] https://willdanefficiency.com/commercial-energy-efficiency-program/

[7] https://socalren.org/sites/default/files/MeteredSavingsFactSheet_FINAL20190409.pdf

[8] The Marin Clean Energy SEM Program (https://mcecleanenergy.org/mces-strategic-energy-management-program/) and the Southern California Edison Local Commercial Strategic Energy Management Program (https://pep.clearesult.com/pep/commercial/) are examples of SEM programs.

Energy Solutions

Responses to Select RFI Questions

2. *What building performance metrics (such as site energy use intensity, carbon dioxide equivalent emissions, or peak electric demand) should be considered in a building performance strategy? What building performance metrics could be used to trigger building-level interventions (such as enforcement, incentives, etc.)?*

Establishing appropriate metrics is a critically important aspect of the program design. It warrants in-depth analyses and ongoing dialogue with impacted parties. Nuances associated with metrics can have a profound impact, so decisions should be made with the benefit of sound analyses. Energy Solutions is interested in participating in ongoing discussions on the appropriate metrics for BPS.

While we are not offering a recommendation on which metric to use, we encourage CEC to select metrics that:

- Encourage buildings to pursue energy efficiency upgrades
- Encourage GHG emissions reductions
- Support effective load management
- Are intuitive and easy to understand
- Are based on reliable, verifiable, and readily available data (e.g., the building's actual energy use data)
- Are harmonized with metrics used to determine compliance with Titel 24, Part 6 and building energy labeling systems.

The CEC should use a transparent process to select the metric or metrics, and the methodology used to create the metrics should be thoroughly documented. For example, if CEC decides to use a source energy metric then CEC should publish a methodology report that explains how the factors to convert measured site energy use to source energy were created. There should also be guidance on how to apply the metric(s) appropriately within the BPS regulatory framework.

Both California and national model codes have made progress on establishing metrics that align with energy and climate goals. CEC should consider the metrics recommended in ASHRAE 100 and those used by the CEC Building Standards Office for Title 24, Part 6.[9, 10]

3. *What building specific conditions and circumstances (such as vintage, climate zone, orientation, etc.) should be included in a building performance strategy?*

Energy Solutions recommends that over time most if not all conditions and circumstances be considered in a long-term building performance strategy. All existing buildings should be performing as well as possible, so all buildings should be at least analyzed for inclusion in a mandatory BPS. The state should consider phasing in a statewide mandatory performance requirement based on building type and building size with the requirements being established based on evidence (data) and putting equity at the forefront in the regulatory development process.

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[9] https://efiling.energy.ca.gov/GetDocument.aspx?tn=255318-1
[10] https://efiling.energy.ca.gov/GetDocument.aspx?tn=230290&DocumentContentId=61830

4. How should building benchmarking data be used to prioritize building upgrades and incentives?

Benchmarking data should be considered in establishing the baseline for each unique building and should be the basis of the customized BPS target for each building.

Benchmarking data should be aggregated into a data warehouse and correlated with other data that is available from multiple publicly available and proprietary sources to allow analysts to establish appropriate BPS targets based on the building's unique physical attributes, location, and occupancy characteristics as well as how the building compares to similar buildings in the state. For example, benchmarking data should be considered with data sets that use predictive modeling to estimate energy and GHG performance of buildings if they complete specific retrofits (e.g., XeroHome,[11] AutoBEM,[12] ResStock,[13] and ComStock[14]).

The goal should not be to get all buildings of the same type to meet the same goals. The objective must be to improve a building's performance against its own potential.

6. What enforcement mechanisms should be considered for both benchmarking and a potential building performance requirement? Which similar programs are known to achieve high compliance rates?

We recommend that CEC be given the charge and authority to establish and update statewide requirements for benchmarking and mandatory BPS. CEC should also have the responsibility to verify compliance and enforce the requirements including imposing penalties for noncompliance.

Local government building departments in California, as in jurisdictions across the country, are often understaffed and under-resourced to do the enormous amount of work they are tasked with. Placing the burden of enforcing expanded benchmarking requirement or new BPS regulations on local government units (another "unfunded mandate") will have limited success. It is more prudent to empower a state agency to implement the new requirements. Doing so will reduce overall administrative costs and result in improved compliance.

