



Green Codes for California

**A progress report and recommendations
from the LEED & CALGreen User Group**

April 8, 2015

Authored and Facilitated by USGBC California and the U.S. Green Building Council.



About the U.S. Green Building Council

The U.S. Green Building Council (USGBC) is committed to a prosperous and sustainable future through cost-efficient and energy-saving green buildings. USGBC works toward its mission of market transformation through its LEED green building program, robust educational offerings, a nationwide network of chapters and affiliates, the annual [Greenbuild International Conference & Expo](#), the [Center for Green Schools](#) and [advocacy](#) in support of public policy that encourages and enables green buildings and communities. For more information, visit [usgbc.org](#), explore the [Green Building Information Gateway \(GBIG\)](#) and connect on [Twitter](#), [Facebook](#) and [LinkedIn](#).



About USGBC California

USGBC California represents thousands of sustainable economy professionals throughout eight California USGBC chapters. We bring a broadly-based, forward-thinking business voice to California policy discussions and endeavour to transform buildings and markets to enable a healthier, more equitable, and prosperous future for all. For more information, visit [USGBC-California.org](#).

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FOREWORD BY ANDREW MCALLISTER

For nearly four decades, California has set the bar for building design and construction standards that protect public health, improve energy efficiency, and save billions of taxpayer dollars.

In 1978, under Governor Edmund G. Brown Jr., California enacted the country's first comprehensive standards for building energy efficiency. Our building standards and other efficiency policies have played an important role in reducing Greenhouse Gas (GHG) emissions and have saved Californians billions of dollars in energy costs. In 2012, Gov. Brown continued the state's tradition of environmental and economic leadership by issuing a sweeping executive order that targets zero net energy consumption for state-owned buildings. Such high-level government leadership is critical if we are to achieve our long-term goals for energy resilience and environmental stewardship.

Recently, communities across the state have also begun to benefit from CALGreen, the first statewide green building code in the nation. CALGreen sets minimum environmental standards for virtually all newly constructed and renovated buildings. In essence CALGreen says that building green is a minimum expectation, enacted as a requirement in order to protect public health, safety and general welfare. California seeks to blaze a trail others can follow: establish a green building baseline in code, while also working very hard to encourage the many beyond-code health, safety, and environmental benefits that green building has to offer. Success will secure and enhance our future prosperity.

As you'll read in this report, the state has a robust, experienced community of green building professionals—including architects, engineers, contractors, building owners, manufacturers, business leaders and government staff—whose collective work is realizing the state's many policy goals for healthier, safer, more resource-efficient buildings for all Californians. These and other market participants innovate on the ground, demonstrating technologies and expanding possibilities in actual buildings. Government must certainly lead, by providing vision and a well-considered policy environment; and we depend on the marketplace to find progressive ways to make that vision reality.

CALGreen establishes a base level of environmental performance, but California's leaders in the private, public and nongovernmental sectors don't stop there. They continue to embrace green building rating systems such as LEED, which provide an important framework for exceptionally responsible stewardship and that also catalyze ongoing innovation, improvement and results.

At the national scale, a new partnership of buildings-focused organizations is embarking on a new endeavor to formalize alignment of portions of the LEED rating system with green codes.¹ As a result of this effort, the market should benefit from greater harmony between market drivers and green building guidelines. A similar, targeted effort is happening within California, where authors of this paper are also seeking to harmonize LEED documentation and requirements with California's green code.

The results we all seek are cost-effective ways to ensure and verify better-performing, safer, healthier and more sustainable buildings for everyone. The need to move forward is urgent: both we and generations of our descendants will occupy and utilize the buildings we create today, and will benefit from our success in building green. I very much appreciate the authors' contributions toward achieving that end.



Andrew McAllister is a Commissioner at the California Energy Commission. He oversees the Commission's energy efficiency efforts, including the energy-related codes and standards that apply to buildings and appliances.

¹ On August 21, 2014, USGBC, ICC, ASHRAE, AIA and IES announced a partnership to build a more intentionally coordinated green building code and align it with the content and objectives of LEED. See [USGBC press release](#).

PREFACE

There is a green code movement sweeping this country and, once again, all eyes are on California. With CALGreen, green building practices are no longer an optional feature or an upgrade: they are now code and thus fundamental to all construction in the Golden State.

Californians have a well-deserved reputation for being different. We may not all be movie stars or tech titans or hot chefs, but we seem to be pretty good at wisely using our resources. The average Californian uses half of the energy of their fellow U.S. citizens; there has long been broad consensus about energy efficiency that is now extending to water and waste; and more and more of us are concerned about the foods we eat, the health of our communities, and the adverse impacts of a changing climate. With this context as a backdrop, it was only a matter of time before green building practices became a fundamental part of the building code in California that seeks to protect the public health, safety and welfare of all Californians.

This paper summarizes observations, findings and recommendations from a group of green building practitioners seeking to answer several central questions about how codes and rating systems evolve and harmonize in California. The LEED & CALGreen User Group (User Group) represents highly skilled and dedicated professionals who understand that smart and environmentally responsible buildings are also good for business, local communities, and for California.

The User Group is not an exclusive club – there is no monopoly on good ideas and plenty of room for more involvement from experts throughout the many industries involved in building design, construction, supply and services. We hope you, too, will support your local green building community and support innovation from this new CALGreen baseline throughout your professional networks. Consider participating in national, state, and local dialogue on buildings policy, or joining membership organizations like Build It Green or one of the many USGBC chapters by taking part

in advocacy activities, training workshops, and local events.²

The work of the User Group and our peer reviewers does not stop here. In fact, our User Group has initiated a parallel effort (the LEED & CALGreen Task Group, see Appendix B) that is examining and proposing ways to align LEED with CALGreen (and vice-versa).

The User Group members concluded that, as professionals in the California building industry, we have an obligation to make sure our code is fair, forward-thinking and followed. Together, our industry must work to find ways to foster the same pride and effort in our respective fields of work that led to green building becoming standard practice in the state. As codes evolve, let us strive to build better while simultaneously making compliance easier and the requirements less complex.

Great green buildings and communities can and should be part of our legacy that protects the health, safety and welfare of all Californians. Let's take a renewed interest in our buildings and celebrate how far we've come, but recognize how much more work there is to be done to build a more prosperous, sustainable and equitable future.

Wes Sullens

Green Building Programs & Policy Manager,
StopWaste

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Chair, USGBC California

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Join Us!

Support your local green building community and support innovation from this new CALGreen baseline throughout your professional networks!

² Find out more at www.usgbc-california.org, www.BuildItGreen.org, or contact your local USGBC chapter in California: [California Central Coast](#), [Central California](#), [Inland Empire](#), [Los Angeles](#), [Northern California](#), [Orange County](#), [Redwood Empire](#) and [San Diego](#).

ACKNOWLEDGEMENTS

Special thanks are due to all who have helped excel green building in California and, in particular, to the User Group members who volunteered their time on this effort and shared their passion for making green building even better, greener, and more market-ready in California (Table 1).

Table 1. LEED & CALGreen User Group Participants

NAME	AFFILIATION	PERSPECTIVE
Loren Aiton	Teter Architects & Engineers VP, USGBC Central CA Chapter	Architect
Rick Fochtman	Bernards	Commercial Builder
Barry Hooper	City of San Francisco	Local Government
Thomas Lunneberg	Innovative Energy Solutions	Energy Engineer
Ryan McEvoy	Gaia Development	Green Building Consulting
Amy Rider	Sonoma Clean Power	Green Building Consulting
Rashmi Sahai	University of California Office of the President	Higher Education
Jeremy Sigmon (Staff Lead)	U.S. Green Building Council	NGO / National Green Building Policy
Corina Solis	U.S. Green Building Council	Interested Yale University Masters Student
Matt St. Clair	University of California Office of the President	Higher Education
Wes Sullens (Chair)	StopWaste of Alameda County / Vice-Chair, USGBC California	Local Government / CA Green Building Policy
Bill Worthen	Urban Fabrick, Inc.	Architect / Professional Education / Green Building Consulting
Courtney Yan	U.S. Green Building Council	U.S. Green Building Council & Green Building Certification Institute Liaison

In addition, we are deeply indebted to the group of expert peer reviewers who generously offered their comments and suggestions on early versions of this report (Table 2).

