



# COMMUNITY DEVELOPMENT DEPARTMENT

Council Meeting Date: August 23, 2011  
Staff Report #:11-141

Agenda Item #: D1

**CONSENT CALENDAR: Waive the Reading of and Approve an Ordinance Adopting Local Amendments to the 2010 California Green Building Standards Code to Include Additional Sustainable Building Requirements**

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## RECOMMENDATION

Staff recommends that the City Council waive the full reading of and approve an ordinance adopting local amendments to the 2010 California Green Building Standards Code (Attachment A) to require:

- All newly constructed residential and non-residential structures currently subject to the 2010 California Green Building Standards Code (Cal Green) regulations to exceed the minimum energy efficiency standards established in the 2010 California Energy Code (Energy Code) by 15 percent;
- All newly constructed residential and non-residential structures currently subject to Cal Green regulations to test heating and cooling ducts for leakage; and
- All newly constructed residential structures currently subject to Cal Green regulations to install cool roofs or use alternative methods and materials to achieve equivalent energy savings.

## BACKGROUND

The State has developed and adopted Part 11 of the Building Standards Code known as the 2010 Green Building Standards Code or Cal Green which was adopted by City Council on December 14, 2010 and became effective January 1, 2011. Cal Green establishes minimum green building standards for the construction of new residential and non-residential structures to encourage sustainable construction practices. Cal Green does not currently apply to additions or alterations of existing buildings.

In an April 5, 2011 Council informational item, staff identified a two-phase approach to the adoption of local amendments to the State Code intended to enhance energy efficiency in newly constructed buildings beyond that provided by Cal Green. The focus of the first phase was to establish local sustainable building measures that provide significant beneficial environmental impact while balancing ease of implementation by the development community and staff. The proposed ordinance amendment currently

before the Council is the result of the first phase work effort. The second phase will focus on the exploration of additional sustainable building measures and includes an extensive community outreach component and participation by the Environmental Quality Commission. The adoption of an ordinance exceeding the sustainable building standards established in Cal Green is a strategy identified in the City's Climate Action Plan (CAP) assessment report which was approved by Council at the July 26, 2011 meeting.

The Council first reviewed the proposed ordinance amendment at its May 24, 2011 meeting and acted to introduce the ordinance. As part of the Council's action to introduce the ordinance amendment, the Council expressed an interest in additional outreach to the development community. Following the May 24<sup>th</sup> meeting, staff sent an email describing the proposed changes embodied in the local amendment to 36 architects, contractors and developers who frequently work in Menlo Park.

At its meeting of June 14, 2011, the Council considered adoption of the proposed ordinance amendment. In response to the outreach conducted by staff, six members of the community submitted a total of seven pieces of correspondence for the Council's consideration. Additionally, three members of the community spoke at the meeting. The comments ranged from support of the proposed ordinance to concern regarding individual elements of the proposal. Of specific concern was the proposed requirement for the installation of cool roofs. Following Council's consideration of the proposal and public comments, Council directed inclusion a change to the proposed ordinance that explicitly allows for alternative methods or materials to be used by applicants that would provide an equivalent level of performance as a cool roof. The revised language necessitated the reintroduction of the ordinance at a future meeting.

On July 19, 2011, the Council voted 4-0 with Mayor Cline absent to introduce the ordinance with added Council direction for staff to evaluate the bullet points provided by Sam Sinnott and to coordinate with Mr. Sinnott and potentially other architects to incorporate the suggestions. The four suggestions are as follows:

- Exempt residences with wood shake or shingle roofs that do not have heating or cooling ducts in the attic;
- Exempt residences with wood shake roofs that use radiant or hydronic heating and or cooling systems;
- Exempt residences with a radiant roof barrier or an added air space in a roof deck over the attic; and
- Exempt residences that meet tier 2 standards (30% rather than 15% reduction in energy usage) for overall energy efficiency.

