



CODE ADVISORY COMMITTEE
Regular Meeting of the
Green Building Subcommittee

DATE: January 3, 2014 (Friday)
TIME: 9:00 a.m. to 10:30 a.m.
LOCATION: 1660 Mission Street, Room 6034

This subcommittee meets regularly on Friday before the second Wednesday of the month at 1660 Mission Street, Room 6034. If you wish to be placed on a mailing list for agendas, please call (415) 575-6832.

Note: Public comment is welcome and will be heard during each agenda item. Reference documents relating to agenda are available for review at the 1660 Mission Street, 1st Floor. For information, please call Kirk Means at (415) 575-6832.

AGENDA

- 1.0 Call to Order and Roll Call Members: Zachary Nathan, AIA, CASp; Arnie Lerner, AIA, CASp; Kevin Wallace; Ilene Dick; Henry Karnilowicz; Robert Wong, M.E.
- 2.0 Discussion and possible action regarding proposed revisions to Administrative Bulletin AB-093, Implementation of Green Building Regulations, as required to implement the 2013 San Francisco Green Building Code. The action would be to make a recommendation to the full Code Advisory Committee for their further action. (60 minutes)
- 3.0 Discussion and possible action regarding proposed updates to Administrative Bulletin AB-004, Priority Permit Processing Guidelines. The action would be to make a recommendation to the full Code Advisory Committee for their further action. (10 minutes)
- 4.0 Discussion and possible action regarding proposed updates to Administrative Bulletin AB-088, Collection and Storage of Trash, Recycling, and Compostable Materials, for conformance to the 2013 California Building Code. The action would be to make a recommendation to the full Code Advisory Committee for their further action. (10 minutes)
- 5.0 Introduction and general discussions regarding the San Francisco Green Building Cost Effectiveness Analysis study. (10 minutes)
- 6.0 Subcommittee Members' and Staff's identification of new agenda items, as well as current agenda items to be continued to another subcommittee regular meeting or special meeting. Subcommittee discussion and possible action regarding administrative issues related to building codes.



- 7.0 Public Comment: Public comment will be heard on items not on this agenda but within the jurisdiction of the Code Advisory Committee. Comment time is limited to 3 minutes per person or at the call of the Chair.
- 8.0 Adjournment.

Note to Committee Members: Please review the appropriate material and be prepared to discuss at the meeting. If you are unable to attend, please call Chair Zachary Nathan at (415) 701-0877 or Kirk Means at (415) 575-6832 as soon as possible.



INFORMATION SHEET **(INTERIM) ADMINISTRATIVE BULLETIN**

AB-093

DATE : Effective January 1, [2011-2014](#)
(~~Updated July 18, 2012. Supersedes prior versions based on code changes~~)

SUBJECT: Administration and General Design

TITLE: **Implementation of Green Building Regulations**

PURPOSE : The purpose of this Administrative Bulletin is to detail standards and procedures for the implementation of the Green Building requirements of ~~Chapter 13C~~ of the San Francisco [Green](#) Building Code effective January 1, ~~2014~~2011, ~~as well as the application of California Building Code Title 24 Part 11, Division 5.7, effective July 1, 2012.~~

REFERENCE : ~~2010-2013~~ San Francisco [Green](#) Building Code; San Francisco Administrative Bulletin 005: Procedures for Approval of Local Equivalencies, ~~Chapter 13C~~; California Title 24 Part 11; [San Francisco Environment Code Chapter 7](#).

DISCUSSION : Approved construction documents, and completed projects must conform to the Green Building ~~code~~ requirements ~~that are~~ established in ~~Chapter 13C~~ of the San Francisco [Green](#) Building Code, which combines all mandatory elements of the ~~2010-2013~~ California Green Building Standards Code (CALGreen) and stricter local requirements.

Herein, "~~specific~~ locally required measures" refers to [the combination of](#) prescriptive measures required as a consequence of adopting the California Green Building Standards Code, ~~with~~ local amendments, [and other relevant local requirements](#).

At various project milestones, particularly at the conclusion of construction, the Department of Building Inspection must verify that Green Building requirements have been met. Under these implementation procedures, the majority of verification is required to be provided to the Department of Building Inspection via a formal third-party certification under green building rating systems referenced in ~~Chapter 13C~~ of the San Francisco [Green](#) Building Code, or by a third-party licensed design professional.

Note: Future local, state or other regulations may change the scope and implementation of Green Building requirements. [Projects that submitted a complete application for building permit under prior versions of San Francisco green building codes must meet the requirements in effect at that time.](#) Project sponsors should verify that they are meeting all applicable code requirements, which may modify the standards and procedures addressed in this Administrative Bulletin.

IMPLEMENTATION:

Green Building Requirements to be Applied

Green building requirements of ~~Chapter 13C~~[the San Francisco Green Building Code](#) apply to all new construction in San Francisco, as well as certain ~~major alterations and additions and first-time tenant improvements~~. To identify the ~~specific~~ green building requirements which apply to a project:

- Use Attachment A Table 1 of this bulletin ~~summarizes to find~~ the overall green building standard (LEED, GreenPoint Rated, or '~~Specific~~ Locally Required Measures Only') that applies based on occupancy, project size, and whether the project is new construction or alteration. ~~Attachment A~~ Table 1 also identifies the submittal required in order to confirm compliance with local requirements.
- Attachment B consists of ~~three-four~~ tables that ~~itemize-summarize~~ specific required measures:¹
 - Table 1: Requirements for projects meeting a LEED standard
 - Table 2: Requirements for projects meeting a GreenPoint Rated standard
 - Table 3: ~~Specific~~ Local Requirements for all ~~other-types of non-residential~~ projects ~~which are not required to meet a LEED standard (includes certain new construction as well as certain additions and alterations)~~
 - Table 4: Local Requirements for residential additions and alterations

Mixed Occupancy Buildings

For mixed occupancy buildings where local standards reference a green building rating system (Attachment A, Table 1), the project sponsor may apply a single green building rating system to the entire building. Each portion of the building must meet the ~~Specific~~ Local Requirements applicable to that occupancy.