Table 2. CALGreen & LEED User Group Peer Reviewers

NAME	TITLE	AFFILIATION
Panama Bartholomy	European Director	Investor Confidence Project
Dan Burgoyne	Sustainability Manager	State of California, Department of General Services
Amy Dryden	Senior Technical Manager	Built It Green
Ron Fong	Principal	Ron Fong Consulting
Daniel Hamilton	Energy Codes & Standards Program Manager; San Francisco Bay Area Regional Energy Network	Association of Bay Area Governments
Josh Jacobs	Technical Information & Public Affairs Manager	Underwriters Laboratory
Doug Kot	Senior Consultant, Sustainable Buildings and Communities	DNV GL
David Kaneda	Managing Principal	Integral Group
Heather Klein	Planner III, Bureau of Planning	City of Oakland
Joseph Marfi	Director of Sustainable Design & Construction	Turner Construction
Brenden McEneaney	Director, Urban Resilience	Urban Land Institute
Peter Pirnejad	Director of Development Services	City of Palo Alto
Lynn N. Simon	Senior Vice President	Thornton Tomasetti, Inc.
Ted M. Tiffany	Associate Principal	Guttman & Blaevoet Consulting Engineers
Walker Wells	Green Urbanism Program Director	Global Green
Osama Younan	Chief of the Mechanical, Electrical & Green Buildings Division	Los Angeles Department of Building and Safety
Nehemiah Stone	Principal	Benningfield Group, Inc.

EXECUTIVE SUMMARY

In 2009, California adopted the nation's first statewide green building code. Four years later, the LEED and CALGreen User Group formed to see how it was going, and how to further advance green building in the state.

Four years after the California Green Building Standards Code (CALGreen) was enacted in 2009, the U.S. Green Building Council and eight California chapters, organized under the banner of USGBC California, convened the LEED & CALGreen User Group (User Group). This group of green building experts from across the state volunteered to share experiences, lessons learned, and ideas for improving and accelerating green building in California.

The User Group's goal was to look at how the implementation of California's green building code was unfolding and to explore how USGBC and its partners and networks, could ensure that California remains a global leader in high performance building design and construction. The User Group focused on the following key questions:

- ▶ How effectively is CALGreen being implemented at the local level?
- ▶ What challenges and opportunities does CALGreen present for California's building industry?
- ▶ What observations about the application of CALGreen and LEED in California can we share with green building practitioners in the state and beyond?
- ▶ What ways can LEED be enhanced to better complement projects in California that are subject to CALGreen requirements?

In answering these questions, the User Group found that CALGreen has been successful in expanding the opportunity and demand for green buildings products, services, manufacturing and associated industries. User Group participants agreed that CALGreen is helping move the state toward safer, healthier and more environmentally sustainable buildings overall, and also identified significant opportunities to make further improvements.

These include:

- ▶ Clarifying key provisions and code language to reduce ambiguity

- ▶ Developing uniform documentation, compliance, and enforcement procedures across jurisdictional boundaries
- ▶ Providing additional education about effective code implementation for building officials and design and construction professionals
- ▶ Optimizing the voluntary above-code measures in CALGreen (also known as CALGreen "Tiers")
- ▶ Streamlining documentation to reduce overlap in efforts to demonstrate compliance for LEED and CALGreen

The User Group further agreed that building codes could inspire project teams to innovate beyond code minimum requirements, such as by leveraging the capabilities of rating systems like LEED and GreenPoint Rated. These market driven rating systems act as accelerators for above-code benchmarks; becoming the proving ground for strategies that may become future code measures. The suite of essential green building practices now required by code in California allow rating systems to consider an evolving and complementary role to continue to drive the green building marketplace to higher performance levels. And the green code also makes achieving recognition from green building rating systems more accessible than ever (see sidebar on page 16).

This paper focuses on the nexus of opportunity in both CALGreen and LEED to help inform the next phases of greening California's buildings and communities. The paper and, especially, the Epilogue also point to some initiatives already underway to align CALGreen and LEED in California.

The intended audiences of this paper are several:

- ▶ Building professionals applying LEED on projects permitted in California under CALGreen.
- ▶ Rating System authors seeking ways to leverage the strengths of green codes.

- ▶ Code officials approaching green codes such as CALGreen or others and looking for additional perspective, support and resources.
- ▶ State agencies, policymakers and code development bodies considering new measures for the green code, or interested in improving compliance with an existing code.

Summary of Recommendations

After thorough exploration and analysis of the User Group’s findings, the following recommendations (reviewed in greater length in this paper) emerged as a means to build on past success and ensure a bright green building future for California.

Education & Outreach.

Recommendation: Expand publicly funded training programs (including utility rate payer programs for the California Energy Code) to include CALGreen content. To further meet training needs, associated training organizations and building industry groups should develop complementary education, resources and programming.

Funding for Enforcement.

Recommendation: Authorize increased funding for CALGreen enforcement and training. State lawmakers must hear from the building industry and local governments.

Code Clarity.

Recommendation: Strive for greater simplification and clarity in future California Building Standards Code updates (aka Title 24 of the California Code of Regulations). In the meantime, the state should develop additional guidance documents (e.g. on complex applications of the code) and resources (e.g. a central repository for commonly asked code questions and implementation issues).

Uniform Documentation.

Recommendation: Establish statewide agreement on CALGreen documentation. The California Building Standards Commission (BSC) and California Department of Housing and Community Development (HCD) should publish additional templates to promote greater uniformity for compliance documentation. Other organizations should supplement

these resources with additional documentation guidance and support.

A Plan for the Tiers.

Recommendation: Publish a clear plan for the future development and evolution of the CALGreen Tiers with input to BSC and HCD from local governments and industry.

Regional Adoption of Tier Criteria.

Recommendation: Coordinate adoption choices of CALGreen Tiers and amendments across regions and/or metropolitan areas to offer consistency for the market. City and county organizations like the Bay Area Regional Energy Network have convened ‘Codes & Standards Forums’ to engage as many public agencies as possible.³

Continuous Improvement.

Recommendation: Code officials, policymakers and state and local government should track industry trends and rating system development with a focus on learning how to encourage best practices and policies, and to embrace new technologies.

Model Code Alignment.

Recommendation: Agencies that propose and adopt new code requirements should look for opportunities to harmonize with model green codes where appropriate.

Get Involved.

Recommendation: Engage openly and actively in the code development process. Bring in other key stakeholders such as state agencies, professional organizations, and the public to ensure California building regulations meet the needs of all people in all communities.

³ The Bay Area Regional Energy Network hosts regular regional forums. These are half-day meetings in which elected officials, appointed policy board members, local building department Chief Building Officials and other leadership roles, and regional codes and standards advocates focus on high-level policy and program design issues on energy efficiency and energy code compliance. For more information, see BayREN.org.

INTRODUCING THE LEED & CALGREEN USER GROUP

In 2013, the U.S. Green Building Council (USGBC) and USGBC California convened a group of experts to participate in the LEED & CALGreen User Group (Table 1, page 6). These green building leaders have deep experience designing, building and operating LEED projects as well as facilitating compliance with the state's green building code. The User Group members volunteered their time attending a series of meetings convened by USGBC California to look at how the new code's implementation was unfolding.

In addition to their own in-depth discussions, the User Group also consulted with additional California green building experts to identify opportunities to streamline implementation and enforcement, improve code effectiveness, and accelerate the adoption of better, greener building practices. These peer reviewers volunteered their expertise to review these documents, and are listed in Table 2 (page 7). Though CALGreen applies to both residential and non-residential construction, the User Group focused primarily on the non-residential aspects of the code.

The User Group also considered what roles USGBC, its partners, networks and the broader California green building industry could play in improving CALGreen implementation and helping project teams meet and exceed the code's green building goals and requirements. The User Group recommendations are based on their collective experience in applying CALGreen on projects since its initial development in 2008. For an overview of CALGreen adoptions, the history of the code's evolution, and a gathering of resources created by numerous organizations in order to help with code compliance, see Appendix A.