The benefits of state-level compliance and enforcement as opposed to local enforcement are evident when looking at compliance with California's Title 20 and Title 24, Part 6 requirements. CEC has the sole responsibility to enforce Title 20 requirements. CEC has created and maintains the Modernized Appliance Efficiency Database System (MAEDbS),[15] which includes information about all regulated products that meet Title 20 requirements. The CEC has mechanisms to track and document compliance and frequently takes action to penalize noncompliance.[16] As a result, compliance with Title 20 requirements is high. In contrast, CEC is not responsible for enforcing the statewide energy code because the enforcement authority is disaggregated and assigned to local jurisdictions. Each jurisdiction has a process to enforce the statewide rules, and enforcement is not consistent across the state.

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[11] https://about.xerohome.com/
[12] https://www.ornl.gov/content/automatic-building-energy-modeling-autobem
[13] https://resstock.nrel.gov/
[14] https://comstock.nrel.gov/
[15] https://www.energy.ca.gov/programs-and-topics/programs/appliance-efficiency-program-outreach-and-education/modernized
[16] https://www.energy.ca.gov/programs-and-topics/programs/enforcement-case-settlements/case-settlements.

Assigning local jurisdictions authority to enforce energy codes has resulted in an absence of reliable data on if and how buildings throughout the state comply with code. Jurisdictions do not collect or store code compliance data in the same way; information is not always digitized; and despite CEC's attempts to aggregate data in statewide repositories, there is not an effective mechanism to collect code compliance data from local jurisdictions. Without data, it is difficult to identify compliance gaps (e.g., which requirements are problematic, which jurisdictions are not enforcing code). The lack of statewide data limits the state's ability to make evidence-based decisions to tailor compliance improvement initiatives, and the state is not empowered to impose penalties to buildings that do not comply with code or jurisdictions that are not enforcing state regulations. See our response to RFI Question 10 for a discussion of the importance of an effective statewide data infrastructure and what the infrastructure might entail.

While we recommend that CEC be responsible for enforcing a statewide mandatory BPS, local jurisdictions should have defined roles to support effective implementation. Local jurisdictions are in a strong position to understand local conditions that impact building performance. They are also poised to work directly with building owners and managers and support local workforce development initiatives. We encourage CEC to create an enforcement framework that recognizes local jurisdictions' value, supports effective collaboration between the state agency and local jurisdictions, and delegates appropriate roles to local jurisdictions. The program should be designed and funded so the state is obligated to provide adequate resources for local jurisdictions to fulfill any new mandates. For example, CEC could provide funding to jurisdictions to cover the costs of new staff and expenses associated with the program, or CEC could employee staff that they loan to jurisdictions.

Jurisdictions play an important role in demonstrating the viability of policies before they are considered for statewide adoption. As CEC considers BPS concepts for the entire state, jurisdictions should be encouraged to lead by establishing local, mandatory BPS and share lessons learned with CEC staff.

A statewide mandatory BPS should not prohibit local jurisdictions from adopting ordinances that are more stringent than the statewide minimum requirements. Just as jurisdictions are allowed to adopt reach energy codes that are more stringent than Title 24, Part 6, jurisdictions should be allowed and encouraged to lead the way on mandatory BPS. CEC should anticipate that initially a statewide mandatory BPS may not be well harmonized with local mandatory BPS rules. CEC should create a plan to align statewide and local mandatory BPS programs, including identifying how leading jurisdictions can continue to move faster than the state and help inform the expansion and enforcement of a statewide requirement.

In addition to working with local jurisdictions, we encourage CEC to form collaborative partnerships with local and regional organizations to create a network that building owners and managers can rely on for ongoing support to maintain persistent building performance. This network could include regional energy networks, energy utilities, community-based organizations, trade and contractor's associations, educational organizations (e.g., grades schools and high schools, community colleges, universities), and beyond.

We are supportive of CEC's Existing Buildings Office (EBO) being responsible for administering the current benchmarking requirements and any potentially expanded regulations. The EBO resides within the Efficiency Division, which also houses the branches that are responsible for the

development and compliance for Title 20 and Title 24, Part 6. This division has the expertise and resources that are needed to effectively administer statewide standards. Just as the appliance standards and building codes are administered by unique branches within the Efficiency Division, we agree that the existing building performance strategy should be administered by a dedicated branch. A prospective mandatory BPS should not rely on or be closely linked to the energy code development and compliance infrastructure. This critical new policy initiative needs to be administered by a division that has dedicated resources, capacity, and expertise.