Applicability of Green Building regulations based on date of Building Permit Application

The date of applicability of these Green Building requirements is January 1, ~~2014~~2014. Application of the Green Building requirements is based on the date of submittal of a building permit application.

In the case of Site Permits, the effective date shall be the date that the Site Permit application (not an addendum) is filed with the Department of Building Inspection. Neither addenda to site permits nor revisions to permit applications received before the effective date of the ordinance will be required to meet the green building requirements, unless such site permit addendum or revisions change the scope of the project such that a project that would have been previously exempt from green building requirements would be covered.

However, San Francisco Building Code 13C ~~remains (2008) is~~ applicable to project applications received between November 3, 2008 and ~~January-December 31,~~ January-December 31, 20142013. For details, see the appropriate version of Administrative Bulletin 93: "Implementation of Green Building Regulations," as summarized in ~~Table 1~~ the following table below:

~~Table 1: Applicability of green building requirements based on date of application for building permit in San Francisco:~~

¹ Attachments are provided for reference only. For complete details on any specific requirement, refer to San Francisco ~~Green~~ Building Code ~~Chapter 13C~~.

Applicability of green building requirements based on date of application for building permit in San Francisco:

<u>Green Building Requirements</u>	<u>Effective Dates</u>	<u>See Administrative Bulletin 93 dated</u>
<u>San Francisco Building Code 13C (2008)</u>	<u>November 3, 2008 through December 31, 20104</u>	<u>September 4, 2008</u>
<u>San Francisco Building Code 13C (2010)</u>	<u>January 1, 2011 through July 17, 2012</u>	<u>January 1, 2011</u>
<u>San Francisco Building Code 13C (2010)</u>	<u>January 1, 2011 July 18, 2012 through December 31, 2013</u>	<u>July 18, 2012</u>
<u>San Francisco Green Building Code (2013)</u>	<u>January 1, 2014 through December 31, 2017</u>	<u>This bulletin</u>

For details, see the ~~September 4, 2008~~ version of Administrative Bulletin 93: "Implementation of Green Building Regulations."

PROJECT SUBMITTAL REQUIREMENTS

Screening of Building Permit Applications for Applicability

Attachment A, Table 1 should be used to determine which green building requirements may apply. Department of Building Inspection staff will screen all building permit applications to ~~determine~~ confirm which Green Building regulations apply, as summarized in Attachment A, Table 1. Every application for Site Permit subject to these regulations must include a copy of Attachment C-2 ("Green Building: Site Permit Submittal.") Permit applications for new construction projects will not be accepted for processing without ~~this form~~ Attachment C-2, and permit applications for addition or alteration will not be accepted without Attachment C-3, C-4, C-5, C-6 or C-7 as applicable. ~~It is recommended that Attachment C-3, C-4, or C-5 (as applicable) be additionally included with the first building permit submittal, in order to ensure green building goals and requirements are incorporated into the project as early as possible.~~

At the time of the first architectural or superstructure addendum, ~~for application for permit in the case of addition alteration~~—whichever comes first, the submittal package for all applicable projects must include a checklist incorporated into the project plans indicating the required green building—measures.² This checklist must reference, as appropriate, location of green building features in the submittal documents. The Green Building Submittal (Attachment C-3, C-4, ~~or C-5, C-6, or C-7~~) shall include this checklist, shall detail the specific green building requirements to be met, and shall indicate which addendum or other document will provide compliance details for each required performance measure or credit.

The Green Building Submittal may be reformatted as needed to conform to plan submittal size if all information is provided.

Compliance with the submittal requirements of Chapter 13C, Green Building Requirements, may be documented as met in any of the following ways:

1. Registration and submittal for certification under LEED. For buildings that propose to meet LEED standards, the permit applicant must provide submittal documentation showing that the

² Where Form 3 or Form 8 are used to apply for permit, such a checklist is also required for all applicable projects.

project will meet the appropriate LEED standards. See “Energy Compliance Guidelines for LEED projects” section below for details about energy compliance.

2. Registration and achievement of GreenPoint Rated status. For buildings that propose to meet GreenPoint Rated standards, the permit applicant must submit documentation showing that the project will meet the appropriate GreenPoint Rated standards.
3. Documentation of compliance with either LEED or GreenPoint Rated standards without registration and certification from those systems. The Green Building Compliance Professional of Record must provide submittal documentation showing that the project will meet the appropriate standards.
4. Registration and submittal for another rating system or documentation of equivalency as approved by the Director. For buildings that propose to meet such alternate standards, the Green Building Compliance Professional of Record must provide submittal documentation detailing compliance with the proposed standards.
5. Where neither LEED nor GreenPoint Rated is required, submit documentation of compliance with [Specific](#) Locally Required Measures in effect at the time of permit submittal, as indicated.

Green Building Compliance Professional of Record

For options 3, 4, and 5 above, the owner or owner’s agent must employ a Green Building Compliance Professional of Record who personally reviews and/or verifies, or directly supervises, persons who provide on-site review or verification of compliance with San Francisco [Green](#) Building Code [13C](#) requirements.