Background: Green Building in California

For nearly four decades, Californians have redefined building codes to include innovative ways for buildings to be healthier, more efficient, and have a lower impact on the environment.⁴ Once fledgling, these efforts

⁴ The California Building Standards Commission hosts a timeline of milestones on its [web site](#) – spanning from the State Tenement Housing Act of 1909 that first addressed public health in California buildings to

have become increasingly central to statewide industries and policy, aided in large part by voluntary green building programs like LEED and GreenPoint Rated over the past 15 years.

Thus is the context for the emergence of CALGreen: the nation's first statewide green building code that went into effect in 2009. This was a pivotal moment for green building, as CALGreen sought not only to normalize green building activity across the state but also to extend its reach to every community. The LEED and CALGreen User Group was established to examine this new context and offer insights into how green building at and beyond the code can keep moving forward.

As CALGreen has raised the bar on minimum performance for green building, the state has not lapsed in its leadership role for green building and LEED project implementation. In fact, 2014 was a banner year for green building in California. A new set of building codes took effect that include an unprecedented level of mandatory green building requirements for nearly all projects. In addition, over 10,000 homes earned green certifications using voluntary ratings systems such as GreenPoint Rated and LEED. Non-residential LEED certifications in 2014 reached nearly 70 million square feet of space across almost 600 projects – by far the most total LEED certified projects in any U.S. state. Thousands more California homes and commercial buildings have achieved ENERGY STAR certification.

At a global scale, California is the most active green building marketplace in the Western Hemisphere^{5,6} with more than 440 million square feet of LEED-certified commercial real estate across more than 3,200 projects⁷ and over 43,000 GreenPoint Rated or LEED certified homes.⁸

the Warren-Alquist Act of 1975 that brought about the state's first energy code in 1978 and beyond.

⁵ See USGBC's [State Market Brief for California](#), accessed 2/1/2015.

⁶ See USGBC's announcement: [Top 10 Countries for LEED](#). May 5, 2014.

⁷ U.S. Green Building Council's [State Market Briefs](#), accessed 1/20/2015.

⁸ Courtesy of Build It Green and USGBC as of March 2015. View a map of GreenPoint Rated homes at [GreenPointRated.com](#).

In parallel with the code, a suite of leading policies and regulations⁹ help ensure that core green strategies are widely practiced and prioritized across the state.

This context makes California unique in its early commitments to regulating greener construction practice statewide. As other cities and states seek to set minimum expectations for green building, California's early experience with green building codes and their interplay with other policies and private sector programs serves as a noteworthy example from which others can learn.

USER GROUP FINDINGS

After nearly one dozen meetings over the course of several months, the User Group made several observations about the application of LEED and CALGreen in California's green building marketplace. The User Group's major findings are summarized in the following sections.

Prior Experience Leads to CALGreen Success

The User Group recognized that state and local government leadership has played an important role in paving the way for CALGreen and that government will continue to drive uptake of green building practices. State and local jurisdictions have been at the forefront of leading by example with green government buildings and also by setting a high bar for private sector leadership.

User Group members found that, in general, jurisdictions that had prior experience with green building codes and rating systems were better equipped to adapt to the new CALGreen requirements than those without prior exposure. Whether these jurisdictions already had green codes or had early involvement with LEED and other green rating systems like GreenPoint Rated, the User Group noted that these jurisdictions tended to understand the green building strategies better and also tended to have processes already in place for

⁹ On April 25, 2012, USGBC and USGBC California chapters released the [Top 10 Green Building Policies](#) – ten at the state level and ten at the local level – at USGBC California's annual [Advocacy Day in Sacramento](#).

verifying compliance. These localities appear to have developed the experience and knowledge needed to more effectively address CALGreen implementation and enforcement challenges.

Even in jurisdictions with few or no green building policies prior to CALGreen, the User Group found that private-sector experience with green building rating systems such as LEED and GreenPoint Rated has made green building strategies more familiar, accessible, cost effective and practical for designers, contractors and code officials alike. For professional firms that were early adopters of sustainable design and construction, the User Group noted that CALGreen has not had much impact on their practice, since their project teams were already familiar with many of the green measures now required by code.

Jurisdictions that had prior experience with green building codes and rating systems were better equipped to adapt to the new CALGreen requirements

Complementary Forces Driving Green Building in California

The User Group recognized that the regulatory and enforcement backdrop for California's design and construction industry provides substantial motivation and success in following the green building code. Besides the building code there are additional legal and regulatory levers that affect the construction industry and lead to greater compliance rates with CALGreen than may be apparent by looking at individual inspections or projects.

Professional Liability Aids Compliance

California's building code is typically updated on a triennial cycle, and members of the professional architectural, engineering, and general contractor communities are aware of their need to keep current with changes as they occur. Owners of buildings are largely responsible for knowing and following the building code, and therefore the onus of code compliance falls predominantly on the project team, with all parties expected to know and follow the most current standards of care and legal requirements.

Added to this professional obligation is the responsibility for oversight of code provisions on every project provided by public code enforcement bodies. This relationship for professional upkeep with codes—not to mention the threat of litigation for missteps—provides a significant assurance that professionals in all industries stay current with California’s continually evolving Code of Regulations. Implementation is not perfect, of course, but the User Group found that the overall depth and quality of compliance with CALGreen is on the rise, thanks to the complementary forces of professional liability and local enforcement.

Statewide Priorities Support Green Construction

Beyond the limited scope of CALGreen, a complementary set of statewide laws, targets, and other regulatory mechanisms support California’s broad environmental goals, objectives and mandates. These drivers affect the availability and legality of practices, products and technologies bought and sold in California. Many suppliers of building materials have no market for products that do not comply with state requirements, nor can consumers, for example, buy dirtier energy or install higher-flow fixtures than required by law. As a result, all permitted construction in California must follow a long list of high performance environmental criteria that are found in CALGreen. Many of these criteria were originally enacted outside of the building code. Such criteria include but are not limited to:

- Limits on Volatile Organic Compound (VOC) content in adhesives, aerosols, and architectural paints and coatings (as set by each of the 35 California Air Districts, since the mid-1970s)
- Water heating, HVAC, and other appliance equipment efficiency regulations since 1976 (per the California Title 20 Appliance Efficiency Regulations)
- Statewide waste diversion requirements for local governments, residents and industry (including California Assembly Bill 939 (1989) and AB 341 (2011))
- Limits on high-water using landscapes (Model Water Efficient Landscape Ordinance, originally AB325-1990 and AB 1881-2006)
- Particulate matter limits on wood-burning fireplaces (per California Air District standards since 1990)

- Carbon reduction mandates for regulated sources of emissions (AB 32, 2006)
- Water efficiency requirements for indoor plumbing fixture replacements (Senate Bill 407, Padilla, 2009)
- Formaldehyde limits in composite wood products (per the California Air Resources Board’s Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products, which have been in effect and ratcheting-up since 2009)
- Efficient lighting technologies and controls (as per California’s early adoption of Federal regulations beginning in 2011)
- A renewable portfolio standard for statewide Investor-Owned Utilities (Established in 2002 under Senate Bill 1078, accelerated in 2006 under SB 107 and expanded in 2011 under SB 2)

The User Group found that CALGreen implementation and enforcement (and the entire building code itself) benefits from this legal and regulatory backdrop in California. In addition to federal environmental laws and regulations such as the Energy Policy Act for water conserving fixtures, or federal appliance energy efficiency standards, these statewide pressures provide a level of assurance that—so long as laws are not being broken—basic sustainability criteria are incorporated into every permitted project in the state.

Optimism for Enforcement

User Group members concurred that since CALGreen measures became mandatory for most project types in 2011, enforcement consistency has improved, especially in jurisdictions that already had green building ordinances in place prior to CALGreen and where time and resources have been committed to prioritize the green code. The User Group expects to see more improvements in enforcement as building departments, designers, and contractors gain familiarity with CALGreen. Organizations such as CALBO, the International Code Council and USGBC chapters offer a variety of affordable education and training options throughout the state and online.