When the time comes to establish mandatory BPS, CEC should design penalties for noncompliance thoughtfully so building owners and managers do not choose to pay the fine rather than pursuing building retrofits or changes to management practices that allow the building to meet the performance target. There may be innovative approaches to penalizing noncompliance while still sending a strong signal that the building owner should invest in improvements instead of paying an annual fee for noncompliance. For example, fines a building owner pays for noncompliance could be placed into an escrow account that the building owner can only access to pay for building upgrades or modifications to management practices.

10. For future building performance policies, how can the state manage and minimize administrative costs to the state and local governments while maximizing building performance improvements?

As mentioned in the previous response, we recommend that CEC maintain the responsibility to verify compliance and enforce any expanded benchmarking requirements or prospective mandatory BPS. This will be more cost efficient and effective than delegating compliance to local jurisdictions. Securing statewide funding for a critically important program to meet energy and GHG goals is likely more reliable than securing funding for every jurisdiction in the state and unfunded mandates will result in low compliance.

Having access to reliable data will allow CEC to make informed and evidence-based decisions when administering the program. The ability to make evidence-based decisions will enable the state to use the available funds for tailored interventions that are most effective in improving and maintaining building performance. With this in mind, we recommend that developing and maintaining the secure statewide data infrastructure to support existing building performance be one of CEC's core functions as the program administrator. The state should be proactive in planning how data can be collected, cleaned, stored, and analyzed to support program implementation and continuous improvement. This careful planning will enable the data infrastructure itself to be developed as cost effectively as possible.

The CEC is already demonstrating leadership in developing the data infrastructure that is needed to help the state achieve its ambitious goals for building performance. The Efficiency Division already manages significant data initiatives including the Public Disclosure Database for the Building Energy Benchmarking Program[17], the Modernized Appliance Efficiency Database System (MAEDbS)[18] to support compliance with appliance standards, and Market Informed Demand Automation Server

[17] https://tableau.cnra.ca.gov/t/CNRA_CEC_PUBLIC/views/EnergyEfficiencyBenchmarkingDashboard/BenchmarkingDashboard?%3AshowAppBanner=false&%3Adisplay_count=n&%3AshowVizHome=n&%3Aorigin=viz_share_link&%3AisGuestRedirectFromVizportal=y&%3Aembed=y

[18] https://cacertappliances.energy.ca.gov/Login.aspx

(MIDAS)[19] to support load management standards. These projects demonstrate the CEC's existing and expanding capability to effectively undertake projects that maintain data initiatives to support program objectives. We commend CEC for embracing opportunities to offer data insights to decision makers. Continued investment in data products will not only allow CEC administrators to make data-driven decisions, but it could also help provide data insights to all parties who will play a role in improving the performance of existing buildings. The use case for data insights include:

- CEC analysts need reliable data to establish appropriate performance targets for each existing building.
- Building owners and managers would benefit from data that would help them identify how to meet performance targets for their property without a detailed energy audit. This data insight could also be the basis of prescriptive compliance pathways.
- Utilities and grid operators could query data for all buildings in a geographic area to gain insights on how building performance targets can impact electricity grid operations.

An intentional data strategy will allow the state to administer the multi-faceted program with the benefit of insights that are not otherwise possible. The state should not allow data that supports compliance with statewide regulations and programs to be disaggregated across jurisdiction because doing so would eliminate the possibility of statewide analyses and insights.

Developing and maintaining a reliable and secure data infrastructure requires specialized expertise. Since the data warehouse will include sensitive information, data security is also of utmost importance. The organization that collects and maintains the data should comply with the highest cyber security standards. CEC already adheres to these security standards, which is costly and associated with significant overhead. It would not be cost effective or practical to ask local jurisdictions to adhere to the cyber security requirements.