For compliance options 3, 4 and 5 above, ~~the Green Building Compliance Professional of Record may not be the Design Professional of Record, and~~ the qualifications for Green Building Compliance Professional of Record include a license or registration as an Architect or Engineer, and specialized understanding of Green Building standards and technologies:

- for LEED projects, such specialized understanding shall include LEED accreditation and successful completion of at least one LEED certified project
- for GreenPoint Rated projects, such specialized understanding shall include the GreenPoint Rater designation, or the project team shall include a person who is a GreenPoint Rater.
- For projects solely required to meet ~~Locally Required Measures~~, such specialized understanding shall include either: ICC Certified CalGreen Inspector certification, the GreenPoint Rater designation, LEED accreditation, or equivalent training and certification as approved by the Director.

For residential alteration and addition projects which increase total conditioned floor area of the building by 1,000 square feet or less, a Green Building Compliance Professional of Record is not required.³ In such cases, the applicant may complete the green building submittal.⁴ Note that in all cases, applicable green building requirements apply to the entire project, and are not limited to the area of addition.

The Department of Building Inspection may request verification of such training or experience and may make an administrative determination as to the qualification of a person to act as such a Green Building Compliance Professional of Record.

³ Projects which are “major alterations” to residential occupancy (with project area of 25,000 square feet or greater; and significant structural upgrade; and significant mechanical, electrical, or plumbing) continue to require either registration and certification, or verification by a Green Building Compliance Professional of Record.

⁴ Procedures for verification of compliance for small residential alterations are expected to be reviewed by June 30, 2014, and are subject to revision.

A Green Building Compliance Professional of Record is responsible for providing verification to the Department of Building Inspection that all Green Building design and construction requirements are met. Where a Green Building Compliance Professional of Record is responsible for verifying compliance with the requirements of [Chapter 13C of the San Francisco Green Building Code](#), and no third party green building certification is to be achieved, project documents may be reviewed in detail in plan review and inspection, at standard hourly rates for staff time.

Compliance Guidelines: Energy

~~The San Francisco Green Building Code 13C~~ requires building permit submittals to show that they meet, ~~and exceed by at least 15%~~ the compliance margin required by the applicable rating system, and the California Building Energy Efficiency Standards in effect at the time of permit submittal. In each case below, standard Title 24 Part 6 documentation must be prepared using software from the California Energy Commission List of Approved Computer Programs for the Building Energy Efficiency Standards. The following guidelines explain when additional calculations and documentation, ~~in addition to standard Title 24 Part 6 submittals~~, are required.

- Any buildings meeting a LEED for Building Design and Construction, or LEED Core and Shell standard under this ordinance must demonstrate energy compliance using one of the following methods: must prepare and submit all standard documentation required by the California Energy Commission to demonstrate compliance with the Title 24 Part 6 standard in effect on the date of permit application.⁵
 - Where the ASRHAE 90.1 option in LEED 2009 (or subsequent) rules are used to document 'points' are voluntarily earned for energy efficient design and construction, the supporting analysis must be submitted, and must include a detailed accounting of all on-site building energy use, including all exterior and security lighting, elevators, all process loads and receptacle loads. Documentation to be retained in the records of the project must include all information required for LEED certification by the Green Building Certification Institute.
 - Where %-less-than-TDV calculations based on the Title 24 Part 6 standard applicable to the project are used to document 'points' are voluntarily earned for energy efficient design and construction, the compliance margin cited in the CFR-PERF-1 submitted for compliance may be utilized without modification. Optionally, the GBO-PERF-1 (Appendix D) form may be used to adjust the TDV compliance margin by (a) accounting for on-site photovoltaic electric generation not otherwise included in Title 24 Part 6 analysis, and/or (b) excluding systems subject to mandatory requirements in the California Energy Standards.⁶
- Buildings meeting a LEED for Homes or GreenPoint Rated standard must perform the standard Title 24 Part 6 performance analysis using California Energy Commission approved compliance software, and submit documentation to demonstrate that the proposed building both:
 - Complies with the California Energy Efficiency Standards in effect on the date of application for building permit, AND
 - Meets the minimum energy efficiency requirements of the applicable green building rating system.

Where California Energy Commission approved compliance software is used to document the minimum energy efficiency requirements of the green building rating, all submittals related to compliance and the green rating system must be generated in the same compliance run. For example, for a GreenPoint Rated project, the compliance run number must be consistent throughout the entire compliance documentation package AND the GPR-1 compliance certificate.

⁵ LEED BD&C (2009) and LEED CS (2009) minimum energy efficiency requirements are less strict than California Title 24 Part 6 (2008 or 2013).

⁶ Where mandatory requirements apply under the California Energy Standards, the standard %-less-than-TDV calculation summarized in PERF-1 will exclude savings from substituting a more efficient design.

4. ~~During any period where the 2008 Title 24 Part 6 energy standards may be decreed by the California Energy Commission to remain effective after January 1, 2013 Perform the standard 2008 Title 24 Part 6 performance analysis and submit documentation to demonstrate that the proposed building uses at least 15% less TDV energy than the standard design, excluding exterior lighting, process and receptacle any loads not used by California Energy Commission approved compliance software in the course of the a %-less-TDV energy calculation. LEED-equivalent energy points for this calculation method are listed in Table 1. Attachment D, Supplementary Energy Compliance Documentation (PERF-1-GBO) is an example⁷ form that may optionally be used to document that the building uses 15% less TDV energy than the standard design after excluding any loads that are not used in calculating compliance.~~