Academic studies have long touted the benefits of implementing building energy codes and standards, and green building programs and codes are a natural extension. In 2009, McKinsey & Company identified that the U.S.

buildings sector is responsible for more than \$130 billion wasted annually from leaky, inefficient buildings, and that building codes are one of the lowest-cost means for addressing the opportunity.¹⁰ A 2010 task force led by the Institute for Market Transformation found that every dollar spent on energy code compliance and enforcement leads to \$6 in energy savings.¹¹

In 2014, a study by UC Berkeley's Center for Resource Efficient Communities reported that energy codes result in a nearly 4-to-1 return to local governments from expenditures to enforce energy efficiency standards. The study also includes a number of recommendations of ways that local governments can increase compliance and enforcement effectiveness.¹²

The User Group observed that CALGreen, and the players involved in development and implementation, play an important part in the state's comprehensive efforts to reduce greenhouse gas emissions. AB 32 established strong carbon reduction goals on aggressive timelines that have produced myriad associated programs, policies and initiatives to attack the challenge from all angles, and essentially led to the formation of CALGreen. The efforts of designers, construction firms, code enforcement officials, building owners and managers are cogs in the wheel that help California's buildings effectively contribute to reducing emissions in the state via energy conservation, waste reduction, low-emitting materials, and water-energy impacts.

Of course, the User Group found areas where these many benefits of full code enforcement and compliance were not maximized. In particular, the User Group was aware of several key barriers that have effected how quickly and uniformly CALGreen is applied at the local level.

Barriers to Implementation and Enforcement

The User Group observed that, even though improving, the implementation and enforcement of CALGreen has not been

¹⁰ McKinsey & Company. July, 2009. "[Unlocking Energy Efficiency in the US Economy](#)."

¹¹ Institute for Market Transformation. October, 2010. Policy Maker Fact Sheet: "[Building Energy Code Compliance](#)."

¹² Eisenstein, W., Mazingo, L. September, 2014. "[Municipal Fiscal Impacts of Building Energy Efficiency in California: A Guidebook for Local Officials](#)." UC Berkeley Center for Resource Efficient Communities.

uniformly successful across the state. User Group members noted that this challenge exists for all parts of the building code, and is not unique to the green code. But for designers, contractors and building officials, the transition to CALGreen in particular has been complicated by the economic recession, government austerity, and the resulting stagnation in construction activity.

The constrained construction market during the early years of CALGreen slowed down the learning curve, providing industry with fewer opportunities to gain experience with the new code. In addition, resources and guidance on CALGreen enforcement also got a slow start. Key manuals were published well after implementation dates of the code. Software and trainings for the energy code also lagged. The continuously churning 3-year code cycle further exacerbates the challenges that building officials and design and construction teams face in trying to adapt to and optimize the use of California's green building code.

The constrained construction market during the early years of CALGreen slowed down the learning curve, providing industry with fewer opportunities to gain experience with the new code

Implementation Challenges for Design & Construction Teams

CALGreen requires improvements or modifications to a range of building components, systems, and fixtures. Therefore, the onus for ensuring that a project complies with the code falls heavily on design professionals and construction teams. However, the User Group reported a number of situations where professionals lacked the requisite knowledge and subsequently had difficulty meeting the new code provisions.

For example, some designers have mistaken CALGreen for a rating system and have sought final project sign off on CALGreen from green building professionals (like LEED consultants or GreenPoint Raters) rather than the local building official. In other cases, projects have been submitted without any acknowledgment that CALGreen was law, indicating that the project team was unaware of the new requirements. The more common areas of misunderstanding typically fall into two categories: practices required by CALGreen

with which project teams have little experience or applicability of requirements to technologies, materials or methods that don't fit neatly into the code's commonly understood scope. Measures like building improvements for noise pollution control, VOC compliance for finishes applied on site, parking lot marking for low emitting vehicles, stormwater pollution prevention measures, and building energy commissioning are a few of the many measures that came up in the User Group discussions as being sticking points for some project teams.

For projects to realize the many benefits of CALGreen measures, building elements must not only be designed and specified, but also be correctly installed or applied by construction professionals. Some examples include energy efficient equipment, controls, low-emitting products, and water efficient plumbing fixtures.

The User Group noted that the inspection process needs to better include CALGreen measures so that substitutions by contractors or technicians do not result in a failure to comply with code provisions. In many cases this failure is a result of some member of the construction team being unaware or improperly informed of the provisions in code that led to specific practices, products or controls being specified for installation. For example, in some cases, commonplace value-engineering or field change-outs could result in withholding a certificate of occupancy; a situation that places building inspectors in the precarious position of having to know the technical nuances of myriad code scenarios—at the risk of not allowing a project to be approved.

Even among professionals who have some experience with CALGreen, certain provisions may not yet be well understood. For example, by 2013, the code had not yet clearly defined what a qualified commissioning agent was or what the criteria were for qualified commissioning agents (those definitions came in 2014 when the 2013 version of the code came into effect). The User Group identified that this is due, in part, to the lack of an organized or regulated building commissioning industry. While some industries have rigorous credentialing and exams (like the National Society of Professional Engineers and their licensure program), building commissioning is not yet fully organized or regulated to a similar extent.

As a result, design and engineering firms responding to Requests for Proposals may have submitted commissioning plans that did not meet CALGreen requirements. In fact, this and

similar workarounds have become expected practice in certain jurisdictions due to a lack of clarity about the requirements for implementation. Although issues related to definitions and criteria for commissioning were largely addressed in the 2013 version of CALGreen, there continues to be a need for education and training to reach all design and construction professionals in the state – especially those who have limited or no green building experience – to ensure full and consistent implementation of the code.

Enforcement Challenges for Building Officials

California has some of the most extensive, sophisticated, and technically complex building codes in the world. The 2013 building code, for example, is comprised of 12 volumes and well over 5,000 pages. In addition, there are also several thousand pages of compliance manuals, appendices, forms, and referenced standards; not to mention the myriad local code variations and amendments.

Therefore, the implementation challenges identified by the User Group are, by and large, a factor of prioritization. Code officials must prioritize their limited time and resources during plan check and on-site inspections in order to enforce core life-safety elements of code. To optimize time and to also make room for oversight of CALGreen measures, California's building officials must be highly educated, well trained, and must also rely on experience and industry leading tools for streamlining verification and compliance of the building codes.

The following enforcement challenges were highlighted by User Group participants:

Too Many Codes... Too Little Time

Prior to the enactment of CALGreen, rating systems played a critical quality assurance role for project teams and building officials alike to validate green building strategies, performance outcomes, preferable product specifications, and quality construction practices. In jurisdictions that required LEED or GreenPoint Rated certification, for example, local governments could effectively outsource review of green building compliance to a credible entity or agency (like Build It Green or USGBC) at little or no cost to the jurisdiction.

This relieved building departments of the burden of having to develop, oversee and enforce compliance with green building measures. However, now that green building measures have been codified by CALGreen, building officials require additional time,

resources and training to effectively take on the enforcement and verification role (or to oversee the enforcement of outsourced code compliance experts, which is quite common in today's marketplace).¹³ For example, construction waste management plans used to be reviewed as part of rating systems like LEED, or were enforced by environmental service departments when required by city or county local ordinances. With CALGreen, however, the building code now includes a requirement for construction waste recycling, putting an area that was previously covered by rating systems or other municipal departments in the hands of the plan check and building inspections departments. This shift can take compliance verification out of the hands of review systems that were perhaps better equipped for oversight or better invested in the intended outcomes of compliance.¹⁴

Adding more inspection provisions to a code official's docket is a challenge in any code cycle, but adding to the complexity and frustration of many code officials was the delay of the 2013 energy code (Title 24, Part 6). With the exception of Part 6, which was delayed seven months, the full set of 2013 codes took effect on January 1, 2014. The delay came at the last minute; causing strain for several leading jurisdictions that were in the middle of revising their above-minimum energy code requirements.