Finally, a statewide data infrastructure to support expanded benchmarking requirements and mandatory BPS could minimize the burden on utilities who will be tasked with providing accurate energy use data. With a statewide infrastructure, utilities could work directly with CEC staff to securely transfer meter data from buildings that are subject to benchmarking or mandatory BPS rules. This alleviates the burden of utilities working with multiple local jurisdictions thereby creating cost efficiencies and likely making it easier to minimize barriers associated with access to accurate meter-level data.

Developing detailed plans for data infrastructure should be one of the CEC's main priorities as the existing building performance strategy takes shape. We recommend the CEC seek public input when defining data needs. It is helpful to ask each market actor who will have a role in implementing the existing building performance strategy which questions they would like to have answered using data. Knowing the research questions in advance will allow CEC to create data schemas that will provide useful information to end users. To begin a dialogue on data needs, we offer that the statewide data infrastructure should include:

[19] https://midasapi.energy.ca.gov/

1. A **secure data warehouse** that houses structured and cleaned data. Entries in a data warehouse incorporate fixes to known errors, enables normalization and standardization, allow for fields to be derived easily, and allows analysts to form connections between different data sources. Information in the data warehouse could include:
    a. **Metered and submeter data from all existing buildings:** this data could be used to benchmark current performance, establish appropriate performance targets for each unique building, monitor progress towards meeting performance goals, and document compliance with the performance goals on an ongoing basis.
    b. **Building characteristics:** each building in the database should have an associated record that documents key information about the building that impacts the building's performance. Information may include: building type, vintage, climate zone, usage/ occupancy, etc. It may also be helpful to identify key design elements such as the type and age of the HVAC system, results of leakage testing, as designed/as built insulation specifications, etc. It is important to factor in building characteristics when determining appropriate performance targets.
    c. **Simulated energy performance from building upgrades:** Multiple organizations have used building energy modeling software to simulate how a variety of building upgrades could impact real buildings (e.g., AutoBEM[20]) or prototypical buildings that are representative of real buildings (e.g., ResStock[21] and ComStock[22]). These datasets could help analysts identify appropriate performance targets for buildings or recommend building upgrades to meet performance targets.
    d. **Equity overlays:** Data that provides information on equity metrics, such as information from CalEnviroScreen[23], should be included in the data warehouse to allow analysts to study how prospective mandatory BPS may impact buildings and people in environmental and social justice communities.
2. **Standardized reporting and visualizations** for various users such as building owners and managers, program administrators establishing appropriate performance targets for buildings, policy makers, those charged with verifying buildings achieved their targets, regulators, and program administrators. Each user group should have a defined level of access to information in the data warehouse. Reporting and visualizations should be easily accessible, and it should be possible to refresh reports as new data becomes available.
3. **Mechanisms to populate data warehouse.** Aggregating data from multiple sources into an organized and structured data warehouse will require planning and collaboration across multiple stakeholders. For example, it is likely that the data warehouse would include meter and submeter data from each building. Energy utilities have meter data and already have mechanisms in place to share meter data with CEC while protecting personally identifying information and maintaining data security. This meter-level data could be integrated into the

[20] https://www.ornl.gov/content/automatic-building-energy-modeling-autobem
[21] https://resstock.nrel.gov/
[22] https://comstock.nrel.gov/
[23] https://oehha.ca.gov/calenviroscreen

data warehouse. Alternatively, performance data could be populated through ENERGY STAR® Portfolio Manager or the Standard Energy Efficiency Data (SEED) Platform.[24] It may also be advantageous to include proprietary sources such as Acxiom,[25] ATTOM,[26] and CoStar.[27] For each data source, there needs to be a mechanism to collect and aggregate the data along with agreements that ensure data remains secure and only used in agreed-upon ways. The United States Department of Energy has invested in multiple software tools and data platforms that CEC could use as part of its BPS data infrastructure.[28] Currently, there are many disconnected tools that could be integrated to offer a simplified and cohesive data offering.

12. *Please submit any additional comments, issues, references, models, recommendations, or other information that you believe is relevant to the development of the California Building Energy Performance Strategy Report.*

Develop Workforce for Commissioning and Verification

Energy Solutions recommends that CEC invest in the state's commissioning and field verification workforce. An argument against more stringent verification of energy code provisions has been that the workforce in the state cannot support the additional requirements. There is little incentive for these industries to grow organically if there is little to no demand resulting from regulations. However, the success of a BPS program is heavily reliant on an adequate, well-trained, and competent workforce of building science experts to advise building owners and provide reliable evaluations of building performance.