OR

- ~~During any period where the 2008 Title 24 Part 6 energy standards may be decreed by the California Energy Commission to remain effective after January 1, 2013, using Using the published LEED 2009 rules, submit documentation to demonstrate that the proposed building has an annual energy cost at least 15% less than a LEED baseline building (2008 Title 24 Part 6 or ASHRAE 90.1-2007.) This analysis must include a detailed accounting of all on-site building energy use, including all exterior and security lighting, elevators, all process loads and receptacle loads. Documentation to be retained in the records of the project must include the full set of information required for Green Building Certification Institute for LEED certification.~~

OR

- ~~Projects must prepare and submit all standard documentation as required by the California Energy Commission to demonstrate compliance with Title 24 Part 6 (2013), and use the published LEED 2009 (or subsequent) rules to prepare and submit documentation demonstrating that the proposed building has an annual energy cost that meets the applicable minimum performance standard for a LEED baseline building (2008 Title 24 Part 6 or ASHRAE 90.1-2007, or subsequent as applicable.) This analysis must include a detailed accounting of all on-site building energy use, including all exterior and security lighting, elevators, all process loads and receptacle loads. Documentation to be retained in the records of the project must include the full set of information required for Green Building Certification Institute for LEED certification.~~

~~In each case, demonstration of compliance must include submittal of standard Title 24 Part 6 performance documentation to confirm compliance with the California standards in effect at the time of permit application using software from the California Energy Commission *List of Approved Computer Programs for the Building Energy Efficiency Standards*.~~

Compliance Guidelines: On-site Renewable Energy

The methodology used to calculate solar photovoltaic credit shall be the California Energy Commission PV Calculator (<http://www.gosolarcalifornia.ca.gov/tools/nshpcalculator/index.php>) or an SB 1 compliant calculator. Installation of solar PV systems shall meet all requirements specified in the "Guidelines for California's Solar Electric Incentive Programs Pursuant to Senate Bill 1" available at www.gosolarcalifornia.org

⁷The PERF-1-GBO form may be useful for occupancies where the California energy standards do not allow specific systems to be considered in performance-based compliance calculations. In such cases, for fairness, the applicant may optionally calculate the required 15% TDV energy compliance margin based only on the systems that contribute to performance-based code compliance. For example, in multifamily high-rise, residential unit interior lighting power density may also be excluded from the calculation of the additional 15% TDV compliance margin.

Compliance Guidelines: Construction Site Runoff Pollution Prevention

Construction site runoff pollution prevention requirements depend upon project size, occupancy, and location in areas served by combined or separate sewer systems. Projects required to meet a LEED standard (see Attachment A, Table 1) must - at minimum - prepare an erosion and sediment control plan (LEED prerequisite SSp1). However, more stringent local requirements may apply to any project, whether or not LEED is to be applied, such as a stormwater soil loss prevention plan or a Stormwater Pollution Prevention Plan (SWPPP). To confirm the construction site runoff pollution prevention requirements applicable to your project, please contact the SFPUC: www.sfwater.org/CleanBay.

Compliance Guidelines: Design for Post-Construction Stormwater Management

Projects that disturb 5,000 square feet or more of ground surface must meet local stormwater control requirements, ~~which reference the two relevant LEED credits (SS c6.1 and SS c6.2) as applicable determined by the San Francisco Public Utilities Commission, and. Such projects~~ must submit a Stormwater Control Plan to the San Francisco Public Utilities Commission for approval. The SFPUC has developed San Francisco Stormwater Design Guidelines to aid project teams in meeting local requirements for stormwater controls, which are available online at: www.sfwater.org/sdg.

Compliance Guidelines: Water Efficient Irrigation

Projects that include 1,000 square feet or more of new or modified landscape are subject to the San Francisco Water Efficient Irrigation Ordinance.⁸ Details are available online at: www.sfwater.org/landscape.

New Large Commercial Interiors and Major Alterations to Existing Buildings

The application of [San Francisco Green Building Code](#) Sections ~~43C-5.103.3~~ or ~~43C-4.103.3~~ to Major Alterations to Existing Buildings is based on a determination as to whether a “significant upgrade” is proposed to both the structural system and to one or more of the mechanical, electrical and/or plumbing systems in an area of 25,000 gross square feet or more in a Group B, M or R occupancy. For the purpose of enforcement of [the San Francisco Green Building Code Chapter 43C](#), a significant structural upgrade shall be determined to take place when a structural alteration takes place in thirty percent or more of the area of proposed construction. Areas to be counted toward the thirty percent include areas tributary to the vertical load carrying components (joists, beams, columns, walls and other structural components) that have been or will be removed, added or altered.

The application of Section ~~43C-5.103.1~~ to New Large Commercial Interiors requires that the first time tenant improvement work in an area over 25,000 square feet must meet the green building standards detailed in the ordinance. This requirement applies regardless of the date of construction of the building.

Historic Building Requirements for Historic Resources Based on Planning Department Determination

For purposes of applying the specific provisions of [Chapter 43C San Francisco Green Building Code](#) related to historic buildings, the Planning Department shall determine whether a building is an historical resource. This Planning Department review applies a standard based on the California Environmental Quality Act (CEQA) as to whether a structure is or might be considered an “historic resource”. Based on such information, the Green Building Compliance Professional of Record shall assure that submittal documents properly reflect the requirements of the [Ordinance Code](#).

Projects that retain, rehabilitate or repair significant historical architectural features may receive credit toward Green Building requirements, per Attachment A, Table 3.

⁸ The San Francisco Water Efficient Irrigation Ordinance is stricter than both the landscape irrigation efficiency measures in California’s Green Building Standards (Title 24 Part 11) as well as California’s Model Water Efficient Landscape requirements (AB 1881.)