The timing of the new code also added complexity for local governments. The recent economic recession in California resulted in layoffs and consolidation for many in the construction industry, including code enforcement professionals. Now that the economy is rebounding in many parts of the state and construction is once again on the rise, code officials face challenges in meeting new staffing needs and, all the while, are expected to maintain standards of care and consistency.

Smaller Cities Face Larger Barriers

The User Group observed that smaller cities, much like small design and construction firms, struggle to stay abreast of green building code updates. Many small or resource-constrained

inspection and permitting offices simply do not have the budgets or capacity to significantly incorporate CALGreen enforcement activities into their existing workload, train staff in green building practices, or effectively communicate constantly evolving code requirements to permit applicants.

Organizational hierarchy and building department structure can also be an obstacle. For example, the User Group noted that some jurisdictions do not review mechanical, electrical, or plumbing at plan check; and therefore compliance must be assessed in the field. In these cases, not every code section can be enforced adequately without increasing the number and type of inspections, which many jurisdictions are unable to do given limited staff and resources.

Doing More With Less Isn't Always Possible

The recession forced many building departments to cut staff or outsource entire service areas. The User Group noted that this made many core functions even more difficult, such as locating new reference materials and finding time for training. As a result, despite the fairly good availability of CALGreen educational resources, many code officials remain under-trained.

Compliance at Planning or Construction Phase?

CALGreen measures are often reviewed at the planning phase, limiting the ability of code officials to verify as-built compliance. During the plan review phase, there is often not enough detail in the drawings to be able to assess or verify CALGreen compliance. Yet by the time the building is in construction, it is too late to correct mistakes that happen in the field. As a result, many jurisdictions have little to no recourse for penalizing non-compliance beyond the heavy hand of withholding the Certificate of Occupancy (which some User Group members attested has been utilized) or, in some cases, withholding a performance bond or deposit.

Tiers

CALGreen's tiered structure has also made enforcement more challenging, according to some User Group members. The Tiers are confusing to builders and practitioners that work in multiple jurisdictions because the Tiers, if adopted at all, often differ from city to city. Although the Tiers were envisioned to allow a uniform way for local governments to go above code in a consistent manner, the fact that Tiers can be amended piecemeal when adopted by a jurisdiction has led to a patchwork of requirements. In addition, since projects will

¹³ For more information on effective code compliance strategies see: Meres, Ryan et al. "[Successful Strategies for Improving Compliance with Building Energy Codes](#)," published by ACEEE in August, 2012.

¹⁴ Some User Group members noted that several jurisdictions had kept their former review processes for things like construction waste recycling intact post CALGreen, which was considered a best practice.

rarely select the same combination of CALGreen Tier electives, the plans examiner and inspector must be familiar with all the different provisions as well as how combinations of green building measures in the Tiers may interact and impact compliance.

Green Codes Not Yet a Priority

As the construction market rebounds from the recession, construction is booming once again in parts of California, resulting in more permits being issued, and more plan reviews and inspections required. User Group members noted that some California cities with limited resources may be forced to balance the desire to welcome the renewed flow of tax dollars against the unpopular and constrained ability to raise fees for cost-recovery of enhanced code enforcement. As agencies welcome the economic recovery, the concept of adding more staff, inspection time and higher permit fees for green code verification may suffer relative to other priorities like restoring service to areas that lagged during austere times.

CALGreen Documentation

Documentation requirements for green building practices can vary from builder to builder and from city to city. Therefore, one of the greatest challenges to CALGreen implementation, the User Group found, is the inconsistency of documentation requirements. In some jurisdictions, an approved green building specialist can sign-off on a one-page CALGreen checklist to meet compliance expectations set by the jurisdiction. In these jurisdictions, the full suite of documentation for the CALGreen measures is rarely submitted to code officials because there is little incentive to thoroughly document compliance, even if the project team has kept detailed records. As a result, there is often little information in the project records of how certain provisions were met beyond a checkmark indicating that the building meets code. The User Group noted that best practice would be a common set of documentation guidelines that require designers to indicate clearly on the plans how each code provision was met, and provide a link to the drawing pages and specification sections where compliance can be verified.

As documentation requirements and procedures continue to evolve, many jurisdictions are working to better define and streamline compliance requirements. This will help by providing greater consistency in documentation and verification procedures.

One leading agency, the City of Los Angeles' Department of Building and Safety (LADBS), was one of the first jurisdictions to create an extensive series of forms for CALGreen documentation and compliance verification.¹⁵ LADBS' templates have been well received and widely copied by other jurisdictions. Further adoption by more jurisdictions could result in more consistent enforcement. Organizations like the AIA-California Council and Build It Green have also developed resources for CALGreen forms and checklists that are making documentation clearer and more consistent in the state.¹⁶

CALGreen Lowers Real and Perceived Cost of Building Green in California, Adds ROI

Green buildings have time and time again proven to be smart investments for their demonstrated ROI, market differentiation, and profitable premiums. Despite the overwhelming evidence, many are still convinced that green costs more.

A 2014 study prepared by UC Berkeley for the California Air Resources Board and Cal EPA found that LEED certified green buildings throughout the state use less energy and water, produce less waste, and require fewer car trips than traditional commercial buildings. These benefits make dollars and cents in any economy, and provide even greater benefit in California's cap-and-trade economy.

Thanks to the alignment between many CALGreen code requirements and credits in voluntary green building programs, projects in California can take advantage of lower marginal costs to achieve green building certification. This is true for both hard and soft costs as any effort or investment in technologies is incremental over CALGreen compliance, and the availability of green building products, professionals and services in California is sure to be competitive. Read more on this project in the Epilogue.

For more information see UC Berkeley's December, 2014 *release* of green building research, see [California's page](#) on the Green Building Information Gateway (GBIG) and also *GBIG Insight*.

¹⁵ See the "Green Building Related Forms" section of the Los Angeles Department of Buildings and Safety's website, <http://ladbs.org/LADBSWeb/green-bldg.jsf>

¹⁶ Search for CALGreen forms at www.aiacc.org.

Despite differences between specific requirements for CALGreen measures and LEED credits, many design teams use LEED forms as a template for CALGreen compliance documentation in the absence of any other guidance. In fact, this is an approved process in San Francisco, where LEED is codified as the compliance path for measures in CALGreen with significant overlap, and in San Diego, where LEED documentation is used to demonstrate CALGreen commissioning compliance.¹⁷

The User Group emphasized that the LEED documentation and certification process, while more stringent in most areas than CALGreen, does not serve as a *de jure* approval of compliance with the code. Several mandatory measures in CALGreen are not found in LEED, such as rodent proofing; grading and paving; and moisture control. Additionally, many of the voluntary/Tier measures are elective and may or may not correlate to similar LEED requirements. Furthermore, LEED documentation is typically only used if the building is also pursuing LEED certification because, for many measures, greater detail is required for LEED project documentation as compared with CALGreen documentation. Also, only project teams registered for LEED certification have access to editable versions of the LEED forms and templates. In Alameda County, guidance for demonstrating CALGreen compliance via LEED forms is provided in StopWaste's "CALGreen Companion Guide for LEED Projects." This document is intended only as a guide for project teams and code officials. While the Guide is not a substitute for full documentation, it has been used as a resource throughout the state.¹⁸

Impacts of Tiers and Local Amendments

CALGreen Mandatory code provisions are universally adopted in California's building code while the Tiers are available for voluntary adoption by local jurisdictions. The arrival of CALGreen Mandatory was an important policy step forward in communities where green building rating systems previously had little traction. Other communities have found the Tiers to be natural extensions of their existing

green building policies, thus the Tiers provided a means to align the code with more advanced local policies and sustainability goals.

For the jurisdictions that adopt them, CALGreen's Tiers have made above-code green building strategies simple to codify, thanks to a pre-set list of official Tier measures. Tiers also provide a convenient pathway to providing additional guidance for beyond-code leadership. While the Tiers can facilitate leadership, they also can lead to confusion by projects building green in California. For the 2010 code cycle, some 50+ jurisdictions adopted an additional CALGreen Tier, or portions of a Tier, and many of those jurisdictions also made changes to specific Tier measures.^{19, 20} One result of these local adoptions and amendments, the User Group found, is that CALGreen—unlike other portions of the state's building code—has significant variation throughout the state. While the Tiers exist within the code as a fixed menu of options in an appendix to the CALGreen code, almost all jurisdictions that adopt a Tier modify it in some manner. Therefore the Tiers facilitate a system of code irregularities across the state.

