City of Scottsdale

GREEN BUILDING RELATED CODE AMENDMENTS

International Residential Code
International Building Code
International Energy Conservation Code

July 17, 2007

Following is a summary of green building related amendments in the 2006 International Residential Code (IRC), International Building Code (IBC) and International Energy Conservation Code (IECC). The amendments are related to energy efficiency, indoor environmental quality (daylighting & air quality) and water efficiency (hot-water recirculation). They are part of an overall package of code amendments which were adopted by Scottsdale City Council on July 10. The effective date will be September 1, 2007.

INTERNATIONAL RESIDENTIAL CODE (2006 Edition)

1. Indoor Environmental Quality

Chapter 3, Building Planning
Revise Section R303.1 (Habitable rooms), Exception 2 to read as follows:

"2. With the exception of living rooms, bedrooms, kitchens, breakfast and dining rooms, the glazed areas need not be installed in rooms where Exception 1 above is satisfied and artificial light is provided capable of producing an average illumination of 6 footcandles (65 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level."

Note: The referenced "Exception 1" is part of the code that exempts openable windows when an approved mechanical ventilation system is installed.

Intent: This proposed revision would exclude living rooms, bedroom, kitchens, breakfast and dining rooms from the exception for providing artificial light in lieu of natural daylight.

It is widely acknowledged that natural sunlight is the most amenable light source for the human eye. In addition to the benefits of supplying substantial light for free, natural lighting has been shown to provide substantial physical and psychological benefits to building occupants. In recognition of Arizona's regional abundance of ambient daylight, the intent of this exception is to reduce the lighting energy load of dwellings during peak energy demand (early morning and late afternoon/early evening during summer) by making it possible to rely on natural sunlight for indoor illumination of habitable spaces during daylight hours.

Revise Section R303.3 (Bathroom ventilation) to read as follows:

"**R303.3 Bathrooms**. Bathroom, water closet compartments and other similar rooms shall be provided with aggregate glazing in windows of not less than 3 square feet. A mechanical ventilation system shall be required. The minimum ventilation rates shall be 50 cfm for intermittent ventilation or 20 cfm for continuous ventilation. Ventilation air from the space shall be exhausted directly to the outside.

Exception: The glazed areas shall not be required where artificial light is provided."

Intent: The intent of this proposed revision is to provide a means for year-round exhaust of moisture from the bathroom area. The unamended code allows an openable window to serve this purpose. However, in hot desert regions like the Scottsdale/Phoenix area, windows are rarely opened during the summer season, which can foster moisture and mold issues. An exhaust fan will provide for a healthy bathroom environment.

2. Energy Efficiency

Chapter 11, Energy Efficiency
Revise Section N1101.2 (Compliance) to read as follows:

"**N1101.2 Compliance**. Compliance with this chapter shall be demonstrated by passing REScheck energy compliance software with a score at least 15% above the IECC."

Intent: Due to our desert environment and the extensive use of glazing in a typical Scottsdale homes (over 15% of total wall area), compliance with REScheck energy compliance software is a flexible tradeoff measure for ensuring energy efficiency. REScheck evaluates building insulation values in relation to floor area, glazing area, building orientation and heating/cooling equipment efficiencies.

3. Mechanical Ventilation

Chapter 15, Exhaust Systems
Revise Section 1507.2 (Recirculation of air) to read as follows:

M1506.2 Recirculation of air. Exhaust air from kitchens, bathrooms and toilet rooms shall not be recirculated within a residence or to another dwelling unit and shall be exhausted directly to the outdoors. Exhaust air from kitchens, bathrooms and toilet rooms shall not discharge into an attic, crawl space or other areas inside the building.M1506.2 Recirculation of air.

Intent: This revision adds kitchens to the section, thereby requiring kitchen exhaust fans to exhaust directly to the outdoors. This contributes to good indoor air quality and a healthy indoor environment.