Alternate Building Code Applicability Under the California Historical Building Code, Based on Department of Building Inspection Qualification

For buildings that are qualified to use the California Historical Building Code, project sponsors may apply the alternate provisions of that code. Buildings are determined to be qualified to use the California Historical Building Code upon specific request to the Department of Building Inspection. This broader standard differs from the determination of an “historic resource” by the Planning Department; determination that a building qualifies to use the California Historical Building Code does not classify the building as an “historic resource.” Buildings that qualify to use the California Historical Building Code include buildings that are on federal, state or local adopted lists or surveys, or buildings that are determined by the City to be eligible for such a list or survey, or buildings that have otherwise been determined by the City to be potential historic resources. The Department of Building Inspection coordinates with the Planning Department on the review of such requests for qualification. Alternate code provisions for historic buildings are to be applied on either a case-by-case, item-by-item basis, or, where specifically addressed in the California Historical Building Code, may apply to general provisions or alternatives.

Demolition

For a replacement building which is to be constructed on a site on which one or more buildings were demolished after the effective date of this ordinance, the Planning Department, during the course of permit review, shall confirm applicable Green Building requirements. Additional Green Building requirements for these projects may be found in Attachment A, Table 2.

Requests for Approval of Equivalencies

Project sponsors wishing to submit alternates or equivalencies for the specific requirements referenced in [Chapter 13C the San Francisco Green Building Code](#) or its referenced standards may do so as described in Administrative Bulletin 5, “Procedures for Approval of Local Equivalencies.” Note that related state and local requirements continue to apply, including but not limited to California Title 24 Part 11 Green Building Standards Code, SFPUC Stormwater Management Ordinance, and SFPUC Water Efficient Irrigation Ordinance.

1. With project submittal documents or at any later date, provide a specific request to use an alternate or equivalent method of compliance. Each alternative must be separately presented.
2. Requests must be accompanied by a complete analysis of the Green Building and other code-related issues, and must be recommended by and signed by the Green Building Compliance Professional of Record. The analysis must include calculations or other documentation for each specific element of equivalency confirming that the equivalent proposal meets or exceeds the requirements of the Ordinance.
3. The Department of Building Inspection staff will review the equivalency and may, at its discretion, request review by other City staff or outside professional persons who are expert in the matter under review. The project sponsor will be responsible for all additional costs incurred for such review, including review time by City staff, charged at the hourly rate as set forth in the San Francisco Building Code, or direct costs for other consultant review.
4. The Department of Building Inspection staff may request additional information as part of the review.
5. The Department of Building Inspection will issue a decision to approve, deny or require modifications to any submitted alternate or equivalency.
6. Project sponsors may appeal any decision to the Deputy Director, Director, and appeal bodies as detailed in the San Francisco Building Code.

Note that San Francisco [Green Building Code 13C \(2010/2013\)](#) recognized GreenPoint Rated v.2009-116 and all LEED v.2009 rating systems (see [13C-SFGBC 101.10](#)), and allows the application of more recent versions of these rating systems. ~~Therefore, n~~New residential projects ~~of any size of 4 stories and greater~~ may ~~therefore~~

utilize LEED for Homes Midrise, LEED BD+C, or GreenPoint Rated without triggering the above process for confirming equivalency. Similarly, major alterations to residential may use LEED BD&C, ~~or GreenPoint Rated Multifamily New Home, or GreenPoint Rated Multifamily Existing Home~~ to comply ~~with SFBC 13C~~, provided applicable local requirements are met.

Project Completion: Verification that Green Building Requirements are Met

Verification that green building requirements have been met requires either submittal of Attachment E, Green Building: Final Compliance Verification, or submittal of final certification as meeting LEED or GreenPoint Rated requirements, or both. **Final Compliance Verification documentation is required prior to final inspection.** Attachment E may be filled out in any of the following ways:

1. If the project has been submitted for certification under LEED, project shall provide documentation that Green Building Certification Institute has certified the project.
2. If the project has been submitted to be GreenPoint Rated, project shall provide documentation that Build It Green has provided a GreenPoint Rated certificate to the project.
3. If the project is built to meet LEED or GreenPoint Rated standards but will not be certified, then Attachment E must be signed by the Green Building Compliance Professional of Record.
4. If the project is built to meet specific locally required measures, then Attachment E must be signed by the Green Building Compliance Professional of Record.
5. If the Director has approved use of an alternate rating system, or documentation of equivalency as approved by the Director. For buildings that propose to meet such alternate standards, then Attachment E must be signed by the Green Building Compliance Professional of Record.

Temporary Certificate of Occupancy

A Temporary Certificate of Occupancy may be issued pending final compliance certification. However, no final Certificate of Completion may be issued until Green Building Final Compliance Verification (Attachment E of this bulletin) has been received, reviewed and accepted by the Department of Building Inspection.

Quality Assurance and Compliance Review

All projects are subject to comprehensive review by the Department of Building Inspection or its agents; all project sponsors must maintain comprehensive records to allow verification that all requirements have been met; buildings that receive certification through LEED or GreenPoint Rated will generally be accepted as being fully compliant. It is the intent of the Department of Building Inspection to undertake comprehensive review of a significant percentage of green building projects.

Failure to Comply with Green Building Requirements

Failure to meet all required Green Building requirements will subject a project sponsor to all of the enforcement and abatement remedies detailed in the San Francisco Building Code.