Trailblazing Localities

In a 2012 study of green building activity in California's 58 counties and 482 municipalities, Harvard University and Boston University researchers found that public sector investment in LEED led to a near doubling of private market uptake in those communities and a positive and important spillover effect on their neighbors.

Research in 2014 by the Georgia Institute of Technology reveals how green building rating systems serve as a competitive market signal towards higher levels of green building performance.* Leadership standards represent an opportunity for communities, practitioners, and policymakers to advance green building innovation and generate higher performance outcomes than would otherwise be possible with codes alone.

*Matisoff, Daniel C. et al. 2014. "[Performance or Marketing Benefits? The Value of LEED Certification.](#)" *Environmental Science & Technology* 2014, 48 (3), pp 2001-2007.

¹⁷ These cities also require that the CALGreen code mandatory measures are always followed and proven to the building official's satisfaction.

¹⁸ The 2012 version of the "CALGreen Companion Guide for LEED Projects" can be downloaded at www.stopwaste.org/calgreen.

¹⁹ Reference from the [AB 32 Scoping Plan \(update\)](#), 2014, page 83.

²⁰ Far fewer adoptions have taken place for the 2013 code, though an exact statewide number is not. In the Bay Area, 10 jurisdictions had adopted a Tier as of the publication date. See BayREN.org.

According to the User Group, local code variations can be burdensome for design and construction firms working in multiple jurisdictions. The adoption and adaptation of the Tiers also sends a mixed market signal about the state's minimum green building expectations. As an add-on to the code, the User Group observed that the Tiers blur the lines between code and above-code rating systems. Rather than an improved starting point for sustainability efforts in buildings, the Tiers may be causing some building owners and local governments to view CALGreen as a replacement for or an alternative to beyond-code leadership programs like LEED and GreenPoint Rated.

User Group members also expressed concern that beyond-code green building leadership is rarely incentivized in jurisdictions with CALGreen Tier requirements. In fact, it can be more difficult in some instances to comply with a CALGreen Tier while also seeking LEED certification. Unless a jurisdiction has enacted some streamlining provisions like by allowing LEED as an alternative compliance path to a Tier, such projects that seek a Tier and third party label have to double-up on documentation (and verification) of sometimes very similar requirements. And while overlap between Tiers and third-party programs exists, compliance with CALGreen Tiers does not generally equate to the outcomes that are expected of LEED-certified buildings.²¹ All of these factors, the User Group noted, can contribute to projects falling short of their full green building potential.

LOOKING AHEAD

As part of their discussions, User Group participants defined action items that could optimize green building outcomes and drive greater uptake of greener building practice. The actions focused on three major themes: improving the green building code, harmonizing LEED credits and CALGreen measures, and maintaining local leadership in an era of increasingly stringent statewide codes.

²¹ See www.stopwaste.org/calgreen for a comparison between the CALGreen Tiers and LEED v4.

Recommendations: Optimizing CALGreen

The User Group noted a number of critical areas where focused improvements could result in a more effective CALGreen code going forward. Each of these recommendations is folded into USGBC California's 2015 advocacy agenda and action plan.²² Listed in no particular order of priority:

1. **Education & Outreach.** Many firms and jurisdictions are eager for additional training on green building practices as they relate to CALGreen and how best to document and verify compliance. California's IOUs have excellent offerings for the California Energy Code, but much of the CALGreen content is not covered in these trainings and resources. Additional efforts could be made to provide localized training opportunities via existing networks and associations in which code officials already participate. In particular, the training of new testing bodies and third party inspectors will be an important new step for the enforcement of third party testing that is now mandatory. Some examples include acceptance testing, HERS, BPI and GreenPoint Rated inspections.

Recommendation: Expand publicly funded training programs (including utility rate payer programs for the California Energy Code) to include CALGreen content. To further meet training needs, associated training organizations and building industry groups should develop complementary education and programming.

2. **Funding for Enforcement.** As important as CALGreen code education, enforcement and oversight may be, local governments often remain constrained with limited resources. USGBC California is working with partners, local governments, and the state legislature to identify opportunities for enhanced funding for enforcement.

Recommendation: Authorize increased funding for CALGreen enforcement training. State lawmakers must hear from the building industry and local governments.

3. **Code Clarity.** Title 24, the state's code of building regulations, is both long and complicated. These factors contribute to challenges on both sides of the plan check

²² For USGBC California's 2015 advocacy agenda and action plan, and other news and updates, see www.usgbc-california.org.

counter to fully understand, implement and enforce the codes. In some cases, more detail is needed on the intent of some specific measures, and on how code measures apply to newly covered project scopes and types. For example, CALGreen requirements for a small one-room addition are written such that it triggers the full documentation of CALGreen for each element of the project in scope. However, few local jurisdictions will likely enforce such a requirement given their inspection priorities and limited review processes. Therefore, clarification about when and how to apply code provisions would help, especially on complex situations like additions/alterations or mixed-use projects.

Recommendation: Strive for greater simplification and clarity in future Title 24 code updates. In the meantime, the state should develop additional guidance documents (i.e. on complex applications of the code) and resources (i.e. a central repository for commonly asked code questions).

4. **Uniform Documentation.** Many of the measures in CALGreen do not have standard documentation forms. This results in a variety of different methods to document CALGreen compliance, adding a burden to all project teams and leaving jurisdictions without adequate guidance on documentation best practices. Uniform documentation would give a greater understanding of CALGreen compliance requirements and ensure more consistent reviews. This documentation could be in the form of a manual for design teams and building officials to ensure that all parties understand what is acceptable for documentation. Such guidance would especially benefit smaller building departments and smaller design firms. An updated CALGreen implementation guide for LEED projects²³ that addresses existing building renovations could also support this goal.

Recommendation: Establish statewide agreement on CALGreen documentation. BSC and HCD should publish additional templates to promote greater uniformity for compliance documentation. Other organizations should supplement these

resources with additional documentation guidance and support.

5. **A Plan for the Tiers.** The CALGreen Tiers can be a flexible, useful tool for jurisdictions that choose to use them, however, the mechanisms behind the Tiers are not well understood. Some say the Tiers are a holding place for measures that will become mandatory in the future. Others consider the Tiers a testing-ground for measures that are not yet (and may not soon be) ready for application statewide. Regardless, the Tiers are being utilized today as code requirements in some jurisdictions, making the current structure questionable as a place for experimental provisions. Therefore, local governments and the building industry would be better equipped for today's and tomorrow's code if the criteria for how Tiers are added and how existing Tier measures are evolved within CALGreen were clearly articulated.

Recommendation: Publish a clear plan for the future development and evolution of the CALGreen Tiers with input to BSC and HCD from local governments and industry.

6. **Regional Adoption of Tier Criteria.** While 30+ jurisdictions have adopted some form of CALGreen Tier requirements, no two are exactly alike. Local governments enjoy the flexibility of modifying CALGreen Tiers but the result is a patchwork of compliance requirements that differ across jurisdictional boundaries. Some jurisdictions are banding together to facilitate less variation across metropolitan areas. A coordinated effort in Sonoma County during the 2010 code cycle²⁴ resulted in nearly identical tier adoptions in every city in the county. The Bay Area Regional Energy Network has convened 'Codes & Standards Forums' to coordinate CALGreen tier adoptions by engaging as many municipal agencies as possible.²⁵

Recommendation: Coordinate adoption choices of CALGreen Tiers and amendments across regions and/or metropolitan areas to offer consistency for the market. City and county organizations like the Bay Area Regional Energy Network have convened 'Codes & Standards Forums'

²³ The 2012 version of the "CALGreen Companion Guide for LEED Projects" does not address existing buildings. Find it at www.stopwaste.org/calgreen

²⁴ View Sonoma County's green building code at: Sonoma-County.org

²⁵ See BayREN.org.

to engage as many public agencies as possible.²⁶

7. **Continuous Improvement.** Within the most recent two code cycles, California has set ambitious goals for zero net energy buildings, water conserving fixtures, and more integrated and web-based control systems. There have also been rising concerns about product safety, including more focused attention on building products that contain chemicals that can harm people or the environment.²⁷ Some green building rating systems are already rewarding strategies for outcome-based energy performance, and give points for product manufacturers that have screened and/or removed potential hazardous ingredients in products. Watching and following these rating systems is an excellent way for code officials and policymakers to experiment with the evolving landscape of regulating greener practices.