## ANALYSIS

Staff has modified Section 12.18.050 of the proposed ordinance to include the language directed by the Council at its June 14, 2011 meeting. Although the proposed requirements for increased energy efficiency, duct-testing and cool roofs would remain as part of the ordinance, the new language explicitly allows for the use of alternative materials or methods that can demonstrate an equivalent performance to the requirement without having to comply with the specific requirement. When an alternative material or method is being proposed, reports providing evidence of equivalency are required to be supplied by a source that the Building Official finds to be reliable and accurate. The explicit inclusion of this language allows for the use of innovative ideas or technological advances which may not have been envisioned at the time of the drafting of the ordinance.

Staff has had further discussions with Mr. Sinnott regarding the recommended alternatives to mandating the installation of a cool roof presented at the July 19, 2011 meeting. The discussion focused on the function of a cool roof which is to both reduce energy consumption and reduce local air temperatures (sometimes referred to as the urban heat island effect). Cool roofs were first incorporated into the California Energy Code in 2007 to reduce air conditioning energy consumption during the summer and early fall. A cool roof's reflective surface keeps the roofing material surface temperature cooler which reduces the amount of heat transferring into the attic space and ultimately into the habitable area of a structure.

Staff's discussion included the explanation of the intent of including cool roofs in Cal Green which is to reduce the heat island effect in addition to the reduction of energy consumption. On hot, sunny summer days, the sun can heat dry, exposed urban infrastructure surfaces, such as roofs and pavement, to temperatures 50–90°F hotter than the actual air temperature. Urban heat islands are often weak during the late morning and throughout the day and become more pronounced after sunset due to the slow release of heat from urban infrastructure. The annual mean air temperature of a city with 1 million people or more can be 1.8–5.4°F warmer than its surroundings. On a clear, calm night, however, the temperature difference can be as much as 22°F according to the United States Environmental Protection Agency. The cooler roof surface temperatures reduce the amount of heat re-radiated into the air after sunset.

Elevated temperature from urban heat islands, particularly during the summer, can affect a community's environment and quality of life. Some impacts from heat islands include:

- Increased energy consumption: Higher temperatures in summer increase energy demand for cooling and add pressure to the electricity grid during peak periods of demand. One study estimates that the heat island effect is responsible for 5–10% of peak electricity demand for cooling buildings in cities.

- Elevated emissions of air pollutants and greenhouse gases: Increasing energy demand generally results in greater emissions of air pollutants and greenhouse gas emissions from power plants. Higher air temperatures also promote the formation of ground-level ozone.
- Compromised human health and comfort: Warmer days and nights, along with higher air pollution levels, can contribute to general discomfort, respiratory difficulties, heat cramps and exhaustion, non-fatal heat stroke, and heat-related mortality.
- Impaired water quality: Hot pavement and rooftop surfaces transfer their excess heat to stormwater, which then drains into storm sewers and raises water temperatures as it is released into streams, rivers, ponds, and lakes. Rapid temperature changes can be stressful to aquatic ecosystems.

The recommendations made by Mr. Sinnott at the July 19, 2011 Council meeting were reviewed by staff for determination of whether or not they meet the intent of the cool roof provisions of the ordinance and could be accepted as an alternate method or material. The recommendations to exempt newly constructed residences from the cool roof requirement if the heating or cooling ducts are not located in the attic, or use radiant or hydronic heating and or cooling systems, or meet tier 2 standards for exceeding the Energy Code (30 percent reduction in energy usage rather than 15 percent reduction in energy usage) address energy consumption but do not address the heat island effect and therefore could not be accepted as an alternate method.

The recommendation to use a radiant barrier under a wood roof could be accepted as an alternate method to the cool roof provision as this assembly reduces energy consumption and the heat island effect. A radiant barrier is designed to inhibit heat transfer into the attic space by thermal radiation keeping the attic space cooler similar to the reflective nature of a cool roof and addresses the reduced energy consumption component that a cool roof provides.