Originally Signed by:

Vivian L. Day~~Tom Hui~~, C.B.O., S.E. ~~Acting~~ Director
Department of Building Inspection

Date: ~~September 25, 2008~~December XX, 2013

~~Revision Signed by:~~
~~Tom C. Hui, S.E.~~ _____
~~Acting Director~~ _____
~~Department of Building Inspection~~
~~Date: July 25, 2012~~

~~Original version~~ Approved ~~approved~~ by the Building Inspection Commission on September 24, 2008; current revision approved on July 8, 2012 [Date]

- Attachment A, Table 1, ~~Green Building Ordinance: Summary of Performance Standards and Timelines~~Summary of requirements
- Attachment A, Table 2, Additional ~~R~~requirement if a ~~B~~building has been ~~d~~Demolished
- Attachment A, Table 3, ~~Reduced requirement for R~~etention of ~~s~~Significant ~~Historical-historical A~~rchitectural ~~F~~eatures
- Attachment B, Table 1, ~~Specific Local~~ Requirements for projects meeting a LEED standard
- Attachment B, Table 2, ~~Specific Local~~ Requirements for projects meeting the GreenPoint Rated standard
- Attachment B, Table 3, ~~Specific Local~~ Requirements for all ~~other non-residential~~ projects ~~(when not required to meet a LEED standard)~~
- Attachment B, Table 4, ~~Local~~ Requirements for residential additions and alterations
- Attachment C--1, ~~Instructions for Green building Green Building S~~ubmittals~~—Instructions~~
- Attachment C-2, ~~Green Building S~~ubmittal ~~sample template for~~ —LEED projects
- Attachment C-3, ~~S~~Green Building Submittal ~~sample template for~~ —GreenPoint Rated projects
- Attachment C-4, ~~S~~Green Building Submittal ~~for Sample template~~ — ~~Specific locally r~~Required measures for non-residential projects ~~(when not required to meet a LEED standard)only~~
- Attachment C-5, Streamlined Green Building Submittal ~~template~~ — ~~Streamlined required measures for interior non-residential alterations (only)~~
- Attachment C-6, Green building submittal for residential additions and alterations (when not required to meet LEED or GreenPoint Rated standards)
- Attachment C-7, Green building submittal for municipal projects~~Green Building Submittal template~~ — ~~Required measures for residential addition or alteration~~
- Attachment D, Supplementary ~~E~~nergy ~~c~~Compliance ~~d~~Documentation
- Attachment E, Final ~~c~~Compliance ~~v~~erification
- Attachment F, Recommended ~~p~~Project ~~i~~Implementation ~~p~~Procedures
- Attachment G, Selected ~~g~~Green ~~b~~Building ~~r~~Resources

City and County of San Francisco
**2013 San Francisco Green
Building Code**
Analysis of Cost Effectiveness of
Energy Requirements

Version 1 | October 17, 2013

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 214757

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Prepared for:

SF Environment
Our home. Our city. Our planet.

ARIIP



Job title	2013 San Francisco Green Building Code	Job number 214757
Document title	Analysis of Cost Effectiveness of Energy Requirements	File reference

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1 Summary

This report presents the results of an energy savings and cost-effectiveness analysis conducted for the City and County of San Francisco, examining the cost-effectiveness of energy efficiency requirements of the San Francisco Green Building Code (2013). The San Francisco Green Building Code (2013) consists of California Green Building Standards Code Title 24 Part 11 (2013), known as CalGreen, and stricter local requirements established for San Francisco in 2008 and updated in 2010.

This report summarizes the cost-effectiveness of energy efficiency requirements for new low-rise residential buildings in San Francisco (or any community located in "Climate Zone 3" as defined by the California Energy Commission.) It is limited to new low-rise residential because the proposed San Francisco Green Building Code (2013) would continue to require such projects to achieve 75 points in GreenPoint Rated and all GreenPoint Rated prerequisites – including a significant cost-effective compliance margin over California's Title 24 Part 6 Energy Standards consistent with this analysis. Build It Green has confirmed that the prescriptive package of cost-effective measures in this report will be accepted as one cost-effective way to meet the minimum requirements of GreenPoint Rated. In practice, projects would continue to have the option of meeting this requirement through a performance-based energy model prepared in California Energy Commission approved energy modeling software, which allows tradeoffs among measures, provided that the resulting designed will consume at least 10% less energy than a similar building which minimally complies with the code.

This report is a part of the application from City of San Francisco to the California Energy Commission (CEC). It is intended to meet the requirements specified in Section 10-106 of the Title 24, Part 6: Locally Adopted Energy Standards, as follows:

- (a) Requirements. Local governmental agencies may adopt and enforce energy standards for newly constructed buildings, additions, alterations, and repairs to existing buildings provided the Energy Commission finds that the standards will require buildings to be designed to consume no more energy than permitted by Title 24, Part 6.
- (b) Documentation Application. Local governmental agencies wishing to enforce locally adopted energy standards shall submit an application with the following materials to the Executive Director:
 1. The proposed energy standards.
 2. The local governmental agency's findings and supporting analyses on the energy savings and cost effectiveness of the proposed energy standards.
 3. A statement or finding by the local governmental agency that the local energy standards will require buildings to be designed to consume no more energy than permitted by Part 6.
 4. Any findings, determinations, declarations or reports, including any negative declaration or environmental impact report, required pursuant to the California Environmental Quality Act, Pub. Resources Code Section 21000 et seq.

This report is also the first part of a broader analysis of the potential for cost effective energy efficiency in new construction in general under the 2013 Energy Standards. SF Environment and the Department of Building Inspection will share results of the broader analysis as they become available, as well as technical analysis of LEED v4, which will be optional until at least July 1, 2015. SF Environment prioritized analysis of energy efficiency opportunities in low-rise residential for two reasons:

1. Energy modeling software approved by the California Energy Commission was not available until September, while it was necessary to finalize the draft code by July 2013 in order for the San Francisco Green Building Code to be effective January 1, 2014. The 2013 California Energy Standards are more than 20% stricter than the prior 2010 Energy Standards – so every

project built to the 2013 Energy Standards will be held to a higher efficiency requirement than projects subject to San Francisco's 2010 green building requirements.