4. Water Efficiency

Chapter 20, Boilers and Water Heaters
Add new Section M2005 (Water Heaters):

"**M2005.5 Hot water recirculation pumps**. Provide a hot water demand controlled recirculation pump for water heaters located more than 20 feet from furthest fixture served. A manual control or occupant sensor switch shall operate the pump with an automatic temperature sensor shut-off.
Exception: Homes designed with a central manifold (home-run) distribution system."

Intent: Conventional plumbing layout ignores the waste of water caused by waiting for hot water to arrive at the point of use. The problem is compounded by the tendency in new homes to spread the bathrooms and kitchen over a wide area, often locating them in different wings. Waiting times are 10 to 30 times longer than they were 30 years ago (due to house size) and hot water distribution systems are generally less efficient. Demand controlled hot water circulation systems can result in a 20-30% reduction in water use and enhance the energy performance of water heaters. The recirculation pump needs to be controlled by the user at the time of use rather than circulating hot water through the piping system continuously. A switch or occupant sensor located near the fixture activates a small pump that begins circulating hot water when there is a demand for it. A temperature sensor at the fixture automatically turns the pump off.

INTERNATIONAL BUILDING CODE (2006 Edition)

1. Adminstrative

Chapter 1, Administration
Add new Section R102.4.1 (Referenced codes and standards):

"**R102.4.1 Green Building Program**. Provisions in the Scottsdale Green Building Rating Checklist shall apply as long as the project is enrolled in Scottsdale Green Building Program."

Intent: The intent of section (sec. 102.4) is to recognize other codes and standards for establishing minimum requirements to safeguard the public health and general welfare. The Green Building Rating Checklist becomes a requirement and enforceable by code (plan review/building inspections), as long as the project is enrolled in the program.

A project becomes officially enrolled in the program at the time of plan review submittal, receiving a special green building designation. Once a project is issued a building permit, all green building items are inspected like regular building code requirements. This gives the building inspectors the authority to stop a job for non-compliance. However, if a builder wants to withdraw from the green building program, revised plans (with removed green building items) must be resubmitted, undesignated and reviewed by the city building plan review staff at an hourly fee. During this process, inspections are on hold until approved revised plans are on site. The revised plan is logged in like any regular plan (non-expedited) and wait its turn for review. This could take 1-2 weeks and serves as a deterrent for builders to withdraw from the program.

Add the following item to Section R106.1.1 (Information on Construction Documents):

"**R106.1.1.2 Green Building Program Information**. For projects enrolled in the city Green Building Program, the plans shall include applicable provisions of the Green Building Rating Checklist."

Intent: The intent of this section is to make green building an integral part of the construction documents, thereby giving the city building inspectors the authority to enforce green building checklist items like building code items.

3. Energy Efficiency

Chapter 13, Energy Efficiency
Revise Section 1301.1.1 to read as follows:

"**1301.1.1 Criteria.** Buildings shall be designed and constructed in accordance with the *International Energy Conservation Code* with the following modification to Section 502.1.1 of the IECC.

502.1.1 Insulation and fenestration criteria. Building thermal envelope compliance (sections 502.2 and 502.3) shall be demonstrated by passing COMcheck energy compliance software with a score at least 15% above the IECC. Buildings with a vertical fenestration area or skylight area that exceeds that allowed in Table 502.3 shall comply with either the Total Building Performance provisions (section 506) of the IECC or the Building Envelope Trade-Off Option (section 5.4) of ASHRAE/IESNA 90.1"

Intent: Due to our desert environment and the extensive use of exposed glazing in commercial buildings, compliance with COMcheck or other energy analysis software is an effective means for ensuring energy efficiency and reducing carbon emissions associated with fossil fuel based electricity generation. COMcheck and energy performance tools optimize energy performance by evaluating building insulation values in relation to floor area, glazing area, lighting, building orientation and exterior shading.

This amendment is consistent with a similar amendment in Chapter 11 of the IRC for one- and two-family dwellings and townhouses.

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