Recommendation: Code officials, policymakers and state and local government should track industry trends and rating system development with a focus on learning how to encourage best practices and policies, and to embrace new technologies.

8. **Model Code Alignment.** When California set out to create CALGreen, there were no model green codes in existence. However—following California’s lead—in 2011 the International Code Council published the first International Green Construction Code (IgCC).²⁸ Because California adopting agencies already reference various model codes (including those developed by ICC and IAMPO), drawing more directly from the IgCC in future updates would allow for greater consistency with industry best practice.

Recommendation: Agencies that propose and adopt new code requirements should look for opportunities to harmonize with model green codes where appropriate.

²⁶ Ibid.

²⁷ California passed the Green Chemistry Initiative in 2008 which created the [Safer Consumer Products](#) program.

²⁸ Included within the IgCC is the ANSI/ASHRAE/IES/USGBC *Standard 189.1 for the Design of High-Performance Green Buildings*. More about the IgCC and 189.1: [ICCSafe.org](#) and [ASHRAE.org](#).

9. **Get Involved.** If built upon successful examples of local government leadership, coordinated with statewide goals, and calibrated to match the continuously transforming green building marketplace, future versions of CALGreen could be even more effective at driving sustainability outcomes in California’s buildings. In order for this to happen, the code process requires the participation of more professionals, perspectives and advocates. Leading local governments, builders, designers, environmental advocates, and state agencies could be far better represented in the code update process.

Recommendation: Engage openly and actively in the code development process. Bring in key stakeholders such as state agencies, professional organizations, and the public to ensure California building regulations meet the needs of all communities.

Green codes provide a promising leverage point from which to drive innovation beyond minimum requirements.

Early Progress: AB 341 of 2013

Some of the ideas presented in the recommendations above have begun to be addressed via state legislation and code advocacy. One such action was a bill sponsored by USGBC California in 2013: Assembly Bill 341 (Dickinson/Gordon). AB 341 was signed by Governor Brown in October of 2013 and is now state law.²⁹ AB 341 has the potential to lead to a clearer and more consistent green building code via the following mechanisms:

- ▶ Allowing portions of CALGreen to be reprinted within other parts of building code as feasible, in order to provide consistency and promote a building code that is green throughout;
- ▶ Providing a process by which all state agencies that have expertise in green building subject areas can provide input during green building code updates; and

²⁹ Approved language of AB 341 (2013-14) can be found online at [LegInfo.Legislature.CA.gov](#).

- ▶ Requiring a process where authors indicate whether newly proposed green building standards should be considered for adoption as mandatory or voluntary green building standards in future code update cycles.

As part of USGBC California's 2015 advocacy agenda and action plan,³⁰ USGBC California is currently working with partners like the California Building Industry Association, Build It Green and state agencies to support the implementation of AB 341 within the 2016 code update process.

CONCLUSION

California is a global leader in designing, supplying, delivering and operating green buildings. A unique suite of policies and programs help ensure that green building is increasingly mainstream. CALGreen raises statewide expectations and helps make exemplary, beyond-code green buildings more attainable than ever before.

After a close investigation into the relationship between CALGreen and the market-based LEED rating system, the User Group identified significant opportunities for improvement. A set of recommendations seeks to enhance the effectiveness of the code and associated tools so that they better serve the end-user and also the state through its policy commitments to strong energy, health and environmental objectives.

To realize the potential of these insights and opportunities, USGBC California has incorporated these specific recommendations and actions into its advocacy agenda for 2015 and beyond. In addition, USGBC and GBCI are currently considering steps to make LEED even more attractive and compatible with this green code reality (read more in the Epilogue and Appendix B).

Perhaps the most significant take-away from this research was a sense that green codes provide a promising leverage point from which to drive innovation beyond minimum requirements. The User Group acknowledged that as implementation and enforcement of CALGreen improves, the need for leadership from local government and the private sector remains more relevant than ever. USGBC California and numerous other organizations are working hard to leverage the unique abilities of local jurisdictions to press forward, lead by example, and prove that greener buildings are practicable, possible, and profitable.

Green building will play a central role in delivering sustainability outcomes in line with state and community priorities. Only through continuous improvement can the green building sector play an evolving and positive role in combatting some of our planet's and California's most pressing environmental problems.

We stand at the precipice of a new frontier for green building, public policy, and increasingly sustainable communities. Join us in making a lasting legacy in California and beyond.

³⁰ For more information, see www.usgbc-california.org

EPILOGUE

As a direct result of the User Group's work, a task group was formed in 2014 to specifically address the alignment of CALGreen on LEED projects in California.³¹ This group, called the LEED & CALGreen Task Group, has developed extensive analysis of measures that are similar in both LEED and CALGreen for nonresidential buildings. The Task Group believes that a streamlined pathway for documenting LEED in parallel with CALGreen in California can not only improve compliance with the goals and objectives of the code, but also accelerate investments in beyond-code green building strategies, technologies and performance by boosting the uptake of LEED in the state. See Appendix B for more details on the Task Group and their progress to date.

Nationally, a similar alignment is taking place between the International Green Construction Code, ASHRAE, the AIA, IES, and the USGBC.³² Below is a status update on this follow-up project to pilot test how LEED alignment with green codes could work.

Alignment: A More Streamlined LEED for California?

While there is significant overlap between portions of LEED and CALGreen, the User Group highlights that green building codes are a best effort at defining the minimum accepted building sustainability measures. The challenge for beyond-code programs, then, is to continue to set a high bar for green building excellence and to make sure that bar gets higher with each new code iteration. Current trends in leading rating systems and local governments, for example, have focused on outcome-based policies; in which validation of actual building performance is equivalent to meeting prescriptive code requirements.

Rating systems like GreenPoint Rated, LEED, and the Living Building Challenge provide a framework to begin this important experiment towards outcome-based programs. In addition, rating systems ensure high quality validation that green building goals and desired outcomes

are met. LEED also allows recognition and tracking of practices that go beyond the construction process and extend into a building's operations and maintenance phase. Ratings systems like LEED for Building Operations & Maintenance address real estate operations and management practices, therefore better ensuring ongoing savings as compared to construction-phase codes or new construction rating systems that can typically only predict future performance.

It is important to note that LEED v3 (2009), available for project registration until October of 2016, references Title 24, Part 6-2005 as an alternate compliance pathway to the minimum energy efficiency prerequisites in LEED—registered projects are expected to be able to use LEED v3 up to five years after their registration date. Provided that project teams adequately document their building energy usage expectations through modeling, buildings permitted in California under the 2010, 2013, 2016 or the 2019 California energy codes inherently start with a considerable advantage on the scales used to measure building performance in LEED v3. In 2015, the LEED Steering Committee is investigating how best to update the globally-applied rating system in order to calibrate it with continually evolving energy standards like Title 24 part 6.

A recent comparison of LEED v4 and CALGreen 2013 (including the energy code, Title 24 Part 6) developed by StopWaste shows that CALGreen mandatory measures could contribute to earning between 15 to 25 LEED points.³³ While this is still shy of the 40 points needed for LEED v4's minimum level of certification, the overlap is significant. Without question, CALGreen gives projects a major boost towards meeting LEED certification as compared to buildings built in other states, especially as CALGreen complements the other forces driving green building in the state (see "Complementary Forces Driving Green Building in California" on page 11).

With this significant overlap in mind, the User Group investigated how LEED could be even better suited to help propel California buildings toward higher levels of sustainability achievements. Among the questions and ideas the User Group considered are:

1. **Strengthening CALGreen with LEED.** How can LEED facilitate better CALGreen code

³¹ See Appendix B for more information on the CALGreen Task Group.