2. The San Francisco Green Building Code as proposed would continue to require LEED for Building Design & Construction (BD&C) v2009 rating system (or LEED Core & Shell, etc.) for any applicable non-residential new construction project.¹ In all cases, all projects applying for building permit on or after January 1, 2014 must meet the 2013 California Title 24 Energy Standards. However, for purposes of additionally meeting San Francisco's green building requirements (which extend to many considerations in addition to energy efficiency), LEED BD&C v2009 continues to allow energy efficiency calculations based on ASHRAE 90.1 (2007) or CA Title 24 (2005).² As a result, California's Title 24 (2013) Energy Standards are significantly stricter than the minimum requirements of LEED v2009. However, GreenPoint Rated New Home and LEED for Homes are the two rating systems applicable to new residential buildings of 3 floors or less, and both require energy efficiency beyond code compliance.

2 Costs and Savings Analysis

2.1 Base Building Models

Arup is performing a comparative analysis of energy savings and costs using four representative building energy models. Four key building types – single family residential, multifamily, large high-rise office, and low-rise retail – were chosen as representative of anticipated new construction in San Francisco. The baseline models have critical attributes consistent with Title 24 2013, which will become effective on January 1, 2014. Key building characteristics are described in Table 2 in Appendix O.

2.2 Methods and Assumptions

Energy savings data was developed from energy modeling using an adapted version of EnergyPlus customized for the *Technical Feasibility of Zero Net Energy Buildings in California Study* (ZNE Tool), and cross-verified against results from Codes and Standards Enhancement (CASE) research done for Title 24 2013 development. Energy savings were estimated for a set of sample measures for each model in terms of the CEC approved 2013 Time Dependent Value energy (TDV). Energy and cost savings were scaled to a per-square-foot basis.

Incremental cost data was developed from existing CASE research, from RS Means, and from other sources where CASE data was not available. Cost data was scaled to a per-square-foot basis. Measures such as LED lighting, with long useful lives, were compared against the initial purchase price and eventual replacement cost of comparable equipment (such as a compact fluorescent lamp).

3 Results

3.1 Single Family and Multi-Family Residence

Table 1 shows the feasible energy savings measures beyond code that could be implemented in a low-rise residential building in San Francisco (CZ3). The analysis looked at both single family and multi-

¹ In the case of new high-rise residential, the San Francisco Green Building Code as proposed would continue to allow LEED BD&C v2009 or GreenPoint Rated as compliance options. For the reasons stated, projects that opt for LEED BD&C v2009 would not have mandatory energy efficiency requirements beyond Title 24 (2013) at this time.

² LEED v4 references ASHRAE 90.1 (2010), a substantially higher energy efficiency standard.

family prototypes. Percent savings are based off of a housing unit baseline energy consumption of 185,346 TDV kbtu. The group of measures is cost effective.

Table 1: Low-Rise Residence Energy Results

Prescriptive Measure List Description	Lifecycle Savings			First Costs	Lifecycle Benefit : Cost Ratio
	TDV kbtu	TDV Percent %	TDV \$/sq ft.	\$/sq. ft.	
Wall Insulation R-19 w/R-4ci, 2x6	2,321	1.3%	\$0.19	\$0.41	0.5
Showerheads 2.0 to 1.8 GPM	1,483	0.8%	\$0.12	\$0.02	5.1
Kitchen Sinks 1.5 to 1.4 GPM	556	0.3%	\$0.05	\$0.02	1.9
All Building LED High-Efficacy Lighting	4,887	2.6%	\$0.40	\$0.05	8.0
Natural Ventilation	3,707	2.0%	\$0.30	\$0.00	Large
Ducts in conditioned space*	1,199	0.6%	\$0.10	\$0.40	0.2
Reduced infiltration: 5 ACH50 to 3 ACH50*	4,032	2.2%	\$0.33	\$0.52	0.6
DHW Heat Recovery**	5,321	2.9%	\$0.87	\$0.22	4.1
Total Savings	23,506	13%	\$2.36	\$1.43	1.7

* Single Family Residential focused measures

** Multi-Family Residential focused measures

The package of measures in Table 1 represents one cost-effective path to attaining a substantial compliance margin over 2013 Title 24 Part 6 Energy Standards. Plumbing fitting flow rates, whole building LED high efficacy lighting, and natural ventilation are each anticipated to be afforded prescriptive credit toward the compliance margin due to limitations of commonly available compliance software.³ In practice, projects may meet the requirement via other design solutions, which could for example include improved efficiency of mechanical equipment, on-site renewable energy generation,⁴ or envelope improvements to Passive House standards.

3.2 High-Rise Office

High-Rise Office analysis is underway. Preliminary results indicate an energy efficiency compliance margin in excess of 10% is cost-effective. High rise residential will also be considered in this analysis.

3.3 Small Retail

Small retail analysis is underway. Preliminary results indicate an energy efficiency compliance margin in excess of 10% is cost-effective.

³ Prescriptive compliance credit would solely be applicable to the required compliance margin, not to minimum compliance with Title 24 2013 Energy Standards.

⁴ Photovoltaics and solar hot water heating have been recognized methods to meet San Francisco's supplemental energy performance requirements under the Green Building Ordinance since 2008.