Prioritize Continuity with Title 24, Part 6

There needs to be continuity between code requirements for new construction and the existing building performance strategy. At a minimum, buildings that are minimally compliant with Title 24, Part 6 should be capable of meeting building performance targets. Another suggestion is to strengthen mechanisms to transfer key information about the building assets at the time of new construction, so the information is readily available to building managers that are charged with maintaining building performance over time. One idea is to collaborate with ENERGY STAR Portfolio Manager so there are fields to capture information about the building assets at the time of initial construction and each time a permit is pulled for a major retrofit. Benchmarking programs throughout the country require building managers to use ENERGY STAR Portfolio Manager, so capturing key information about the building as-designed and as-built would make it easy for building managers and energy analysts to access this useful information as they endeavor to maintain or improve performance. Most of the useful information on the building assets (like the type and size of the HVAC and water heating systems, insulation U-factors, fenestration ratings, results of leakage testing, etc.) are documented within code compliance forms. CEC could also consider adding functionality to upload the final building energy modeling files for buildings that used the performance approach, so

[24] https://www.energy.gov/eere/buildings/standard-energy-efficiency-data-seed-platform
[25] https://www.acxiom.com/
[26] https://www.attomdata.com/
[27] https://www.costar.com/products
[28] https://www.energycodes.gov/BPS/Implementation

the code compliance models are available to building managers. If this information is available in Portfolio Manager, it could also be possible to aggregate information across multiple buildings and include the data in the data warehouse.

Accommodate Necessary Health and Safety Upgrades

Many existing buildings have issues that impact health and safety such as compromised structural integrity or mold. Addressing health and safety concerns that could lead to catastrophic failure or are associated with known illness should take priority over energy upgrades. When designing the building performance strategy, there needs to be a mechanism to identify and address major health and safety concerns first before holding buildings accountable for meeting energy or GHG targets. Buildings with health and safety concerns should not be de-prioritized. From an equity perspective, these buildings are in the most need for upgrades and pose a greater risk to occupants than buildings that do not have health and safety issues. While it may not be within the CEC's purview to address health and safety concerns, doing so is a necessary step towards improved energy or GHG performance. There needs to be a way to direct buildings that need health and safety improvements to the appropriate resources (financial and otherwise). For buildings with known health and safety concerns, perhaps the first BPS target could be related to addressing health and safety issues. For example, a building that needs structural repairs and mold abatement could have BPS targets documenting structural repairs and mold remediation. Once that initial target is achieved, an energy target should be established and enforced so that building occupants can experience both the additional health benefits and cost savings that will likely result from complying with a BPS target.

For all buildings, and for low-income housing especially, there needs to be appropriate controls to protect against sacrificing health, safety, or comfort to achieve performance targets.

ASHRAE Standard 100-2024 begins to address the relationship between maintaining building health and safety and maintaining building energy or climate performance. In the standard, regular maintenance of building systems including HVAC and water heating equipment is attributed to maintaining both building safety and energy efficiency.

Consider Embodied Carbon

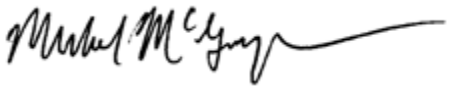
California's long-term existing building strategy should consider GHG emissions that are embodied in materials. Embodied carbon should be considered when deciding the timing of building upgrades such as equipment replacements and envelope improvements. Embodied carbon should also be considered when establishing policies that encourage entire buildings to be replaced. We encourage CEC to leverage existing work on embodied carbon including considering ASHRAE/ICC Standard 240P – Quantification of Life Cycle Greenhouse Gas Emissions of Buildings, which will establish mechanisms to quantify both he operational and embodied carbon emissions from buildings.

Conclusion

Thank you for the opportunity to offer suggestions for California's Building Energy Performance Strategy Report and for the opportunity to provide comments on the May 19, 2024 Building Energy Performance Strategy Report RFI. We support the CEC's efforts in equitably and cost efficiently

improving existing building performance, and we would like to remain engaged in the discussions as CEC develops the strategy.

Sincerely,



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