³² In August of 2014, the USGBC, ICC, ASHRAE, AIA and IES announced a new coordinated alignment effort between green codes and LEED. See [USGBC press release](#).

³³ See the CALGreen Comparisons to LEED and GreenPoint Rated at www.stopwaste.org/calgreen.

compliance and also leverage CALGreen to strengthen rating systems like LEED?

2. **Streamlining LEED in California.** What guidance or processes could make LEED even more attractive for California projects? The User Group came up with these suggestions:
 - a. Allow LEED to better reference California-specific baselines where state law aligns well with LEED credit intent (like in energy, stormwater, product emissions, planning for recycling by occupants, etc.).
 - b. Identify which CALGreen and LEED measures are “functionally equivalent”.
 - c. While maintaining consistency and integrity, develop alternative documentation pathways in LEED for functionally equivalent measures, credits and prerequisites. These efforts would reduce both documentation time by project teams as well as review time by LEED reviewers, reducing costs for both, and making LEED certification even more attractive for California buildings.
3. **Strengthening LEED with CALGreen:** How can CALGreen serve as a test case for creating a more symbiotic relationship between LEED and codes?

Although no decisions have yet been finalized, the User Group has formed a Task Group to explore these ideas of LEED harmonization with CALGreen in depth. Look for further details at www.USGBCCalifornia.org.

APPENDIX A

A Quick CALGreen Overview

In 2008, California developed the country's first statewide green building code—the California Green Building Standards Code, better known as CALGreen. Importantly, CALGreen frames the environmental performance of buildings as a health and safety issue, pioneering the idea of green building as a foundational—rather than additional—component of a safe and healthy building or community. This focus on the sustainability of California's building stock directly aligns with many of the state's most urgent priorities related to water supply, air quality, energy, public health and population growth.

CALGreen occupies Part 11 of California's Title 24 Code of Regulations and consists of approximately 30 mandatory residential measures and 50 mandatory nonresidential measures (the actual number of required measures will depend on a project's scope of work). CALGreen also includes more than 150 pages of additional content, covering definitions, enforcement and administration, and voluntary green building measures.

The base level of the CALGreen code, often called "CALGreen Mandatory," is required on all occupancies and project types under the purview of the Building Standards Commission.³⁴ This means that nearly all permitted new construction or renovation projects must meet certain green building requirements.

CALGreen also includes additional measures that go beyond code minimums. These additional voluntary measures are organized in CALGreen in optional appendices, including some identified in "Tiers," or varying levels of attainment. Jurisdictions can opt to adopt and make mandatory individual voluntary measures,

³⁴ For the most part, nonresidential and residential construction is covered by CALGreen mandatory code provisions developed by Housing & Community Development (for residential occupancies) and the Building Standards Commission (for nonresidential occupancies). Several state agencies adopt and enforce the building standards for specialty building types—including public school construction, state owned buildings, institutional buildings, and hospitals—and these state agencies have similar but different guidelines and requirements than the Building Standards Commission's regarding CALGreen. See www.bsc.ca.gov for more information.

or even mandate a Tier level, if desired. The Tiers consist of a preset list of above-code measures in all categories of CALGreen. The Tiers include some mandatory requirements as well as a recommended set of additional measures that, when adopting a Tier, jurisdictions are able to modify in order to match local conditions or priorities. Both the challenges and opportunities created by the Tiers and their flexible adoption pathways are discussed in this report. For the 2010 code cycle, nearly 30 jurisdictions in California adopted above-code measures and/or the Tiers. For the 2013 code cycle, only a handful of jurisdictions have adopted the Tiers or other above-code green requirements.

On January 1, 2011, the 2010 version of CALGreen went into effect statewide for newly constructed single-family, low-rise multifamily, and nonresidential projects. As of January 1, 2014, all major occupancies and project types are now covered by CALGreen, including nearly all permitted additions, alterations, hotels/motels, high-rise multifamily, and all new residential and nonresidential construction. View the CALGreen code and state agency resources at:

- Residential Code: www.hcd.ca.gov/CALGreen.html
- Nonresidential Code: www.bsc.ca.gov/Home/CALGreen.aspx

CALGreen Resources

Since CALGreen came into effect, USGBC chapters and other professional organizations like the AIA, Build It Green, Green Technology, and the California Building Officials (CALBO) networks have provided workshops and resources to building officials, contractors, design teams, and policymakers. For example, the American Institute of Architects–California Council (AIA-CC), USGBC Northern California Chapter, StopWaste, and San Francisco Department of the Environment created resources³⁵ and comparison charts to illustrate the similarities and differences between commercial LEED rating system measures and CALGreen requirements.³⁶ Build It Green completed similar comparison documents for residential CALGreen and the GreenPoint Rated

³⁵ Find more at USGBC Northern California's [Green Building Codes Resource Center](#).

³⁶ Simon & Associates, Inc. et al. 2010. "CALGreen Non-Residential comparison to LEED for Building Design & Construction 2009."

program, and have folded-in many of the 2013 CALGreen measures into version six of their rating system.³⁷

In 2011, the Bay Area Climate Collaborative, with the help of StopWaste, San Francisco Department of the Environment and the USGBC-Northern California Chapter, released recommendations for leveraging CALGreen in local government policy.³⁸ USGBC and ICF also published a paper explaining the relationship between green building codes and voluntary, beyond-code, leadership programs like LEED.³⁹

More recently, with the enactment of the 2013 building code in 2014, StopWaste and its partners completed an updated comparative analysis of the CALGreen code and several prominent green building rating systems. The comparisons include:

- A quick overview of nonresidential CALGreen mandatory and Tiers as compared to LEED version 4 for Building Design & Construction.
- A detailed overview between CALGreen 2013 for nonresidential and LEED v4.
- Residential snapshots and detailed comparisons between CALGreen, GreenPoint Rated and LEED v4 for Homes.

These documents are available for download at www.stopwaste.org/CALGreen.

CALGreen remains the nation's most only statewide green building code. With several years head start, California and its green building policies, continue to lead the nation and teach others how to follow in its footsteps.

³⁷ See www.builditgreen.org.

³⁸ Bay Area Climate Collaborative. 2010. "[A Recommended Approach to California's New Green Building Code](#)."

³⁹ Burt, Lane, Jeremy Sigmon, Brian Dean and Charlie Haack. August, 2012. "['Green' Codes and Rating Systems: A Framework for Evaluating the Tools and the Measuring Sticks to Create Better Buildings](#)."

APPENDIX B

Introducing the LEED & CALGreen Task Group

As a direct outshoot of the Working Group’s efforts, another group of experts convened starting in summer of 2014 to investigate CALGreen and LEED alignment in more technical detail. Called the LEED & CALGreen Task Group, these experts volunteered their time to explore opportunities to reduce the hard and soft costs of documenting LEED for projects subject to CALGreen mandatory provisions.

In the winter of 2014-2015, the Task Group identified a list of credits that were functionally equivalent to the corresponding CALGreen measure and therefore particularly suited for streamlined LEED documentation. This initial list of credits include:

- WEp1 / CALGreen 5.303.2-3 (20% Indoor Water Reduction)
- EAp3 / CALGreen 5.508.1 & 5.508.2

- (Fundamental Refrigerant Management)
- MRp1 / CALGreen 5.410.1 (Storage & Collection of Recyclables)
- MRc2 / CALGreen 5.408.1-3 (Construction Waste Recycling)
- IEQc4.1 & 4.2 / CALGreen 5.504.4.1 & 5.504.4.3 (Low Emitting Adhesives & Paints)

Because of the substantially similar outcomes that both LEED and CALGreen seek to achieve with these credits and measures, the Task Group proposed an alternative documentation path. The CALGreen alternative documentation path was approved for this collection of credits by the USGBC LEED Technical Committee on March 30, 2015.

Further streamlining efforts are underway for additional LEED credits that have significant overlap with CALGreen measures. For more information and to get involved, [contact USGBC California](#).

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