A1 References

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http://www.energydataweb.com/cpucFiles/pdaDocs/904/California_ZNE_Technical_Feasibility_Report_Final.pdf
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http://www.energy.ca.gov/title24/2013standards/prerulemaking/documents/current/Reports/Nonresidential/Lighting_Controls_Bldg_Power/2013_CASE_NR_Retail_Tailored_Lighting_Oct_2011.pdf
- Codes and Standards Enhancement Initiative (CASE). Residential Increased Wall Insulation: 2013 California Building Energy Efficiency Standards California Utilities Statewide Codes and Standards Team. October 2011.
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- Codes and Standards Enhancement Initiative (CASE). Residential Lighting: 2013 California Building Energy Efficiency Standards California Utilities Statewide Codes and Standards Team. October 2011.
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http://www.energy.ca.gov/title24/2013standards/prerulemaking/documents/current/Reports/Residential/Water_Heating/2013_CASE_R_Shower_Heads_Sept_2011.pdf
- DOE Commercial Prototype Building Models. U.S. Department of Energy (DOE). Accessed October 2013. http://www.energycodes.gov/development/commercial/90.1_models
- National Renewable Energy Laboratory (NREL). National Residential Efficiency Measures Database. Accessed October 2013. <http://www.nrel.gov/ap/retrofits/measures.cfm>
- RS Means Online. Accessed October 2013. www.meanscostworks.com

Measure Description	Data Source	URL
Wall Insulation: R-19 w/R-4ci, 2x6	Residential Increased Wall Insulation: 2013 California Building Energy Efficiency Standards California Utilities Statewide Codes and Standards Team. October 2011.	http://www.energy.ca.gov/title24/2013standards/prerulemaking/documents/current/Reports/Residential/Envelope/2013_CASE_R_Increased_Wall_Insulation_Oct_2011.pdf
Showerhead: 2.0 to 1.8 GPM	Multi-Head Showers and Lower-Flow Shower Heads: 2013 California Building Energy Efficiency Standards California Utilities Statewide Codes and Standards Team. October 2011.	http://www.energy.ca.gov/title24/2013standards/prerulemaking/documents/current/Reports/Residential/Water_Heating/2013_CASE_R_Shower_Heads_Sept_2011.pdf
Kitchen faucet: 1.5 to 1.4 GPM	Original calculation.	
Ducts in conditioned space	Davis Energy Group research: SFD-Residential EEM Cost_v2.xlsx	
Improve indoor lighting from 50 lm/W to 100 lm/W	Measure Information Template – Residential Lighting, California Building Energy Efficiency Standards California Utilities Statewide Codes and Standards Team. March 2011.	http://www.h-m-g.com/T24/Lighting/draft%20presentations%202011.03.11/Residential%20Lighting%20%20Draft%20CASE%20Report.pdf
Natural Ventilation	Remove cooling load.	
Reduced infiltration: 1.8 SLA / 3.15 ACH50	National Renewable Energy Laboratory (NREL). National Residential Efficiency Measures Database. Accessed October 2013.	http://www.nrel.gov/ap/retrofits/measures.cfm
Drain water heat recovery added	Are potential savings going down the drain? – Clean Energy Resource Team. July 2013.	http://s3.amazonaws.com/zanran_storage/www.duluthenergydesign.com/ContentPages/2489554523.pdf http://www.cleanenergyresourceteams.org/blog/are-potential-savings-going-down-drain

A2 Baseline Building Models

Table 2: Representative Baseline Buildings for Energy Reach Code Analysis

	Single-Family Residence	Multifamily	High-Rise Office	Small Retail
Area (sq. ft.)	2,116	84,360	498,600	22,500
Dimensions	46 ft x 46 ft	152 ft x 56 ft	240 ft x 160 ft	300 ft x 75 ft
Number of Levels	1	10	10 + 2 basement	1
Walls	2'x4', 16" o.c., R-15 w/R-4 rigid c.i. U = 0.065	R-13.0 + R-7.5 c.i. U = 0.064	R-13.0 + R-3.8 c.i. U = 0.084	R-13.0 + R-3.8 c.i. U = 0.084
Window to Wall Ratio (%)	25%	14.9%	40% above-grade	10.5% over all 26% south-facing
Window	U = 0.32 SHGC = 0.25	U = 0.65 SHGC = 0.25	U = 0.65 SHGC = 0.25	U = 0.65 SHGC = 0.25
Skylight	None	None	None	None
Roof	R-30 U = 0.031	R-20.0 c.i. U = 0.048	R-20.0 c.i. U = 0.048	R-20.0 c.i. U = 0.048
Heating System	Gas Furnace	WSHP with CAV	Boiler Hot Water VAV	Gas Furnace
Cooling System	DX PTAC	WHSP with CAV	Water-Cooled Chiller Chilled Water VAV	Packaged SZ CAV DX RTU
Interior Lighting Power Density (LPD)	NA High-efficacy lighting mandatory in many spaces Dimming or vacancy sensor mandatory in many spaces	Apartment: 0.35 W/sf Corridors: 0.55 W/sf Weighted: 0.38 W/sf	1.0 W/sf	High Retail: 2.28 W/sf Mid Retail: 1.7 W/sf Low Retail: 1.3 W/sf Weighted: 1.64 W/sf
Interior Plug Load Density (EPD)	NA	Weighted: 0.80 w/sf	Office: 0.75 W/sf Weighted: 0.727 W/sf	1.0 W/sf
Exterior Lighting Power Density (LPD)	None	13.58 kW installed	60.216 kW installed	9.153 kW installed
Base Total EUI (kbtu / sq. ft.)	24.9	30.4	26.8	45.0



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