In order to analyze the recommendation to use a radiant barrier under a wood roof for its ability to also reduce the heat island effect, staff spoke with the Cedar Shake and Shingle Bureau (the Bureau) to better understand how a wood roof could meet the requirement of a cool roof. A wood roof does not meet the definition of a cool roof as specified in the Energy Code or Cal Green because the wood roof does not have the reflectivity required. The representative of the Bureau explained that wood roofs have not been approved as a cool roof because the testing criteria is designed to test the reflectivity of the roof only and a wood roof's surface is not reflective enough to meet the standards. However the Bureau contends that the combination of a wood roof's ability to stay cooler than asphalt shingle roof and its higher insulation value achieve the same or similar energy savings as a cool roof standard and should be accepted as one. The Bureau has provided a report that includes the results of a three year study performed in Wisconsin. The report demonstrates that the maximum hourly average temperature of wood shingles was 118.6 °F and the maximum hourly average temperature of white fiberglass shingles was 143.24 °F. Additionally, the State of Colorado's Department of

Energy list the R value of wood shakes as R-.97 and the R value of an asphalt shingle as R-.44. The R value is a measure of a materials ability to resist heat flow, therefore the higher the R value, the greater the resistance to heat flow.

The combined assembly of a radiant barrier and wood roof would meet the intent of a cool roof in that the radiant barrier and the cooler roof temperature of a wood roof reduces the amount of heat transferred into the attic space and re-radiated into the air after sunset. This assembly would achieve similar results to a cool roof in reducing heat island effect and, as stated above, could be accepted as an alternative method to a cool roof.

At the conclusion of staff's meeting with Mr. Sinnott, he expressed a greater understanding of the dual purpose of a cool roof and why several of his recommendations did not achieve both of the environmental benefits that a cool roof provides. However Mr. Sinnott does not think the environmental benefits due to the reduction of the heat island effect achieved by a cool roof are significant enough to warrant the mandating of their use and the energy savings a cool roof provides can be achieved in other ways. Mr. Sinnott recommended further discussions regarding the benefits of cool roofs and the inclusion of specific exceptions that can be used in lieu of a cool roof during the phase two amendment development process.

Staff's recommendation for adoption of the proposed local amendments is based on an effort to identify measures that will have a minimal impact to the development community while achieving greater energy efficiency in new buildings. The proposed measures are based on measures currently in use by the design and construction community, are required by both Leadership in Energy and Environmental Design (LEED) and Build It Green (BIG), are recommended additional measures in Cal Green, and are proven to reduce energy consumption and greenhouse gases.

Staff is recommending that the ordinance be adopted as written. However if Council continues to have reservations regarding the cool roof provisions in the ordinance, Council can elect to have that section of the ordinance removed and be included in the phase two discussions. The adoption process would start over with the re-introduction of the amended ordinance in September. Staff would like to note that during the phase two discussion the stake holders can recommend that the cool roof provisions be replaced with a different sustainable building element. Additionally all of the adopted amendments to Cal Green will have to be re-adopted along with the adoption of the 2013 Building Standards Code.

Upon action to adopt the ordinance by the Council, staff will forward the ordinance to the California Energy Commission for review and approval. Energy Commission review can take up to 90 days. If the Energy Commission approves the ordinance it would become effective 30 days thereafter. The requirements would apply to new buildings submitted for building permits after the effective date. Notification to the public of the additional measures will be made 30 days prior to their effective date by the posting of a

notice at the development service counter and on the City's web site. Additionally, handouts will be available prior to the effective date to explain the additional measures and provide guidance on implementation of the measures. Specifically, the requirements for cool roofs and alternative methods of meeting the requirements will be addressed.

## **IMPACT ON CITY RESOURCES**

The proposed phase one local amendments to Cal Green will not result in any significant costs to the City other than staff resources to process the ordinance amendment.

## **POLICY ISSUES**

The adoption of the proposed local amendments does not represent a change in City policy and is consistent with the greenhouse gas reduction strategy in the Climate Action Plan.

## **ENVIRONMENTAL REVIEW**

The adoption of the proposed ordinance is not a project that has the potential for causing a significant adverse effect on the environment and therefore is not subject to review under the California Environmental Quality Act (CEQA).

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Report Author

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## **PUBLIC NOTIFICATION**

Public notification was achieved by posting the agenda, with this agenda item being listed, at least 72 hours prior to the meeting.

## **ATTACHMENTS**

- A. [Ordinance No. \\_\\_\\_\\_\\_ amending Title 12 \(Buildings and Construction\) of the Menlo Park Municipal Code adopting amendments to The 2010 California Building Standards Code Part 11.](#)